



**REPORT OF AN ABORIGINAL HERITAGE
SURVEY OF THE DENMARK EAST
DEVELOPMENT PRECINCT: SHIRE OF
DENMARK, WESTERN AUSTRALIA**

*A report prepared for the LandCorp and the Shire of
Denmark*

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***Note:** This report, in terms of its assessment under section 5 of the Western Australian *Aboriginal Heritage Act 1972*, should be read in conjunction with the archaeological report by Harris (2016).

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MAPPING

Datum Used: GDA 1994 MGA Zone 50. Handheld GPS Unit Garmin 64 SX (+/- 10m)

GLOSSARY OF TERMS

The Proponent – LandCorp & the Shire of Denmark
The Consultant – Brad Goode & Associates Pty Ltd
ACMC – Aboriginal Cultural Material Committee
AHA – Western Australian *Aboriginal Heritage Act 1972*
BGA – Brad Goode & Associates Pty Ltd
CHMP – Cultural Heritage Management Plan
DAA – Department of Aboriginal Affairs
SWALSC – South West Aboriginal Land and Sea Council
WK – Wagyl Kaip WC1998/070 Native Title claim group

EXECUTIVE SUMMARY

LandCorp acting upon behalf of the Shire of Denmark is preparing plans and is facilitating compliance studies to meet all the necessary regulatory requirements for a proposal to construct a new bridge across the Denmark River and to upgrade 6.5km of Shire roads to service a proposed Industrial development adjacent to McIntosh Road. The project is hereby referred to as the 'Denmark East Development Precinct Project'.

To remain compliant with their obligations under the AHA, has commissioned Brad Goode & Associates Pty Ltd to conduct a Site Identification Aboriginal Heritage Survey for the proposed Denmark East Development Precinct project.

A search of the DAA Aboriginal sites and places register conducted on **7th July 2016** revealed that there is **one** registered Aboriginal Heritage site, Site ID 22081 Denmark River located within the development area.

Site ID 22081 Denmark River was determined to be **directly affected** by the project plans to conduct geotechnical drilling, clearing, and bridge construction on the Denmark River.

In terms of its significance Site ID 22081 Denmark River is a sacred site of spiritual, mythological and cultural significance, as well as a past and present resource for Aboriginal people. A specific mythology has been recorded about the creation of the river by the green python called *Mardjit*, who in turn was created in the Porongurup Ranges by the *Waugal* serpent who created the Swan River, connecting the *Mardjit* with Uluru. The *Mardjit* moved southwards creating water holes and rivers, including the Denmark River before coming to rest at a place called Quaranup. The Denmark River was also reported to demarcate the boundary between the *Minang* People of the south coast and the *Bibbulmun* People from the west, who both used the river as a traditional walking path. The river provided the Noongar people travelling along the route with food and water, as well as bush medicine and goods for trade, and enabled them to continue carrying out their roles as caretakers of Aboriginal Land or *Noongar Boojara*. This included carrying out ceremonies or Lore along their route, and traditional customary practices such as burning, hunting and the collection of different items for trade at coastal gatherings.

As a result of consultations held with several SWALSC selected members of the Wagyl Kaip WC1998/070 Native Title Claim group **no new** ethnographic sites of significance as defined by section 5 of the AHA were identified to be in locations where the proponent proposes to conduct geotechnical drilling, bridge and road construction within the Denmark East Development Precinct project.

In relation to Site ID 22081 Denmark River, the Wagyl Kaip WC1998/070 Native Title Claim group members consulted are prepared to **support** a section 18 consent notice to conduct geotechnical drilling, bridge and road construction as the work would have little effect upon the flow of the rivers waters and as the bridge is necessary to protect the town from fire events and to provide access to the infrastructure precinct planned at McIntosh Road.

In relation to ranking the 5 options for the bridge locations (see figure 13) it was advised that they all have the same value in relation to the effects that this work has upon the sacred beliefs held for the river, as the Rainbow Serpent (*Waugal* or *Mardjit*) is omnipresent in the entire river and is believed to be responsible for maintaining the river.

In terms of other values held the Wagyl Kaip WC1998/070 Native Title Claim group members consulted identified Option 3 then Option 1 as their preference for the bridge as these options provided the best environmental outcomes in relation to clearing of high value flora.

Option 3 was preferred over Option 1 as this required less clearing of mature Karri and in particular a large old tree at the apex of Ritchie Road and Riverbend Lane. Should an Arborist

report find that this tree has white ants that would limit its long term survival then Option 1 would then have a more equal rating with Option 3 as the preferred bridge location as it was formerly where an old bridge had existed and as such was seen to be already disturbed from this past activity.

As a result of the consultations the Wagyl Kaip WC1998/070 Native Title Claim group members consulted suggested that the new bridge be named 'Kwoorabup', the Noongar name for the Denmark River.

In terms of management of heritage values during construction the Noongar community requested that 2 monitors be appointed, 1 male and 1 female to monitor earth works for artefacts where the archaeologist identifies where there is potential for subsurface material to be located. Should artefacts be found they are to be professionally recorded by an archaeologist and then relocated to an appropriate place along the river by the monitors in keeping with the wishes of the elders who were consulted.

In terms of managing environmental values all requested that clearing of the corridor be kept to a minimum, that Cockatoo habitat and nest sites be avoided and that pollutants and siltation be managed at the bridge site during construction. The group also wished the social amenity of the rivers foreshore be maintained, in particular the walk trail along the eastern embankments.

As a result of the survey the following recommendations are made in relation to the Western Australian *Aboriginal Heritage Act 1972*:

It is recommended that the Shire of Denmark makes application under section 18 of the AHA for ministerial consent to use the land located within the DAA registered site, Site ID 22081 Denmark River for the purpose of geotechnical investigations, road and bridge construction and services.

As the Wagyl Kaip WC1998/070 NTC group members consulted are supportive of the project **it is recommended** that this consent is granted conditional to the bridge not having pylons in the river, conditional to having the bridge abutments as far back from the water as possible, and conditional to minimising clearing of high value flora in particular mature Karri.

It is recommended that the Shire of Denmark engage Noongar monitors during clearing activities at the bridge site and where the archaeologist recommends that potential exists for subsurface archaeological material to exist.

Should archaeological material be identified **it is recommended** that it is reported to the DAA (section 15 of the AHA) and that an archaeologist is called in to record such material and seek advice from the DAA in regards to approvals that are required before proceeding further. Any material subsequently recorded should then be relocated to another location along the river and not be removed from the area.

In relation to the bridge location the Wagyl Kaip WC1998/070 Native Title Claim group members consulted advised that they preferred Option 3 and Option 1. This advice was given in relation to environmental issues as opposed to cultural values. As such **it is recommended** that the Shire of Denmark give due consideration to this request.

In terms of other issues **it is recommended** that:

- The new bridge is named 'Kwoorabup', the Noongar name for the Denmark River;
- That clearing of the corridor be kept to a minimum;
- That Cockatoo habitat and nest sites be avoided;
- That pollutants and siltation be managed at bridge sites during construction;
- The social amenity of the rivers foreshore maintained in particular the walk trail along the eastern embankments.

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REPORT

Report of an Aboriginal Heritage Survey of the Denmark East Development Precinct: Shire of Denmark, Western Australia

ISSUE

LandCorp acting upon behalf of the Shire of Denmark is preparing plans and is facilitating compliance studies to meet all the necessary regulatory requirements for a proposal to construct a new bridge across the Denmark River and to upgrade 6.5km of Shire roads to service a proposed Industrial development adjacent to McIntosh Road.

The proponent wishes to determine if there are any sites or places of Aboriginal heritage significance as defined by section 5 of the AHA that will be affected by this proposed work thereby fulfilling their obligations under the Western Australian *Aboriginal Heritage Act 1972* (AHA).

REPORT OBJECTIVES

To report on archival research in order to determine if there are any previously recorded Aboriginal Heritage sites or places that will be affected by the above project proposal.

To report on consultations held with representatives of the Wagyl Kaip WC1998/070 Native Title Claim group in order to determine if any new Aboriginal Heritage sites or places will be affected by the above project proposal.

To report upon management recommendations should any sites or places of Aboriginal heritage significance as defined by section 5 of the AHA be identified to be located within the project areas.

To report upon any recommendations and/or the significance assessments of the sites or places should the proponent be required to make application under section 18 of the AHA for consent to use the land that may contain an Aboriginal site.

BACKGROUND

On 13th May 2016, Mr Robert Fenn from (Senior Development Manager) from LandCorp made contact with Brad Goode & Associates Pty Ltd to enquire if they could provide a fee proposal to conduct a Site Identification Aboriginal Heritage Survey for the proposed Denmark East Development Precinct project. On the 23rd of June Mr Fenn advised the consultants that BGA were the successful tenderer and supplied the authority to proceed in line with the requirements of the NSHA signed between the proponents and SWALSC.

Mr Fenn advised that the Denmark East Development Precinct project would involve the construction of a new traffic bridge across the Denmark River, the construction and upgrading of 6.5km of local roads (primarily East River & McIntosh Roads) and intersections. Mr Fenn stated these road upgrades are needed to facilitate the creation of 6 Industrial lots within the McIntosh Road Industrial Estate in the short term and to accommodate local traffic movements from future residential growth to the north of the Denmark townsite in the longer term. The second bridge can also provide the town within an alternative crossing of the Denmark River in order to prevent the town's population being trapped should a major fire event affect the current town's bridge on the South Coast Highway. (see Figure 1: Location page).

Mr Fenn advised the proposed new bridge location across the Denmark River is yet to be settled due to a number of planning constraints. As such the consultants were asked to consider up to

five proposed locations for a new bridge and associated road construction and realignments to the bridge approaches. Mr Fenn advised that the survey should also take into consideration geotechnical drilling requirements on the bed and embankments of the river to inform engineering design.

Mr Fenn stated that the consultants were required to seek the Wagyl Kaip WC1998/070 Native Title Claim group support for the necessary consent notice under section 18 of the AHA and to identify the most appropriate bridge location in terms of minimising the affects that the project would have upon the cultural values held for the Denmark River.

As a result of the above scope of work Mrs Jacqueline Harris (archaeologist) and Mr Wayne Webb (Traditional owner) conducted a pedestrian inspection of the project options on the 9th & 10th July 2016. Mr Brad Goode (anthropologist), Ms Jacqueline Harris and Ms Lisa Butcher (ethnographic assistant) conducted consultations with 12 SWALSC elected members of the Wagyl Kaip WC1998/070 Native Title Claim group on the 31st August 2016.

Mr Robert Fenn (Senior Development Manager) from LandCorp and Mr Jeff Folly from GHD Pty Ltd (Manager Southern Region WA) also attended the consultations to provide technical support.

The reports below detail the outcomes.

LOCATION

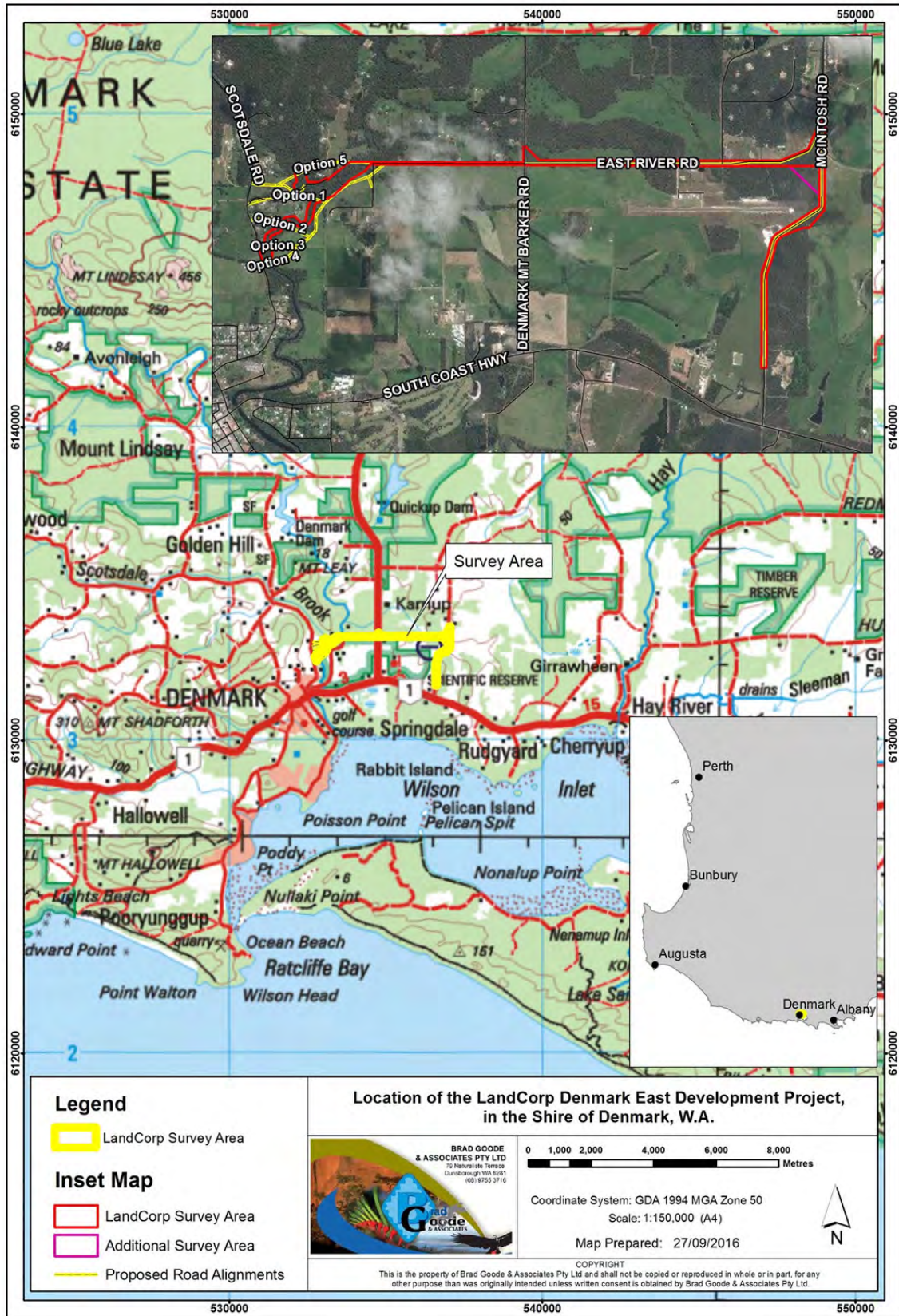


Figure 1: Location of the survey area.

ETHNOGRAPHIC & HISTORICAL BACKGROUND

TRADITIONAL NOONGAR CULTURE

The south-west of Western Australia is considered to form a distinct cultural bloc defined by the distribution of the Noongar language. Before Noongar was used as a group or linguistic name the south-west people recognized themselves, their language and culture, as '*Bibbulmun*' (Bates 1985: 47). Daisy Bates recorded that the *Bibbulmun* people were the largest homogenous group in Australia. Their land took in everything to the west of a line drawn from Jurien Bay on the west coast to Esperance on the south coast (Bates 1966: 59). Bates also recorded that, within the *Bibbulmun* nation, there were more than seventy groups that shared a common language with some local variations. Tindale (1974) identified thirteen 'tribal groups' in the south-west based on socio-linguistic boundaries and minor dialect differences and referred to the Albany group as the *Minang* (Tindale 1974: 248).

Browne (1856, cited in Le Souef 1993: 39) recorded that four tribes occupied the land around the Albany region, the *Murray*, the *Weal*, the *Cockatoo* and the *Kincannup* groups respectively. Bates (1985: 47-48) recorded the Aboriginal tribe on the south coast around Albany as the *Minung Bibbulmun* (sp. Bates), which is likely derived from the word *minung* – meaning south.

Tindale (1974: 248) reported the *Minang* as occupying an area from King George Sound, north to the Stirling Ranges, west to Lake Muir, south to the coast at West Cliff Point and as far east as the Pallinup River. Tindale also identifies Mount Barker, Nornalup, Wilson Inlet and the Porongurup Range as being within the *Minang* tribal boundary (ibid).

The Noongar or *Bibbulmun* people were a distinct group in that their initiation practices varied markedly from their desert and semi-desert dwelling neighbours. Unlike the desert people, the Noongars did not practice circumcision or sub-incision, but rather practiced a ritual of nasal septum piercing and scarring of the upper body (Bates 1985: 151-162). It is interesting to note that the cultural boundary between the Noongar people and their neighbours follows the botanical boundary between the South West Province and the arid inland provinces.

The change from the dense forests of the south west to the low bush of the desert is a gradual one, but botanists use a line that follows the extent of the 175-millimeter winter (May to October) rainfall as a boundary dividing what they call 'the southwest botanical province' from the arid regions to the east and north. Significantly the major cultural boundary that marks the extent of the Noongar religious and ritual practices follows this winter rainfall boundary for over 1200 kilometres (Ferguson cited in Mulvaney & White 1987: 124).

Two primary moiety divisions existed within the *Minang Bibbulmun* – the *Manichmat* or 'fair people of the white cockatoo' and *Wordungmat* or 'dark people of the crow', which were the basis of marriage between a further four class subdivision (Bates 1985: 74-77). Bates describes the only lawful marriage between the groups to be "the cross-cousin marriage of paternal aunts' children to the maternal uncles' children", and states that the four clan groups and relationships, under different names, are "identical in every tribe in Western Australia, east, north, south and southwest" (Bates 1966: 24-25).

The Aboriginal people of the west coast followed a matrilineal system of descent whereas those of the south coast "below Augusta and the Donnelly River," observed patrilineal descent (Bates 1985: 77). Noongar people were often observed to marry outside of their immediate vicinity, and it seems likely that this served to reinforce alliances with neighbouring tribes. Inherent in the marriage relationship was a reciprocity, which transferred rights and privileges between groups (Le Souef 1993: 30).

Each socio-linguistic group, sometimes referred to as the 'tribe', consisted of a number of smaller groups, which were made up of around 12 to 30 persons, related men, their wives and children, and at times, visiting relatives from other groups. These subgroups could be described as a family, a band or a horde (Green 1984: 9). For every subgroup there was a tract of land with which they most closely identified themselves with. An individual or a group's land was called their *Kalla* or fireplace (Moore 1884: 39). This referred to an area of land which was used by the group and over which the members of the group exercised the greatest rights to its resources. It was also the area for which the group would act as custodians. Other groups would also have some rights of access and use gained through marriage (Le Souef 1993: 30-43).

Two forms of socially organised relationships to the land were recognised – a spiritual association and an economic one. Stanner (1965) used the terms 'estate' and 'range' to distinguish these two different associations. He wrote that the 'range' was that land in which the group "ordinarily hunted and foraged to maintain life" whereas the 'estate' refers to the spiritual country and which may be 'owned' by an individual, the group, or part of the group (Stanner 1965: 2). The estate can be considered the country or home of a group, with the relationship to 'estate' being mostly religious, however also with an economic benefit (ibid). It is sometimes referred to as the 'Dreaming place' and as such includes all religious sites, myths and rituals that occur on or about that land, forming part of the Aboriginal ties to Dreaming and place (ibid: 13).

The link between the individual and the land comes from the conception site, where the animating spirit enters the mother and thus there is a direct connection between the land, spirit and the identity of the individual (Machin 1996: 14). The spiritual ties with the land strengthened economic rights and land usage involved both ritual and social connections (McDonald et al. 1994: 35).

Land use or ownership in traditional Aboriginal Australia is based on a religious view of the world and the position of people in it. This religious view is most often referred to as the Dreaming. The Dreaming is an ideological and philosophical basis for a close emotional connection between Aboriginals and their land. The Dreaming refers to a distant past when the world had yet to be fully created. Dreamtime stories refer to mythic beings that roamed the earth creating plant and animal species. During the struggles of these mythic beings many landforms such as hills and rivers were also created (Machin 1996: 10).

The landscape bears testimony to the struggles of creation and is studded with sacred sites recalling the Dreamtime. These sites are owned by or belong to either one or more groups, and so such sites have a shared significance amongst the local population. The shared spiritual significance of these sites had a function of bringing together different groups. Another function of these shared sites is that knowledge of the local myths created rights of use to the land. Custodianship of land through knowledge of dreamtime sites and their associated myths is "transmitted through birth, descent and marriage (to a lesser extent)," and this knowledge is "vital for claiming rights to the land" (Silberbauer 1994: 124).

In the Great Southern Region several mythologies exist concerning the creation of water sources and were recorded by the region's early explorers and from Noongar oral history. In Captain Collet Barker's journal (1830) a mythology explaining the creation of Oyster Harbour and Green Island was related to Barker by a traditional owner of King George Sound called Mokare,

A man & his wife a 'very long time ago' living there, the woman goes into the bush after food and sings out to the husband, who remains sitting at the fire, what she finds. He replies in the negative in recitative, varying the expression from time to time to a great number of things she mentions. At last she says '*Quoyht*', a sort of snake said to exist in those days & to be still in the Eastern parts, the size of a man's body & esteemed a great delicacy. However, it appears she likes it as much as himself & eats it all up. He then becomes 'sulky', '*tabour*', & striking her with the '*Pomnerum*'

breaks her leg & then leaves her. She becomes sick & dragging herself along in the line where the King's River now runs, reaches Green Island, where she dies. ... Her body becomes putrid & an easterly wind setting in is smelt by a dog at Whatami (a pretty good nose to scent 40 miles, but things then were on the grand scale). He follows her track & arrived at the place, commenced scratching, which continues so long that he digs a great hollow & the sea comes in & forms Oyster Harbour. Meantime the woman's son, 'a little boy' goes in search after her death, of his father, & meeting him near a mountain, spears him, hence the name of the Mount Youngermere – 'man spear'. 'Mere' being the name of the stick from which the spear is thrown (Barker 25 Nov. 1830)

This story continues to be told by local Noongars in a very similar form to Barkers written version, which highlights the continuity of traditional knowledge in the Albany area. A *Menang* legend involving two *Waugals* who lived on Michaelmas and Breaksea Islands describes a battle between the two mythological beings which resulted in the creation of many landforms across the landscape (Goode et al. 2005: 161). Dog Rock was one such landform that appears within this legend. A camp dog was thrown by the *Menang* at the *Waugals* to stop them from fighting, creating the rock. Following the fight the *Waugals* then separated – one traveling along the Kalgan River to Moorilup Pool where the red ochre represents his blood; and the second one vomited the eggs he had eaten resulting in the formation of Green Island (ibid).

Another Dreaming mythology was related by Mokare to Barker after he enquired about Noongar beliefs on the beginnings or origins of man,

He told me that a very long time ago the only person living was an old woman named Arregain who had a beard as large as the garden. She was delivered of a daughter and then died. The daughter called Moenang grew up in course of time to be a woman, when she had several children, (boys and girls), who were the father and mothers of all the black people (Barker 1830 cited in Shellam 2009: 31).

WATER AND ABORIGINAL SIGNIFICANCE

In order to understand Indigenous cultural values pertaining to the spiritual significance of water one must first become acquainted with the Noongar cosmological view of the world. Aboriginal people believe that during the Dreaming (or *Nyitting*, the cold time to Noongars) mythic ancestral beings roamed the earth and created all natural features of the world, including creatures (Bates 1985: 51). Aboriginal people view the world's natural features as part of one symbolic whole, which is expressed in Dreamtime stories about the creation of the world and the struggles of these mythic beings within this meta-physical space (Yu 1999: 17).

The Dreaming encompasses the past, present and future, and is a focal point of Indigenous culture. Dreaming stories, myths and rituals attest to this creation and depict epic struggles of beings who subsequently laid down moral laws in order to look after this world. Aboriginal people believe that they, as expressions of these mythic beings, have a responsibility to look after the natural world in order that all life is protected (McDonald 2005: 8).

In regards to the spiritual significance of water across Aboriginal Australia, the Rainbow Serpent is generally deemed as being responsible for both the creation and the ongoing maintenance of the water cycle (Radcliffe-Brown 1926: 19). The Rainbow Serpent is believed to have excavated and created the beds of the rivers during its travels throughout Australia (Jackson 2006: 15). Throughout Australia the Rainbow Serpent is associated with other myths regarding fertility and is sometimes regarded as male or female. Ceremonies and rituals are performed which are associated with the Rainbow Serpent (Reed 2001: 79-80). Reed explains, "In the beliefs of many Aboriginal tribes, the rains would dry up, the earth would become parched, and life would cease to exist if it were not for the Rainbow Serpent" (Reed 2001: 81).

Throughout Western Australia, the Rainbow Serpent is known by various different names by various Aboriginal groups, for example; the *Waugal* in Southwest, the *Beemarra* in the Midwest, the *Warlu* in the Pilbara, the *Mardjit* in the South Coast, *Marghet* in the Great Southern, and the *Norm* in Esperance.

Historically, Bates (1966) recorded that in the Southwest,

Their only deity was a *Woggal* or serpent-god that dominated the earth, the sky, the sea, and punished evil-doers...All permanent native waters have legends attached to them, legends of the 'dream' time, which go back to the days when birds and animals possessed human attributes, or were human beings, or were groups of which the bird or animal was representative, or were magic animals and birds possessing the power of human speech. The natives cannot say that the 'founders' of the various permanent waters were altogether human, although birds or beasts, or half bird half human, but the bird or animal name only is always given in the legend never a human name (Bates 1966: 60, 157).

Bates (1985: 221) also reported that the *Waugal* made all the big rivers of the Southwest and that "wherever it travelled it made a river". She stated that the *Waugal* was not just seen as responsible for the creation of waterways but also created hills and other features of the landscape (ibid: 219). The *Waugal* as a mythic creature was revered and often feared by Noongar people who would have to offer articles of food or sing and throw sand when approaching pools or places where it was known to live as a form of propitiatory ritual in order that no harm would befall those who approached (ibid).

In contemporary times the *Waugal* or *Mardjit* is seen to be present in all water bodies. Few actual tales of contextualized nature of the *Waugal's* activities remain or at least are told by Noongar people. The *Waugal*, as McDonald (2000: 17) states, has essentially now become the "benign bringer of water". This view is largely based upon Aboriginal people now not knowing the traditional mythical stories about specific actions of the *Waugal* at places, but attributing significance by reading the country and assigning "general significance" (Villiers 2002: 11). O'Connor et al. (1989) sums up the theory with this statement,

The *Waugal* is not just a mythic serpent, an Australian version of the Loch Ness Monster. The *Waugal* is not just a totemic ancestor. The *Waugal* is not just a spiritual being, a semi deity. The *Waugal* is indeed all of these but is, more fundamentally, a personification, or perhaps more correctly animalization, of the vital force of running water...As such also, the question does this permanent river (or creek, or spring or other water source) have (or belong to, or be associated with) a *Waugal* (or the *Waugal*) becomes, from an Aboriginal viewpoint, meaningless and condescending. The presence of living water bespeaks *Waugal* immanence (O'Connor et al. 1989: 47).

Contemporary Noongar people believe that that as the custodians of the land it is their jural responsibility to "look after water" and not to allow the region's water sources to be threatened by man (McDonald et al. 2005: 34). This view of jural responsibility is tied to the view that the *Waugal* will punish Noongars who do not respect water and who allow the natural order of things to be changed. Noongar people from the region take the view that water is there for all the organisms that depend upon it for survival, and that it is not there just for man to use irresponsibly. Failure to respect these core values will ultimately lead to sickness in the Noongar community (McDonald 2000: 16-18).

EUROPEAN SETTLEMENT AND DISTRUPTION

Prior to settlement in Western Australia, the Dutch and the French, as well as sealers and whalers of mixed nationalities, were the first Europeans to chart the coast and to make contact with Noongar people. During the early part of the 16th century the Dutch navigated north along the Western Australian coast on the way to the Dutch East Indies, and ships were often forced close to the coast by the prevailing south-westerly winds (Cresswell 1989: 24, 33). Many came to realise their precarious proximity to the coast only after becoming shipwrecked (ibid). The early reports by the Dutch described the coast as a bleak and desolate place (ibid). Apart from a few expeditions to try and rescue shipwrecked sailors, the Dutch showed little interest in Australia and made few recordings of the local Noongar people (McDonald et al. 1994: 26).

Evidence gleaned from the first settlement journals suggest that whalers and sealers made first contact with Noongar people when they visited the coast to collect water, however these contacts proved to be less than cordial for Noongar people. In 1827, Major Lockyer of the Albany garrison reported incidents of Noongar women being found on Michaelmas Island who had been kidnapped and then abandoned by sealers, which caused the “local Aborigines to become hostile and suspicious of strangers” (Le Souef 1993: 3).

The first French and British expeditions of the late 17th and early 18th centuries upon arrival made contact with the local Noongar people and reported that while the men were approachable and friendly, women and children were kept hidden or some distance away (Colwell 1970: 79).

In 1791, Captain George Vancouver visited King George Sound in the vessels *Discovery* and *Chatham*. The ships stayed in the sound for two weeks and although they found fish traps and huts around the harbour area, they did not make contact with the Noongar people (Vancouver 1801: 143-147). In 1801, Matthew Flinders visited King George Sound where he also stayed for one month. During this period Flinders reported that relations with the Aboriginal people were relaxed and his sailors found it possible to trade with them (Colwell 1970: 79). Flinders relates an anecdote which describes the relations between the local people and the visiting sailors,

Our friends the natives, continued to visit us; and the old man, with several others being at the tents this morning, I ordered the party of Marines on shore, to be exercised in their presence. The red coats and white crossed belts were greatly admired, having some resemblance to their own manner of ornamenting themselves; and the drum, but particularly the fife, excited their astonishment; but when they saw these beautiful red and white men with their bright muskets, drawn up in a line, they absolutely screamed with delight...Before firing the Indians were made acquainted with what was going to take place; so that the vollies did not excite much terror...The women were, however, kept out of sight with seeming jealousy; and the men appeared to suspect the same conduct in us, after they had satisfied themselves that the most beardless of those they saw at the tents were of the same sex with the rest. The belief that there must be women in the ship, induced two of them to comply with our persuasion of getting into the boat, one morning, to go on board, but their courage failing, they desired to be re-landed; and made signs that the ship must go on shore to them (Colwell 1970: 79).

In 1803 Nicolas Baudin stayed at the sound with the ships *Le Geographe* and *Le Naturaliste*. Baudin, along with the naturalist Francois Peron, discovered fish traps, kangaroo traps, huts and other evidence of occupation but failed to meet with any Noongar people (Collard 1994: 35-36, 46). Other ships stopped in King George Sound over the next two decades and most had some contact with the Noongar people.

The first ‘settlement’ in Western Australia was the establishment of a garrison of soldiers at King George Sound on Christmas day in 1826 by Major Edmond Lockyer (Le Souef 1993: 3). The surgeon Isaac Scott Nind was attached to the garrison and it is largely through his records

of life in and around the outpost that knowledge about Albany's Noongar people have been preserved (Nind 1831: 15; Stephens 1962: 27). Originally known as Fredericktown, Albany was the centre of the Western Australian colony until 1831, when the running of the settlement was transferred to the Swan River colony and the name officially changed to Albany (Le Souef 1993: 4). The Swan River colony was founded in 1829.

Initially, relations between the Noongar and the settlers were friendly with the Noongar people showing the settlers to water sources and the Europeans sharing game they had shot whilst being guided by the Noongar men (Shann 1926: 99). Berndt and Berndt (1979: 86) interestingly suggests that the Noongar mistakenly believed that the first European settlers, because of their light skin colour, were souls of the dead, or *djanga*, returned from *Karnup*, the home of the Bibbulmun dead located beyond the western sea. Berndt and Berndt (1979) describes,

...the *kanya* (soul of the newly dead) going first to the tabooed *moojarr* or *moodurt* tree (*Nuytsia floribunda* or Christmas tree), where it rested on its way to Karnup...here, and their old skins were discarded and they appeared 'white' (Berndt & Berndt 1979: 86).

The early settlers used many of the tracks created by the Noongar people to explore the land and eventually, many of the tracks became roads, some of which still follow similar alignments. Not only do the original paths used by the Noongar people often coincide with existing road alignments, but they often link areas of traditional importance which are now the locations of town sites (Collard 1994: 23, 85). The first settlers and members of the Albany garrison used Noongar guides to explore the region and find suitable grazing and agricultural land (Le Souef 1993: 5-6). The guide Mokare and his brother Nakina were Noongars of the King George Sound area who were well known to early European visitors and assisted several of the early explorers in their travels throughout the hinterland (Mulvaney & White 1987: 123).

The first settlers in Albany found that although cattle seemed to survive well, sheep were subject to unexpectedly high losses. Sir Richard Spencer lost 226 sheep from a flock of 292 in just ten months (Glover 1979: 11). The settlers blamed the deaths on 'coastal disease', which may have actually been unsuitable feed. Seeking better pasture for their sheep the settlers went looking for more suitable land. Sir Richard Spencer took his remaining sheep west towards the Hay River to the land which Mokare had assisted Barker in exploring. The Hay River region shown to Barker proved to be good for sheep and rapid settlement followed Spencer's initial success (ibid: 12-16). There are some historical records of Aboriginal people spearing stock, including in 1838 when a bull, two oxen and possibly three cows were speared on the upper Hay River (ibid: 23). There are also records of Aboriginal people working on farms and assisting the early settlers in many ways (ibid: 23-24).

As early as 1833 saw the beginning of a new lifestyle and means of survival for the Noongar people. The practice of the early settlers to pay the local Aboriginals with food, tea and tobacco was a major disruption to traditional life. Often small payments of flour or sugar would be given in exchange for services such as firewood collecting or bringing water. This source of food readily attracted Aboriginal people into fringe dwelling camps and, whilst they maintained their diet with bush foods and hunting, they became increasingly dependent on the European foods. This dependency increased as the settlers cleared more land and further encroached on the Aboriginal people's means of survival. This relationship between the settlers and the local tribes spelt the beginning of the end for the Aboriginal 'fully traditional economies' (Veth & Moore 1989: 8). As the settlers demand for labour increased Aboriginal people were employed as farm labour and domestic help in exchange for goods such as flour, sugar, and tobacco. Aboriginal people became increasingly dependent on these European food supplements and, whilst still practicing some aspects of their traditional economies, the traditional lifestyle of the Noongar people had ended as early as the 1860s (Berndt & Berndt 1979: 18).

Disease wrought havoc on the Aboriginal population that had little or no resistance to many illnesses that were common throughout Europe and much of the rest of the world. Much of this destruction may have taken place some years prior to settlement, various diseases having possibly already been spread by visiting ships (Veth & Moore 1989: 8). Population decline occurred rapidly following European contact. In 1791 the Aboriginal population of King George Sound was estimated at 60- 70 people of all ages (Le Souef 1993: 22). By 1827, there were around 50-60 people, by 1837 about 50 and by 1850 around 20-30 (ibid). The measles epidemic of the 1880's caused a significant decline in the south-west Aboriginal population (Cresswell 1989: 12). Bates (1985: 51) recorded that,

The Stirling Ranges were also the inheritance of a local group, of whom I could find but two members living. The Albany district Minung Bibbulmun are all dead. Nenbinyan of Two People Bay district (Yilbering – Two People Bay) was the last member of this group. He died at Katanning in 1911. Wandinyilmernong (Tommy King) of Kingilyilling (Albany) died at Albany about 1903, and Wabbinyet of Warrangain (Torbay and Denmark district) died about 1909 (Bates 1985: 51).

The hardships facing the Aboriginal people steadily increased as their mode of life clashed with European notions of farming. Some settlers complained about Aboriginal hunting and fishing practices. This caused the government to introduce legislation that impacted adversely on the Aboriginal people. Following a number of attacks on stock blamed on the Aboriginals dogs the *Dog Act 1885* was introduced.

...any Aboriginal who had more than one dog, had to have a licence to keep them under the terms of the 1885 Amendment to the Dog Act...Attempts to enforce this particular regulation were deeply resented by Aborigines because of the cost of a license, together with the fact that they depended on the dogs to hunt meat and that they had always kept a number of dogs for this purpose (Tilbrook 1983: 57).

Fish traps were traditionally very important to the Noongars, providing a means of feeding many people and were often the reason Noongars visited certain locations to take advantage of seasonal runs of fish. The settlers destroyed many fish traps in an effort to discourage the Aboriginal people from coming onto land which was being farmed or otherwise occupied by the settlers (Tilbrook 1983: 58). The Noongar fish traps were also sometimes a hazard to navigation and destroyed because of this (ibid). In 1899 the government passed a law prohibiting the building or use of fish traps which caused a further blow to the Noongar economy (ibid).

In 1898 John Forrest wrote to the Aboriginal department stating that the 'care and protection' of Aboriginal people had now 'devolved on the government', and that, although the government and its bureaucracies must provide help to aged and sick Aboriginal people, it will be given 'with due regard given to the practice of strict economy' (Battye Library ACC#594). In the same letter Forrest takes care to point out that 'no able bodied natives who can provide for their own maintenance should receive rations' (ibid).

Noongar people adapted to the new conditions as best they could, obtaining mostly short term seasonal work as stock workers, domestic help farm, labouring and as forestry workers (McDonald et al. 1994: 9). Fringe camps occurred on the outskirts of towns as Aboriginal people followed 'runs' from one area of seasonal employment to another. Many Aboriginal people lived in the bush between jobs living off of whatever game or bush tucker was seasonally abundant (Tilbrook 1983: 57). Those people who were working as farm labour and domestic help found that competition for employment increased suddenly with the influx of people attracted to Western Australia during the gold rushes of the 1880s and 1890s (ibid).

In 1905 the *Aborigines Act* was introduced by parliament that allowed the Chief Protector to remove people from their tribal lands and place them into camps such as the Moore River mission and Carrolup near Collie. The Act meant that the government was able to control

nearly every aspect of their lives, their employment, their travels, their consumption of alcohol and even their sexual relations, “like children needing parental guidance” (Laurie 1994: 17).

Many Noongar people became itinerant labourers and lived off the land between working or in the most abundant seasons of bush food. By the 1870s many local Noongars were not as eager to work for the settlers and rather than turn to farm work large numbers chose to live in the less developed areas where they could remain more independent, such as around the Cranbrook shire, in areas to the southwest of Kojonup, and along the Gordon and Frankland Rivers where less development had occurred (Laurie 1994: 18).

A school for Aboriginal children in Katanning attracted many families from the surrounding area and in 1914 the school and camp were relocated to Carrolup. Some families were able to continue to work as farm help, retaining a fragmented connection with their traditional lands,

Members of some Aboriginal families such as the Krakouers, Smiths and Eades were by now involved in blade shearing, and sometimes the women were able to get temporary domestic jobs on farms. Most remained mobile, travelling their specific ‘runs’ looking for work. They had strong ties with others in their runs and frequently a family group or team would arrive. They were still, however, very dependent on good seasons and often spent long periods without work when hunting formed a very necessary part of their diet (Laurie 1994: 75).

Bolton (1984) discussed how the economic climate soon worsened for the Aboriginal people,

Those who had attempted farming had been defeated by two bad droughts of 1911 and 1914 and the effects of the Aboriginal sharing lifestyle had prevented the would be farmers from getting ahead...it became increasingly difficult for part Aborigines to gain admission to trade unions and thus to jobs...nor would it have been easy to win the support which the Agricultural Bank afforded so generously to white farmers with no capital (Bolton 1984 cited in Laurie 1994: 91).

Further inequity saw the Aboriginal unemployed receive a lower sustenance rate than the white unemployed during the Depression of the 1930s. Living more or less permanently in fringe camps, seeking out seasonal employment and supplementing their diet with game, fish and some bush tucker was a lifestyle which predominated for Aboriginal people late into the sixties (McDonald et al. 1994: 9). Noongar people of the south west have been living in fringe camps creating a living for themselves doing seasonal work and often supplementing their diet with fresh caught fish from the ocean until the late sixties (ibid).

With the *Native Title Act 1994* presenting a legal need to define boundaries to conform to Native Title claimant criteria there is at present an ongoing and dynamic re-drawing of boundaries. These present day boundaries reflect perceived traditional boundaries but may not actually be entirely accurate. Amongst the Aboriginal community there is lack of consensus as to the exact boundaries ‘belonging’ to people and there are often disagreements over areas of overlapping interests.

ARCHIVAL RESEARCH

Archival research involved an examination of the DAA sites and places Register, a review of any relevant site files and a review of any unpublished ethnographic reports that relate to the survey area, in the Shire of Denmark, Western Australia.

SITES REGISTER SEARCH

The DAA Aboriginal sites and places register categorises places reported to be of importance and significance to Aboriginal people into two separate categories.

The first category contains sites classified as **‘Registered.’** Registered sites have been assessed by the ACMC as meeting the definition of section 5 of the AHA and are fully protected under the law. Disturbance to land that contains such sites requires a section 18 application for ministerial consent should proponents wish to use the land that contain these sites.

‘Other Heritage Places’ is the second category of places contained upon the Aboriginal Sites Register. These types of places include reported places **‘Lodged’** and awaiting ACMC assessment, and places where the information has been assessed but there is **‘Insufficient information’** to make a final determination under section 5 of the AHA but there is enough information to warrant these places temporary protection in Law. Disturbance to land that contains such places requires a section 18 application for ministerial consent should proponents wish to use the land that contain these places.

Within the category of **‘Other Heritage Places’** the final category is **‘Stored Data.’** Such places have been assessed by the ACMC but fail to meet the definition of section 5 of the AHA. Places in this category are not sites under the AHA and are not protected in Law. Proponents have no further legal requirements for such places should they wish to use the land unless further information is reported which would lead to such a place being reassessed as a site in terms of the definition of section 5 of the AHA.

A search of the DAA Aboriginal sites and places register was conducted on **7th July 2016**. This search was conducted to determine if any sites or places of Aboriginal heritage significance as defined by section 5 of the AHA would be affected by the development proposal.

Resulting from this search, 1 previously recorded Registered Aboriginal Heritage Site was identified to be located within the project area. This site will be directly affected by the proposal to conduct geotechnical investigations and to construct a new bridge across the Denmark River, ministerial consent under section 18 of the AHA will be required to proceed (see Appendix 1: Sites Register Search).

Table 1: Summary of Aboriginal heritage sites and places located within the project area

ID	Name	Status	Access	Restriction	Location (GDA94 Zone 50)*		Type
					mE	mN	
Registered Aboriginal Sites							
22081	Denmark River	R	O	N	525893	6145210	Myth, Water Source

* Please note: Coordinates are indicative locations that represent the centre of sites as shown on maps produced by the DAA – they may not necessarily represent the true centre of all sites.

LEGEND

R – Registered Site, **I** - Insufficient Information, **S** - Stored Data/Not a Site, **L** - Lodged awaiting assessment,
O – Access Open, **C** - Closed Access, **N** – File Not Restricted.

REVIEW OF RELEVANT SITE FILES

Site ID 22081 Denmark River

In 2005 Australian Interaction Consultants reported the Denmark River as a mythological water source. Traditional Owners from the Womber, Wagyl Kaip, Southern Noongar and Single Noongar Native Title Claim groups identified the Denmark River as a site of spiritual, mythological and cultural significance, as well as a past and present resource for Aboriginal people. As such the Traditional Owners requested that AIC report the entire river as a site to the DAA in order for it to be protected under the AHA.

In March 2010, during a survey for Wester Power who was proposing cabling under the Denmark River, Mr Robert Chown and Mr Joe Mattner from Waru Consulting further recorded ethnographic information pertaining to the significance of the Denmark River. During consultations held with Traditional Owners it was reported that one of the Aboriginal informants believed that the mythology of the river goes, “right down to the core of the earth” (Chown & Mattner 2010: 12). The river was believed to be created by the *Mardjit*, who in turn was created in the Porongurup by the *Waugal* serpent that created the Swan River, connecting the *Mardjit* with Uluru (ibid: 3). The River was also reported to demarcate the boundary between the *Minang* People of the south coast and the *Bibbulmun* (Jarrah) People from the west (ibid: 11). The river provided food and water to the local Aboriginal people and was a walk trail and meeting place (ibid). In addition a corroboree ground was reported to be located on the eastern side of the river, on the northeast side of the South Coast Highway bridge, and was a traditional and historical site used for Aboriginal dancing and ceremonies (ibid: 12-13).

On the 1st June 2010 the ACMC assessed the Denmark River as containing ‘Insufficient Information’ to constitute a site under the AHA (Resolution ID 6366).

In June 2010, during a survey on archaeological investigations on the Coalmine Beach Car Park on the Walpole-Nornalup Inlet, for the Department of Environment and Conservation, Applied Archaeology Australia recorded that the Traditional Custodians reported the Frankland / Denmark River system was called *Kwoorabup Beela* (Applied Archaeology Australia 2010: 11). The river was reported to be a main travel route of the Noongar people and was created by the water snake called the *Waugal* (ibid). The river provided the Noongar people travelling along the route with food and water, as well as bush medicine and goods for trade, and enabled them to continue carrying out their roles as caretakers of Aboriginal Land or *Noongar Boodja* (ibid). This included carrying out ceremonies or Lore along their route and customary activities such as burning, hunting and the collection of different items for trade at coastal gatherings (ibid). In addition ‘where the rivers opens into the vast still waters of the inlets’ were where the *Waugal* was reported to lay his eggs which were protected by the native reeds and rushes, or his ‘whiskers’, until they were, “ready to produce new life lines in the form of new creeks and tributaries when they are needed”. The spirit of the *Waugal* was then reported to move out into the ocean where the sea spirit, called *Wardan*, welcomes the new life, spreads it out where needed, and uses it to carry the spirits of the river’s animal, including human, inhabitants across the ocean to meet the spirit *Walgin* who welcomes the spirits to their final resting place called *Koorannup* (ibid, see also Bates 1985). As such *Kwoorabup* was reported to contain immense special significance with the oral history of the river continuing to be passed along the generations of Noongar people (ibid).

In July 2010 Western Power provided additional information on the Denmark River in order for the ACMC to assess the status of the river under the AHA. In this correspondence the significance of the river as reported by the Traditional Owners to Chown and Mattner in the March 2010 report was reiterated, as well as new information reported by Chown as follows,

There was once a big snake that lived under the earth. One day he heard noises on the surface and came up to meet the Aboriginal people who lived there. As he came through the earth he moved large boulders which settled on the surface creating Uluru.

The Aboriginal people were heading to the West of the country and so the large snake decided to travel west with them. Every so often the snake would have to go underground for it was too hot and where it went underground then re-surfaced it created large holes in the ground which filled with water when it rained. Eventually the group came to the Darling escarpment where the large snake could see the ocean glinting way off to the west. It was then time to return to his own country, but before doing so he created another large snake to continue his journey. The Waugal then followed the path west where it eventually broke through to the ocean which flooded his path creating the Swan River. The Waugal travelled south, creating water ways and waterholes in his path. Then he reached the Porongurup Ranges and could go no further. Instead he created a smaller snake to carry on the work. We call this snake the Mardjit and it moved southwards creating water holes and rivers, including the Denmark River. It came to rest at a place called Quaranup where many still live today.

We believe these snakes created all of our water holes and rivers and we are forbidden to harm them for, if we do, then all our waterways will dry up (V. Gillies pers. comm. 11th July 2010).

On the 1st September 2010 the ACMC reassessed the Denmark River and found it to meet the definition of a site under section 5(b) and sections 39.2(a) (b) (c) of the AHA (Resolution ID 6450). As such the Denmark River was placed on the permanent sites register.

Site ID 22081 Denmark River will be **directly impacted** upon by the proposal to construct a new traffic bridge across the Denmark River. To construct this bridge geotechnical drilling is also required and in line with MRWA bridge approval processes, resulting from the Keely report, vegetation clearing to 10m is required to protect the bridge from heat exposure. To proceed with these activities consideration under a section 18 application of the AHA should be sought by the proponent.

REVIEW OF RELEVANT ETHNOGRAPHIC REPORTS

Goode, B., Huxtable, L. and Harris, J. 2014, *Report of an Aboriginal Heritage Survey of the Denmark Water Source Augmentation Project in the Shire of Denmark, Western Australia*, and report prepared for the Water Corporation, October 2014 [DAA Report ID 200429].

In September 2014 the Water Corporation commissioned BGA to conduct an ethnographic and archaeological Aboriginal Heritage Survey for a proposed Water Source Augmentation project in Denmark (Goode et al. 2014: 6).

Specifically, the Water Corporation were proposing to undertake a Water Source Augmentation project in order to improve the reliability of the town water supply in Denmark, including a pump back facility between the Denmark Dam and Quickup Dam (Goode et al. 2014: 6). The Water Corporation were also proposing to repair the existing gate in the Denmark Dam wall, build an ultra-filtration plant at the current water treatment plant site, replace a section of the existing pipeline and construct a duplicate pipeline between the Denmark and Quickup Dams (ibid).

Archival research conducted by the consultants revealed that there was one registered site, Site ID 22081 Denmark River, located within the survey area and would be directly affected by the proposal to clear vegetation, trench the river, install pipelines and repair works to the dam wall and scour gates (Goode et al. 2014: 18). However, the consultants noted that the survey area had already been disturbed through excavation works by the Water Corporation to install a pipeline and as such the proposed works would ensue a low risk of a section 17 breach of the AHA under the DAA Due Diligence Guidelines (2013) at that time (ibid). This opinion was endorsed by the DAA (ibid).

During ethnographic consultations held with several representatives of the Wagyl Kaip, Southern Noongar and South West Boojarah 2 Native Title Claim groups it was determined that the Aboriginal informants consider the Denmark River, in its entirety, to be a culturally significant site due to its creation by the *Mardjit*, who still resides in the river (Goode et al. 2014: 38). As such it was determined that the river is considered a highly significant site in terms of spiritually and mythological beliefs, as well as a water and food source, hunting and camping ground, and ceremonial place (ibid). As such the Traditional Owners advised that the DAA assessment of rivers under the AHA, at that time, was in direct contradiction of the cultural values Aboriginal people place on waterways (ibid). However, a recognition that the request for the Water Corporation to submit a section 18 consent notice could result in triggering a reassessment of the status of the river under the AHA, coupled with the fact that the survey area had already been heavily altered through previous works, led the Traditional Owners to advise that they did not believe that the Water Corporation should be required to seek a section 18 consent under the AHA (ibid: 39).

As a result of the survey BGA recommended that the proposed Water Corporation works would not adversely affect the cultural values associated with the river (Goode et al. 2014: 40). In addition the consultants advised that the Water Corporation could proceed with their works with a low risk of breaching section 17 of the AHA (ibid).

Chown, R. and Mattner, J. 2010a, *Aboriginal Heritage Surveys & Section 18 Consultation for Proposed Cabling, Denmark River*, a report prepared for Western Power, March 2010 [DAA Report ID 28145]

In 2010 Western Power commissioned Mr Robert Chown and Mr Joe Mattner, from Waru Consulting Pty Ltd, to conduct an ethnographic Aboriginal heritage survey and Section 18 consultation of a proposed underground cabling installation across the Denmark River within the town of Denmark, Western Australia (Chown & Mattner 2010a: 1).

The Western Power proposed project involved the installation of 22kV cabling for a distance of approximately 3.5km from north-west of the Denmark River across the river to the east. Western Power planned to install these sections of cabling within conduit under the Denmark River (Chown & Mattner 2010a: 1).

An ethnographic survey and Section 18 consultation was conducted in Denmark on the 19th October 2009 with 10 Aboriginal heritage spokespersons from the Wagyl Kaip (WC1998/70) and Southern Noongar (WC1996/109) Native Title Claim groups (Chown & Mattner 2010a: 11, 12). Within the Western Power survey area one Aboriginal previously recorded ethnographic site, Site ID 22081 Denmark River was noted (ibid). It was concluded that the proposed works would intrude upon the site and as such the majority of the Noongar informants agreed they would conditionally support a section 18 application being lodged in order for Western Power to carry out the works (ibid: 2). Another nearby ethnographic site, Site ID 18947 Denmark River Midden, was determined not to be affected by the proposed works (ibid: 12).

During the ethnographic heritage survey one new Aboriginal ethnographic Site ID 27936 'Kwoorbup Corroboree Ground' was identified within the Western Power project area. This consisted of a well-known corroboree ground in a clearing surrounded by Karri trees along the north east side of the Denmark River (Chown & Mattner 2010a: 12). The new site was determined to not be at risk of disturbance by the proposed Western Power works (ibid).

In relation to the current BGA survey (2016) the Chown & Mattner (2010a) Western Power survey area is located adjacent to the current survey area.

Chown, R. and Mattner, J. 2010b, *Addendum 1: Aboriginal Heritage Surveys & Section 18 Consultation for Proposed Cabling, Denmark River*, correspondence prepared for the DAA on behalf of Western Power, March 2010.

Additional information was supplied in relation to the above report, *Aboriginal Heritage Surveys & Section 18 Consultation for Proposed Cabling, Denmark River*, prepared for the Western Power in March 2010. In relation to the two sites discussed during the report, Site ID 22081 'Denmark River' and Site ID 27936 'Kwoorbup Corroboree Ground', the Registrar of Aboriginal Sites, Dr Kathryn Przywolnik, wrote to Western Power on the 22nd June 2010 and requested further information be provided regarding the cultural values, importance and significance of these sites and the effects that the proposed underground cabling works would have in order for the ACMC to be able to formulate an opinion under section 5 and section 18 of the AHA (Chown & Mattner 2010b: 2).

Subsequently, Mr Chown had further discussions with the Noongar informants and reported that the Denmark River was a cultural boundary between the *Jarrah* people in the west and the *Minang* people of the south coast, as well as a water source and a migration path (Chown & Mattner 2010b: 2, 3). Chown's informant named the Denmark Area as 'Beejibut' meaning meeting place between the *Jarrah* and *Minang* people, also stating that her grandmother, Jakban, was born at Wilson Inlet (ibid: 2). Finally, the river was reported to be spiritually important because the fresh water gives life and contains a dreamtime story about the *Mardjit* serpent (ibid: 3).

Goode, B., Greenfeld, P., Irvine, C., Gillies, V., Webb, W., Thomas, M. and Cockman, M. 2008, *Aboriginal Cultural Values Study of Water Resources for the South Coast Region of Western Australia*, a report prepared for the Department of Water, July 2008.

In 2008 The Department of Water commissioned BGA to conduct an Aboriginal cultural values study of 29 catchments within the South Coast region of Western Australia (Goode et al. 2008: 2). The Department of Water identified that the South Coast region's many significant surface and groundwater systems (rivers, estuaries, lakes and wetlands) were coming under increasing pressure from demands for water supply development due to the region's rapidly expanding population (Goode et al. 2008: 2). As such, the Department of Water responded to the demand for the development of new and sustainable water supplies by developing a Regional Water Resources management plan (ibid). In order to manage the region's water sources on a sustainable basis and to protect the values that are associated with these water sources the Department of Water commissioned an Aboriginal cultural values study to be undertaken.

A detailed literature review, comprehensive examination of sites listed on the DAA Sites Register and consultations with key Aboriginal stakeholders, as well as detailed field studies with key Noongar informants with specific knowledge of catchments and water sources, were conducted by Brad Goode and Associates Pty Ltd in 2008 (Goode et al. 2008: 2).

Throughout the study it was found that the natural water systems of the South Coast region are of fundamental and central importance to Noongar spirituality, culture and identity (Goode et al. 2008: 45). Goode (2008) summarises this importance through stating,

The regions' water sources are of primary importance to the maintenance and continuance of Noongar culture are places that have been 'customarily used' by Noongar people from the prehistoric past to the ethnographic present. Water sources in the region are the central places where Noongar people camp, collect food, fish, conduct ceremonies, recreate and come together as family groups to educate their youth regarding Noongar culture and identity (Goode et al. 2008: 2).

A detailed assessment of cultural sites and values relation to waterways within the Denmark Catchment were conducted through field inspections of the Denmark Catchment on the 19th and 21st of February 2008 with 8 local Noongar informants (Goode et al. 2008: 142). The Denmark River and its tributaries were recorded as being part of water systems that were perceived as having ‘central importance to Noongars spirituality, culture and identity [...] as ‘sacrosanct’ to all life, not just people, and are valued as the basis of support for the entire natural world’ (ibid: 2). The Denmark River was seen as having profound spiritual and cultural value to Noongar people as, like a number of other waterways in the region, it is home to and created by the mythical ancestral serpent known locally as the *Mardjit* (ibid: 66, 143). As well as this mythological importance the Denmark River was also recorded as possessing immense cultural value both in contemporary and historical times due to its high ecological and water value, as well as its utilisation as a water, food and medicinal source, hunting ground, camping area, a migration path, ceremonial location (ibid: 55, 66-67). The Hay River was further identified as containing Aboriginal significance due to being a natural clan boundary between Noongar cultural groups (ibid: 115). It was also recorded that the Noongar informants stated it was their “firm belief that that *Mardjit*, the South Coast water snake, was responsible for the creation and maintenance of the health of this river and it is believed that Noongar people have a cultural responsibility to maintain and protect this waterway” (ibid: 143).

It was further identified in this report that the construction of Dams in the Denmark catchment was a major threat to the values of all waterways as damming reduced water flows to waterways downstream, such as the Wilson Inlet (Goode et al. 2008: 144, 145). One of the Noongar informants Mr Webb stated that dams “starve the rest of the country downstream of water”, whilst another informant Mr Krakouer stated “The dams stop water from reaching the estuary and that would kill our country. If the water is stopped all the country will die” (ibid: 144). As such activities that are seen to unnaturally interfere with waterways were documented as being culturally inappropriate and against Noongar values of sustainability (ibid).

As such the Noongar community identified a number of locations that were then visited to record cultural features and ethnographic information about the significance of these places. Places such as Blue Lake, Kockellup Springs, Powley Road Granite Outcrop and Styx River Gnamma Hole were visited (Goode et al. 2008: 143).

As a result of the culmination of these ethnographic consultations combined with extensive archival research and literature reviews a number of significant places and sites were recorded. These included Place ID 18947 ‘Denmark River Midden’, located within the Denmark River Catchment, an archaeological place with ethnographic feature as recorded by the Denmark Environment Centre and reported by Mr Webb in 2002 (Goode et al. 2008: 66). The place consisted of a ceremonial area of historical significance with a midden, as well as being reported as a corroboree area and camp ground in the 1900s (ibid).

In relation to the current BGA survey (2016), the Department of Water survey area (2008) is located across the South Coast of Western Australia, including the Denmark River site which overlays the current survey area.

Guilfoyle, D. 2011 *Aboriginal Cultural Heritage Management Plan for Southern Section of Kwoorabup Beelia (Denmark River)* a report prepared for the Shire of Denmark and Department of [Aboriginal] Affairs, July 2011.

This ACHM was prepared by David Guilfoyle from Applied Archaeology Australia upon behalf the Shire of Denmark in July 2011 is written to provide management advice for the southern section of the Denmark River from Mouth (at Wilson Inlet) extending northward for approximately five kilometres to East River Road. The purpose of the plan was to inform the Shire and other managing agencies that have responsibilities for the Denmark River of its Aboriginal heritage values and to detail requirements under the AHA should a number of

projects relating to environmental, social & recreational, and town planning development proposals proceeds along sections of the river.

In this plan Guilfoyle documents that the Denmark River was an important place to the Noongar community in terms of mythological beliefs and in terms of customary use. Guilfoyle provides an inventory of Aboriginal heritage sites and places as defined by section 5 of the AHA located along the river and provides management advice to protect such places in line with the AHA should development activities be planned.

Guilfoyle draws upon his other studies and in particular the Kwoorabup Walk Trail Heritage Management Plan prepared for the Department of Indigenous Affairs (DIA) (2010) and Goode (2008) Aboriginal Cultural Values Study of Water Resources for the South Coast Region of Western Australia to provide an integrated advice that pertains to the river as an integrated cultural landscape that has values that go beyond the AHA and integrate into environmental management concerns.

Guilfoyle provides advice relating to human impacts, pollution, weed infestation, erosion, feral animals, effects from urbanisation, and community recreation and how these can be managed within a heritage framework. Guilfoyle makes recommendations and develops process where by these issues can be addressed through community engagement so that the Noongar community are not the passive receivers of planning outcomes.

In relating to this project Guilfoyle provides advice from a Noongar perspective upon where any future bridges should be constructed across the Denmark River. Guilfoyle advises that at the confluence of the river and the Scottsdale broke was a traditional ford for the Noongar community. Guilfoyle states that as this was also a former bridge site and as a result of these reason it is the preferred location for the Noongar community. Guilfoyle advises that bridge planning should include mechanisms to prevent ongoing erosion and impacts to the heritage area to maintain the natural environment and any un-identified cultural resources, with the need to provide appropriate access routes with minimal disturbance and to accommodate visitors utilising the walk trail.

OUTCOMES OF ARCHIVAL RESEARCH

A search of the DAA Aboriginal sites and places register conducted on **7th July 2016** revealed that there is **one** registered Aboriginal Heritage sites, Site ID 22081 Denmark River located within the development area.

Site ID 22081 Denmark River was determined to be **directly affected** by the project plans to conduct geo technical drilling, clearing and bridge construction on the Denmark River.

In terms of its significance Site ID 22081 Denmark River is a sacred site of spiritual, mythological and cultural significance, as well as a past and present resource for Aboriginal people. A specific mythology has been recorded about the creation of the river by the green python called *Mardjit*, who in turn was created in the Porongurup Ranges by the *Waugal* serpent who created the Swan River, connecting the *Mardjit* with Uluru. The *Mardjit* moved southwards creating water holes and rivers, including the Denmark River before coming to rest at a place called Quarunup. The Denmark River was also reported to demarcate the boundary between the *Minang* People of the south coast and the *Bibbulmun* People from the west, who both used the river as a traditional walking path. The river provided the Noongar people travelling along the route with food and water, as well as bush medicine and goods for trade, and enabled them to continue carrying out their roles as caretakers of Aboriginal Land or *Noongar Boojava*. This included carrying out ceremonies or Lore along their route, and traditional customary practices such as burning, hunting and the collection of different items for trade at coastal gatherings.

IDENTIFICATION OF SPOKESPEOPLE

THE RIGHT TO SPEAK ON HERITAGE ISSUES

Various authors have discussed the contemporary problem of who in the Aboriginal Community has the authority to speak on heritage issues within an area. O'Connor, et al. (1989: 51) suggest that when this question is posed to people in Aboriginal Australia, answers are usually framed by such terms as 'the traditional owners', i.e., those people who are defined by place of birth, or descent. Myers (1986: 128) presents a broader and more contemporary view of 'ownership' based upon descent and association:

An estate, commonly a sacred site, has a number of individuals who may identify with it and control it. They constitute a group solely in relationship to this estate... Identification refers to a whole set of relationships a person can claim or assert between himself or herself and a place. Because of this multiplicity of claims, land holding groups take essentially the form of bilateral, descending kindred. Membership as a recognised owner is widely extended, and therefore groups are not a given.

Myers further clarifies the current perception of 'ownership' when he states:

....such rights exist only when they are accepted by others. The movement of the political process follows a graduated series of links or claims of increasing substantiality, from mere identification and residual interest in a place to actual control of its sacred association. The possession of such rights as recognised by others, called 'holding' (*kanyininpa*) a country, is the product of negotiation (Myers 1986: 128-129).

While the notion of descent is clearly an important criterion within Myers analysis, it must be seen in terms of the contemporary Nyungar situation. Nyungar tradition in the south west has been seriously eroded since colonisation, lines of descent have been broken and previously forbidden and mixed marriages have interconnected many Nyungar groups who would not have traditionally had a close association (Machin 1993: 20). Consequently, in contemporary times the criteria of historical 'association' may in some cases also be regarded as a 'right to speak' on heritage issues within an area:

Traditional subsistence no longer sufficed to support Aboriginals so they combined this with menial work on farms and over time new relationships to land developed. As a consequence, the more recent history associated with their involvement with European agriculture and labour patterns is often more relevant than the pre-contact mode of attachment to an old way of life and the roots of the identity as original owners of the land. Biographical associations are often tied to post-settlement labour patterns and identification. These can predominate. This is part of a dynamic process of ethnicity, identity and tradition (Machin 1995: 11).

O'Connor, et al. (1989) identified several criteria for determining contemporary community spokes people. A spokesperson must have a long-term association with an area, usually as a young person, and had extensive contact with a member or members of the 'pivotal generation of the culture transmitters'; those people whom, as children themselves, had contact with people who could pass on their traditional knowledge. A spokesperson must also demonstrate knowledge of the region's natural resources, its hunting, fishing and camping grounds, its local water sources, and the flora. This is important because a person without this knowledge is unlikely to be seen by their fellow Nyungar's as truly being from that country, despite having been born or lived in that area. In some cases, people from outside a specific region have established themselves by political activism. They are accepted by their fellow Nyungar because they may have participated in mainstream white pursuits, such as advanced education, or legal and political careers, that have empowered them within the broader community. As such, these people are a valuable resource to the local Aboriginal Community. The people consulted in this survey fulfil at least one of these criteria.

NATIVE TITLE CLAIMS OVER THE SURVEY AREA

Currently lodged with the Register of Native Title Claims and the Schedule of Applications, held by the Commonwealth Native Title Tribunal, there is one registered Native Title application that overlays the project area. The Schedule of Applications includes registered applications, unregistered applications and applications still undergoing the registration test.

Wagyl Kaip WC1998/070 WAD6286/98 (Registered)

Applicants: Mr Allan Bolton, Mr Cedric Roberts, Mr Glen Colbung, Mr Ken Colbung, Mr Kevin Miller, Mr Mark Smith, Mr Sam Miller, Ms Hazel Brown, Ms Marlene Ware, Ms Mingli Wanjurri-Nungala, Ms Rita Dempster and Ms Rose Pickett.

SELECTION OF SPOKESPEOPLE FOR THIS SURVEY

In line with the terms of the Noongar Standard Heritage Agreement (NSHA) signed between the proponents and the South West Aboriginal Land and Sea Council (SWALSC) an activity notice for the project was submitted to Mr Matthew Casey (Legal Officer) by Land Corp.

In response to this notice a survey participant list was issued to the heritage service provider, BGA, by Mr Matthew Casey on the 10th August 2016.

As a result of this process the following representatives from the Wagyl Kaip WC1998/070 Native Title Claim group were selected to participate in this survey:

Mr Glen Colbung was born at the Mt Barker Aboriginal Reserve to his parents Mr Tim Colbung from Mt Barker and Ms Ethel Krakouer from Cranbrook. Mr Glen Colbung's paternal grandmother was Ms Charlotte Colbung, who was born at a significant traditional Aboriginal campsite in Albany now known as Lake Weelara. Ms Charlotte Colbung's parents were Mr Billy Colbung and Ms Clara Colbung (nee Brockman). Mr Billy Colbung's parents were *Waylup* and *Boyalubin*. *Waylup's* father was *Coolbun*, who was noted in the journals of early explorers such as Barker and Dr Alexander Collie. Mr Glen Colbung is an applicant to the Wagyl Kaip WC1998/070 Native Title Claim group and was selected by SWALSC to participate in this survey.

Mr Alwyn Coyne was born in Albany to parents Ms Jessie Wandagee (Carnarvon) and Mr Sydney Coyne from Borden. Mr Alwyn Coyne's parents on his father's side were to Mr Edward James Coyne and Ms Mary Anne Woods from Bremer Bay. Mr Alwyn Coyne traces his descent to apical ancestors to Ms Margaret Davidson (born Ravensthorpe) and Mr Fred Coyne. Margaret Davidson was the daughter of a Noongar woman named 'Jinny' (Esperance) and an Englishman named Davidson. Margaret Davidson is reported to have been buried in Ravensthorpe. Mr Alwyn Coyne went to school in Albany before embarking on a career with the public service as a councillor. Mr Coyne was selected by SWALSC to participate in this ethnographic survey.

Mrs Vernice Gillies (nee Coyne) direct traditional descent is from the Minang east of Albany. Mrs Vernice Gillies parents were Ms Jessie Wandagee and Mr Sydney Charles Coyne who was born in Borden, to Mr Edward James Coyne and Ms Mary Anne Woods from Bremer Bay. Mrs Vernice Gillies was born in Albany before embarking on a career in community welfare working in various regions of the state before returning to Albany. Mrs Vernice Gillies has worked as an Aboriginal Liaison Officer at the City of Albany and as a DAA Regional Heritage Officer. Mrs Gillies is a member of the Wagyl Kaip Native Title Claim group and was nominated as a representative of the Coyne family in this survey by SWALSC.

Mr Stanley James Loo was born at the Gnowangerup Mission to Mr Donald Loo from Gnowangerup and Mrs Margaret Loo (nee Innell) from Borden. Mr Loo's paternal grandparents are Mr Jim Loo from the Katanning area and Ms Bertha Coyne who was born in Ravensthorpe.

Mr Loo's maternal grandparents were Mr Charles 'Bullfrog' Innell, born at Little Jerramungup/Gairdner River, and Ms Mena Wells, born in Cue. Mr Loo undertook schooling in Albany before working on a number of farms in the area. Mr Loo has worked as the Senior Gardener at the Albany Aboriginal Corporation. Mr Loo is a member of the Wagyl Kaip WC1998/070 Native Title Claim group was selected by SWALSC to participate in this ethnographic survey.

Ms Lynette Knapp was born in Perth to parents Mr Alfred Knapp from Albany and Ms Gertrude Bynder from Balladonia. Ms Knapp's paternal grandfather was Mr Johnny Knapp who was born at Thomas River in Cape Arid. Mr Johnny Knapp spent many years working in the farming industry throughout the South Coast region and was also involved in the construction of the Palace Hotel in Ravensthorpe. Ms Knapp's great grandfather was *Wural* who was from the *Bibul* moiety; his parents were *Djiniidjanan* and *Midan* from the Warren River. *Wural's* wife, and Ms Knapp's great grandmother was *Jacburn*, daughter of *Melagan* or *Nilgin* and *Barnangain*, who were from the *Minang* moiety and was born at *Kurabilup*. Ms Knapp has lived most of her life in Albany and is a member of the Wagyl Kaip 1998/070 Native Title Claim group and was selected by SWALSC to participate in this ethnographic survey.

Mrs Irene (Winnie) Larsen (nee Woods) was born in Gnowangerup, the daughter of Mr Sam Woods and Mrs Mary Agnes Penny. Mrs Winnie Larsen had no formal education but received some instruction at St Joseph's Orphanage where she spent four years as a child. Upon marriage, Mrs Larsen lived in a number of locations around the Great Southern before settling in Albany. While in Albany as an adult, Mrs Larsen attended TAFE where she learnt to read and write. Mrs Larsen is a member of the Wagyl Kaip Native Title Claim group and was elected by the SWALSC to represent the Penny family during this survey.

Mrs Edith Penny (nee Loo) was born in Katanning to Mr Donald Loo from Gnowangerup and Mrs Margaret Loo (nee Innell) from Borden. Ms Penny's paternal grandparents are Mr Jim Loo from the Katanning area and Ms Bertha Coyne who was born in Ravensthorpe. Mrs Penny's maternal grandparents were Mr Charles 'Bullfrog' Innell, born at Little Jerramungup/Gairdner River, and Ms Mena Wells, born in Cue. Mrs Penny grew up and undertook schooling in Albany before becoming a housewife and working for a number of community organisations. Mrs Penny is a member of the Albany Aboriginal Corporation and Wagyl Kaip WC1998/070 Native Title Claim group and was selected by SWALSC to participate in this ethnographic survey.

Ms Sandra Woods was born in Albany to parents Mr John Woods and Mrs Alma Woods (nee Innell) from Borden. Ms Woods' paternal grandparents are Mr Jack Woods and Ms Sarah James. Her maternal grandparents are Mr Charlie Innell, who was born at Little Jerramungup/Gairdner River, and Ms Mena Wells, born in Cue. Ms Sandra Woods is a member of the Wagyl Kaip WC1998/070 Native Title Claim group and was selected by SWALSC to participate in this survey.

Ms Jeanice Krakouer was born in Mt Barker to parents Mr Eric Krakouer of Kojonup and Mrs Phoebe Krakouer (nee Miller) from Mt Barker. Ms Krakouer's grandparents on her father's side are Mr Alfred Krakouer and Ms Sophie Smith and on her maternal grandparents are Mr Clem Miller and Ms Margaret Miller (nee Colbung). Ms Krakouer conducted her schooling in Mt Barker and works as an Aboriginal Engagement and Program Development Officer. Ms Krakouer is a board member of SWALSC and member of the Wagyl Kaip WC1998/98 Native Title Claim group selected by SWALSC to attend this survey.

Ms Treasy Woods (nee Williams) was born in Gnowangerup to parents Mr Leonard Williams from Borden and Ms Elsie May Haywood of Woodanilling. Ms Woods's paternal grandparents are Mr Eddie Womber 'King George' Williams from Cape Riche and Ms Lilly Burchell. Ms Woods's maternal grandparents are Mr William Samuel Hayward from Kojonup and Ms

Minnie Knapp from Esperance. Ms Treasy Woods went to school in Tambellup and Perth and worked as an enrolled nurse before retiring. Ms Treasy Woods is a member of the Wagyl Kaip WC1998/98 Native Title Claim group selected by SWALSC to attend this survey.

Mrs Suzanne Kelly was born to Mr George Froome from Busselton, whose parents were Mr Henry Froome from Quindalup and Ms Alice Hill from Karridale. Mrs Kelly has traditional ties to the Busselton to Manjimup area through her father's parents who were related to the matrilineal side of the Webb family (Hills). Mrs Kelly is actively involved in the preservation of Aboriginal heritage of the region and is the co-author of a book with the late Mr Angus Wallam of traditional mythological stories about the lower south-west. Mrs Kelly is also a founding member of the Manjimup Aboriginal Corporation where she currently resides. Ms Kelly's son, Mr Glen Kelly, is the former CEO of SWALSC. Mrs Kelly is a working party member of the South West Boojarah #2 Native Title Claim group. Mrs Kelly was nominated by SWALSC to participate in this survey to represent the Bibbulmun people (west side of the river) through the Hill clan.



Figure 2: the survey team from the Wagyl Kaip WC1998/98 Native Title Claim group.

COMMUNITY CONSULTATION

AIMS

- To establish contact with Aboriginal people who retain traditional or current knowledge pertaining to the region.
- To determine if there are any sites or places of significance, as defined by section 5 of the AHA, within the project area.
- To record any ethnographic information provided about identified sites or places.
- To generate consensual recommendations from the Aboriginal community representatives in regards to any section 18 requests and to record management strategies for identified ethnographic and archaeological sites.

METHOD

To arrange the survey the selected informants were contacted by letter and by phone with an onsite meeting arranged. At the commencement of the meeting the informants were briefed as to the details of the project with the aid of the project plans and previously recorded Aboriginal heritage sites and places overlaid upon a large scale air photo map. Ethnographic information was recorded in a notebook and photographs of the survey process were taken. GPS coordinates of any cultural features were recorded in the field and transferred to mapping software ArcView V10 where final maps were produced.

COMMUNITY CONSULTATION PROCESS

On the 31st August 2016 BGA consultants, Mr Brad Goode (anthropologist) and Lisa Butcher (ethnographic assistant) met several elected members of the Wagyl Kaip WC1998/070 Native Title Claim group, Mr Glen Colbung, Mr Stan Loo, Ms Treasy Woods, Ms Janice Krakouer, Mr Alwyn Coyne, Ms Vernice Gillies, Mrs Irene (Winnie) Larsen, Ms Lynette Knapp, Ms Edith Penny, Ms Sandra Woods, and Mrs Sue Kelly at the Gazebo at the Norm Thornton Park on the Denmark River.



Figure 3: Mr Robert Fenn (LandCorp) and Ms Jacqueline Harris (BGA archaeologist) brief the Wagyl Kaip WC1998/070 Native Title Claim group with regards to the development proposal and in particular the five bridge options to cross the Denmark River Site 22081.

Also present was Ms Donna Blight (nee Coyne), Ms Sonia Stewart (nee Kelly) and Mr Colin Woods to assist elders as drivers to attend. Mr Wayne Webb assisted the archaeological survey. Mrs Avril Dean was also invited but did not attend; she rang the consultant with her apologies.

To begin the meeting Mr Goode welcomed the Wagyl Kaip WC1998/070 Native Title Claim group and introduced Mr Fenn (LandCorp) and Mr Foley from GHD. Mr Goode advised that today's survey team was chosen by SWALSC to include both the Minang and Bibbulmun language groups. Mr Goode advised that this was necessary as the Denmark and Hay Rivers were generally believed to be a demarcation zone where a cultural boundary between these two groups had traditionally existed (see Goode 2008: 23-30 for a full discussion of traditional boundaries).

Mr Goode advised that the subject matter of the survey was to examine 6.5km of road upgrades, and realignments for an industrial estate, and a proposal to put a new bridge across the Denmark River. Mr Goode presented an air photo map outlining the planning corridors subject to the survey. Mr Goode then advised that as planning has yet to be finalised the survey would consider five proposed bridge locations on the river. Mr Goode advised that LandCorp would plan and manage the project on behalf of the Shire of Denmark who would construct the roads and bridge when the plans had been finalised.

Mr Goode advised that Mrs Jacqueline Harris (BGA archaeologist) and Mr Wayne Webb (TO assistant) had completed an archaeology survey of the planning corridor and as a result had not located any archaeological sites or material. Mrs Harris however advised that the survey was constrained by ground surface visibility issues and that it was her belief that there was archaeological potential, therefore some monitoring of sediments adjoining the river would be recommended.

In terms of previously recorded ethnographic data Mr Goode advised that the river was a registered Aboriginal heritage site and as such a Section 18 consent notice would be required for the bridge to proceed. Mr Goode advised that it was his intention to examine each proposed bridge location and rank them in terms of the communities' preference and its effects on Aboriginal values held for the Denmark River. Mr Goode asked the Noongar community if they were aware of any other sites along the road corridor and if the group wished to visit any places on the alignments.

The group advised that they were not aware of any Aboriginal ethnographic sites other than the river and advised that much of the road alignment had been surveyed with the Water Corporation who is running a pipeline through the area.

Mr Goode then handed the meeting over to Mr Robert Fenn who thanked the group for being there today. Mr Fenn said the Shire started planning this bridge and road in 2010 to cater for the expected growth of the town and to provide an alternative crossing should a fire event preclude people escaping over the existing town bridge on the South Coast Highway. Mr Fenn said that putting the bridge to the Northern edge of the urban area would provide access across the river and to the East and the road upgrades would also service an industrial estate planned to be adjacent to McIntosh Road. Mr Fenn said that although planning had begun in 2010 funding was allocated by the Government in 2015. The funding arrangements require the project to be done over the next 2 years. Mr Fenn said that LandCorp had been asked to manage the project on behalf of the Shire of Denmark.

Mr Fenn said that out of the 5 alignments to look at, Option 1 was identified previously as the preferred location of a bridge crossing by the Shire and in the Guilfoyle heritage report. This is the one accessed from Riverbend Lane and is just south of the confluence with the Scotsdale Brook. Mr Fenn said there were some environmental work and some engineering work to do before any of the proposed locations were settled on and that at present no decisions had been

made; from an engineering perspective and from the perspective of the agricultural college Option 1 was submitted for funding as the option preferred by the Shire. Mr Fenn stated that community issues with all the locations would be given consideration however in terms of ranking the outcomes of the traditional owner consultations would have a significant weighting within the decision making process.

Mr Fenn advised that in a previous survey for a HMP of the Denmark River foreshore in 2011 by David Guilfoyle had reported a traditional crossing point near the confluence with the Scotsdale Brook was then the Noongar communities preferred option as well. Mr Fenn said that today we are open to discussion and wanting to know if that is still the preference of the group. Mr Fenn said that at the time of the Guilfoyle survey that no bridge designs were known and that today Mr Foley had more information to aid in decision making. Mr Foley advised that a span bridge pitched from concrete abutments was now proposed. Mr Goode showed the group some example photos of such bridge designs that Main Roads had constructed in other locations in the south west.

Following this discussion Mr Goode asked the group if they felt fully informed and if they had any questions regarding the project.

Ms Sue Kelly asked what was meant by environmental work needed to be done. Mr Fenn responded saying a Flora and Fauna survey had been done and found 857 significant trees, with over 150 hollows for cockatoos plotted. Mr Fenn said a level 2 Fauna survey would be done later this month, stating that already cameras had been installed in the area to watch the Cockatoo and Fauna behaviour.

Ms Jeanice Krakouer asked if any endangered fauna/flora had been found. Mr Fenn said that the State and Federal records highlighted 50 potential species in the region. Of that number only 13 were expected to be located this area. The work completed to date indicated one species may be on-site and to his knowledge it was not an endangered species. Further work is being undertaken.

Ms Jeanice Krakouer asked if there would be a new footbridge from the walk trail. Mr Fenn said the walking path would be reinstated and a footpath over the bridge would allow for pedestrian use.

Ms Lynette Knapp asked why the current bridge was not fire proofed. Mr Fenn said Main Roads had recently concreted the bridge deck, but the structure was a timber bridge.

Mr Sue Kelly enquired about the length of the new bridge. Mr Fenn advised it would be approximately 30m long assuming no pylon is acceptable in the River, but the actual length would depend on the final location chosen.

Mr Alwyn Coyne asked if the bridge was only for traffic or would power and water cross it too. Mr Fenn said there would be provisions for utilities but currently there were no plans for water or power yet.

Ms Treasy Woods asked if they would be digging in the river. Mr Fenn responded that the river would be kept clear and not interrupted by pylons but some geotechnical drilling to understand the geology of the bed and embankments was needed to inform the engineering design for the bridge. Ms Woods said that in other projects the river had been scooped out. Mr Fenn assured that they would not be doing that.

Mr Jeff Foley said that in deciding the route selection there was a lot of things to consider and that cultural heritage and safety were the two highest considerations in the assessment.

Ms Donna Blight asked if a route would be recommended in the environmental surveys.

Mr Fenn said that all the issues would be given consideration in the decision for the bridge location. Black Cockatoo habitat in particular nest hollows are given priority, they would look at the whole study area including looking at tree hollows and ascertain if it was currently being used. It is possible to relocate hollows. Mr Fenn said the Shire was conscious of the environment but there was a need for a safe road in and out of town.

Ms Lynette Knapp said flooding must also be considered. Mr Foley advised that preliminary hydrology had been done and the preferred site was quite flooding prone. This would be taken into account and the bridge would be up high to account for flood events. Mr Fenn said the previously preferred bridge site on Riverbend Lane had the least impact on the Agricultural College which has to be considered. Mr Glen Colbung said if there was a bridge already there previously then the land was already disturbed, as such he said stick with this option.

Mr Fenn said Option 4 minimised the amount of vegetation that needed clearing. All other options would impact upon Karri Trees and in particular Option 1 as a large tree which may be up to 400 years old would need to be removed. Mr Fenn also said that due to these requirements that there had been many objections to the bridge construction and the new road from the locals. Mr Fenn advised the group that the new proposed road will cross the walk trail along the eastern rivers embankment which will require a section to be realigned. He said that they are trying to get the road on cleared land but at some point it will have to cross the river which will require trees to be removed. Mr Fenn advised that the footprint for clearing would be minimised to what is required and that no clearing outside the required area will be allowed.

Mr Goode then said that today we would go and physically look at the 5 proposed sites and identify the location that would have the least impact on Noongar values. Mr Goode advised that the survey team would travel in convoy and would be directed by UHF radio.

There being no further questions the group drove in convoy to the first stop. Option 1 was accessed via Scotsdale Road and Riverbend Lane. The group viewed Option 1 on the west side of the river at coordinate 533 267mE & 613 3124mN.



Figure 4: the survey team examine Option 1 at the end of Riverbend Lane; view of the group is west. The insert looks across the river to the east.

Mr Fenn advised that at this location there was previously a bridge that had burnt down. This area had flooded four times in the past 40 years and water had covered the previous bridge remains.

Mr Fenn said that on the approach to the crossing there is also a 400 year old tree here and a number of similar younger trees in the area that the community are concerned will be removed. Mr Fenn advised that it would be difficult to save the old tree and build a road and bridge to modern standards (width of road) so the tree would probably have to be removed.



Figure 5: Mrs Jacqueline Harris and Mr Bill Harris display the project plan to the group showing the bridge option locations. In the background is the 400 year old Karri that would be removed if Option 1 is selected. View is to the north east at the intersection of Ritchie Road and Riverbend Lane at coordinate 532 987mE & 6133 065mM.

Mr Fenn said this was previously identified as the preferred alignment for the bridge because it was the shortest point and flattest land to cross the river and was already disturbed from the old bridge.

Mr Goode asked what clearing would be required. Mr Fenn said the road would be 7m plus 1m either side giving a total of 9m width. However that could extend to 11m – 18m in places. Mr Foley said the steeper the land was the wider the clearing needed to be. Mr Fenn said this location had the least gradient of all options.

Mr Goode asked the group their views if the tree was removed.

Mr Alwyn Coyne said the tree should be saved stating that it was a major issue to him if it were to be removed. Mr Colbung said that he was comfortable with removing the tree as he thought the bridge was more important to the town than the tree. The rest of the group however advised that they thought that the tree was also important and would want it saved if possible. On this basis all advised that they would make a decision later in the day when they had examined all of the options.

The group then walked to the river where the proposed bridge crossing would be. Here Mr Goode asked the group if a bridge at this location would be better in terms of Aboriginal heritage values regards the mythological significance held for the river.

Mr Colbung said that culturally the *Waugal* moves up and down the river so any spot chosen would have the same impact on our beliefs. All agreed that the impact upon spiritual values would be the same at each location; as such the group advised that the decision made would be made on the basis of environmental issues as opposed to cultural ones. All advised that the bridge design that is a span bridge with no pylons in the river was in keeping with Noongar values and that they support the building of the bridge as it is needed for community safety.

Mr Fenn said in terms of vegetation this option had the most profound impact but a better slope and use of open land would make it an easier engineering option. Mr Foley said in a 100 year flood the river would likely be 6m deep; currently it was about 3m so the bridge would be up high.

Ms Irene (Winnie) Larsen was unable to walk to the river with the group so she had remained in the car. Upon our return to the car she was briefed about the conversations. Ms Larsen said if the tree was removed she would like to see an ornament or memorial made out of it but she preferred to save the tree.

In relation to this crossing (Option 1) Mr Fenn advised that the East River Road extension from the river back to Scotsdale Road could either follow Riverbend Lane or go through the paddock to the north of Riverbend Lane, in order to be further from people's houses. All stated that they think that the northern road alignment was better as it was away from the houses.

The group then continued in convoy along East River Road back to Scotsdale Road to Option 2 at coordinate 532 265mE & 6132 893mN.



Figure 6: View east for Option 2, here the road will require a dam to be in filled and will require a large area of land to be raised in height for the connecting road to Scotsdale Road. Past the dam the alignment swings to the south east to cross the river

Mr Fenn advised that using this option would cost more money and require a dam to be filled on private property. Mr Fenn said that this was a flat floodplain and would require a lot of earth works however there was less significant vegetation to impact at the river crossing point. Mr Fenn also said we would get a better view from the other side of the river when we went there later. Mr Goode asked the group to comment. Here people were concerned about the roads proximity to a house. No cultural issues were raised that had not been spoken about at the previous location. The group then walked to Option 3 further south along Scotsdale Road at coordinate 532 717mE & 6132 673mN.



Figure 7: the survey team view option 3 from Scotsdale Road. Photo looking north, insert shows the river crossing point to the east.

Mr Fenn advised that here there were issues with the flood plain height at this location. There was a flat delta and then a steep rise. They would need to cross the floodplain and the bridge would have to be built up plus the gradient to the road would slope the bridge. Mr Foley said the bridge would slope down from here because of this gradient, from an engineering perspective this was not an ideal location. Mr Fenn said there was some impact to bush at this location on the western side but across the river to the east it is mostly paddock. Here Mr Goode asked for comment; none was given at this stage.

The group then walked further south along Scotsdale Road to Option 4 at coordinate 532 751mE & 6132 529mN.



Figure 8: Left: the survey team walking north along Scotsdale Road after viewing Option 4. Right: Option 4.

Mr Fenn said there was restricted room in the road reserve at this location to connect the new road to Scotsdale Road. If this option was used a roundabout would need to be installed on Scotsdale Road. There is also massive fill needed here, however this option has the shortest distance through vegetation. Mr Fenn said in terms of fill required and the steep slope this option was the most challenging for the engineers but would have a small impact upon big old high value Karri particularly on the eastern side which was farm land. The group were asked to provide their comment but declined until they had had a chance to consider the final option, Option 5 which could only be accessed from East River Road on the eastern side of the Denmark River.

The group then drove to the other side of the river stopping at the Agricultural College where Mr John Hendry, Assistant Farm Manager escorted the group through the property.



Figure 9: Mr Robert Fenn and Mr John Hendry (Agricultural College Farm Manager) examine plans and brief the Aboriginal community on the effects that the different options will have upon the college.

Mr Fenn explained the road options 2 to 4 would sweep through the paddock where we were stopped. This was the opposite side of the river and slightly south of Option 1. Mr Fenn advised that where we had stopped was a river gauging point where measurements were being taken to understand the river flow. The crossing for option 2 was downstream of this.

The group then walked along the walk trail to view the other options (2-4) however it was inaccessible as the path was under water. Mr Fenn said all of these three options (Options 2-4) require the most fill and there were engineering constraints on all, however he stated that the Noongar community should base their decision making upon their cultural values not on other constraints.

Mr Goode mentioned that Option 3 was the preferred option discussed by the people in his car on the way to this location.

Mr Fenn said that the further south you travel the steeper the slopes and the more fill that is required.

The group walked back to the cars where Mr Fenn physically pointed out where the three proposed crossings would be situated.

The group then drove to Option 5 on East River Road at coordinate 533 622mE & 6133313mN.

Here a bridge would be built straight across the river and then the road would swing to the south to join Scotsdale Road on the Option 1 north alignment. However according to Mr Fenn it is an unlikely choice due to the need for extra bridges, the land requirements for roads and clearing requirements but the project team were asked to consider this and its constraints in the studies.



Figure 10: Mr Fenn explains Option 5 at the end of East River Road on the east side of the Denmark River adjoining the Agricultural College.

After this description Mr Goode asked the group to give consideration to all the options discussed and then rank them in preference with their reasons given.

In relation to the project Mr Fenn then again provided further information for where Option 1 crosses the river. Mr Fenn said that they would not be rebuilding the original road advising that the new road will be on cleared land.

Mr Goode said that at the previous survey this was the preferred option but the people did not know where the roads would go. Mr Goode asked the group what their opinions were now that they knew when the road is likely to go.

Ms Vernice Gillies said she believed in the previous survey some people were convinced by others that this option was best. She believes they chose this option because of the Agricultural College needs and lack of information given on that survey. Ms Gillies said that her preference was to not use this option due to the environmental effects, especially the loss of large Karri trees.

Mr Fenn said there was no information to provide at the time of the previous survey. Mr Goode asked in terms of cultural values if any of the options were worse than the others.

All in the group agreed they all options had the same impact on Aboriginal spiritual values as assessed under the *Aboriginal heritage Act 1972*. All agreed that a bridge could be built but the location would be decided after some debate. The group then debated the issues making statements of preference.

Ms Jeanice Krakouer said in terms of flora and fauna and rare species she believed Option 3 was the best choice but was unsure about safety issues. Mr Glen Colbung said the roundabout would slow traffic so Option 4 was not preferred. Mr Alwyn Coyne said we obviously need a new bridge so we just need to pick the best option. Ms Sue Kelly said the group could only advise on the best option for cultural issues not road issues. In terms of cultural issues Mr Glen Colbung said any option is the same as the *Waugal* moves up and down the river. Ms Vernice Gillies said it doesn't matter because the bridge goes over the water anyway. Ms Donna Blight said the Scotsdale brook comes in here at Option 1 so this also needs considering. Ms Blight said that you can't disconnect the environmental issues and social issues from cultural issues.

All agreed that wherever the bridge goes there should be no pylons on the abutments or in the river and that the water flow maintenance was paramount to Noongar values.

Ms Sue Kelly said she preferred Option 3 as there was less impact on the fauna and flora.

Mr Foley advised the level 2 flora and fauna survey still needed to be completed and as a part of that they needed to come back in spring to check for flowers again. Mr Glen Colbung reminded them to look for possums.

After much debate it was decided to go back to the Shire Offices to continue the discussion in a dry environment and have lunch. The group left the field and drove to the Shire offices.



Figure 11: Mr Goode at the Shire Offices facilitates the final debate where rankings and recommendations are made.

After lunch Mr Goode asked the group if they had any cultural objections to the Shire of Denmark progressing with the project and in particular constructing a span bridge crossing over the Denmark River. Mr Goode also asked the group to determine if the bridge would interfere

with their cultural values for the Denmark River and to determine management advice with regards to determining ways to reduce this affect.

In response all in the group said they had no objections to building a bridge as the design had no pylons in the water it would have a small impact upon the cultural values of the river as they are enshrined in maintaining the waters flow. Mr Goode asked in terms of the AHA would the group support a section 18, all agreed to support it.

Ms Vernice Gilles said the agreement was however subject to assurances that there would be no interference to the rivers water flow and no pylons would be put in the river.

Ms Donna Blight asked what was being done about sediment and sand going into the river during construction. Mr Foley said it could be managed during construction with sediment traps.

Mr Goode asked the group in terms of the abutment how close could they be to the waters be before they considered it would interfere with flow.

Ms Sue Kelly asked what the norm was.

Mr Fenn said that currently the river was beyond it banks and that in summer it would be much narrower. The abutment would normally be at least 5m back from the top edge of the river so that if erosion happened you could still walk under the bridge.

Ms Lynette Knapp said that normally the river is registered to 30m from the high water mark that the abutments should be way back to allow for floods. Ms Knapp said *Bilya* is the name for river and for nursing mother's milk which reinforced to her how important rivers are. Ms Knapp said the oldies camped at least 100m back from the water so as not to interfere with it. She believes that the abutments should be as far back as possible.

Mr Fenn said that the design is intended to accommodate a 100 year flood. He said that the abutment would be set back as far as they are needed to be, to accommodate this event. Mr Glen Colbung said different families had different ideas and values. He stated that others may not necessarily agree with Ms Knapp's views.

Mr Goode asked if the questions about abutments related to water flow.

Ms Jeanice Krakouer said that as long as it is not interfering with habitat. Ms Krakouer said the values in designing the bridge were the river flow, the flora, the habitat, and the fauna. She requested that when doing site work they ensure that no sand goes into the water siltation is an issue as well. All in the group agreed.

At the end of this debate Mr Goode recapped today's options stating that previously in Guilfoyle's report it stated that Option 1 was preferred however that was based on minimal information, and being a former bridge location. Mr Goode said that now we have more information on types of bridges, possible road location and flora and fauna information to base decisions on.

Mr Glen Colbung asked if there were white ants in the old Karri tree at Option 1. Mr Fenn said that is a rumour that needed to be confirmed. Mr Fenn said an Arborists report would be sought.

At this point the consultants left the room so the survey participants could discuss the proposal amongst them and choose their preferred option.



Figure 12: Ms Vernice Gillies provides the project team with the Noongar community's views and recommendations.

Upon the consultants return Ms Vernice Gillies who was the elected spokesperson for the group said the group had voted and just over half of the people had preferred Option 3 as it had less environmental impact and less entry impact. Option 1 was preferred by the rest of the people as it was the site of an existing bridge and if there were white ants in the tree it would fall over anyway. Overall they requested as little as possible impact on the rivers vegetation and river flow. It was requested that an arborist view the 400 year old tree to determine its life expectancy before a final decision was made.

Mr Fenn agreed to the arborist report being done.

Mr Goode advised the group that once the section 18 notice was lodged it was possible that the river would be taken off the register by the ACMC unless statements from Noongars determined it to be a sacred place of special significance. Mr Goode asked the group what was special about the river.

Mr Colbung said the river itself is not sacred; it is what's in it that is sacred. He stated the *Waugal* travelled everywhere which makes the whole river sacred and special. Ms Vernice Gillies said the river is life. Mr Alwyn Coyne said the Noongar people went to the river to get water but then moved away from it. Mr Coyne said that culturally both sides of the river are important and must be kept environmentally fresh and clean. Ms Jeanice Krakouer said their people survived many generations practicing their traditions there. She said the history books will tell you of the strong presence and significance of the river. Ms Krakouer said the river is very special, stating 'It gives our people life and should remain protected under the AHA as it gives us a say in its management.' Mr Colbung said they used to camp on the rivers as kids and catch big marron, turtles and fish. The river was a food source and provided fresh water. Ms Sue Kelly said the river was a migration path for inland people going to the coast and the interchange between clans. Ms Vernice Gillies said this river is a boundary for us. Ms Jeanice Krakouer said that women used rivers for birthing. Ms Treasy Woods said that parts of the river had been taken by the landowners who have cleared the bush right to the river. She said we must be careful to preserve what is left the AHA gives us that opportunity.

Discussion then turned to the road requirements. Mr Goode said in regard to the road upgrade the orange line on the maps represents the widening and alignment corridor. Mr Goode asked if any Aboriginal heritage sites were known in these areas. All advised no not to their knowledge.

Mr Goode advised that Mrs Jacqueline Harris and Mr Wayne Webb had walked the area during an archaeology survey (see Harris 2016). He then handed over to Mrs Harris who advised that there were minimal chances of finds as there was dense ground cover and lack of visibility therefore they found nothing. Mrs Harris said digging is usually the only way to find artefacts in this type of environment. Mrs Harris recommended monitoring and sieving near the water and up to 100m back from where the bridge and road are built. Mrs Harris said she had not much concern with the East River Road or McIntosh Road as it was too swampy for camping.

Ms Lynette Knapp said they want an archaeologist there when doing the monitoring so sieving could be done and they could get some satisfaction from finding evidence that their ancestors had been there.

Mr Goode asked the group what they would like done with any artefacts if they were found.

Ms Gillies said they should be looked at, photographed, measured and recorded but then they should stay on country or put in a safe place in the same area. Mr Glen Colbung said people didn't camp near the river because of the tiger snakes. Ms Janice Krakouer said there may be graves close to the river as the soil was much softer there to dig.

Mr Goode said they could recommend monitors at places where there was potential for archaeological finds. This was supported by the group.

Mr Fenn also mentioned that the Shire had a dual naming policy and asked to the group to recommend a name for the bridge. Mr Fenn said there was also a name needed for a road and asked the group to get back to them with suggestions. Ms Krakouer said this could be taken to the working party for a decision

Ms Gillies suggested Kwoorabup Bridge. Ms Knapp suggested Bilya. Mr Coyne said his Dad said Kwoorabup was the name for it. Ms Krakouer agreed with Kwoorabup as she said it made sense.

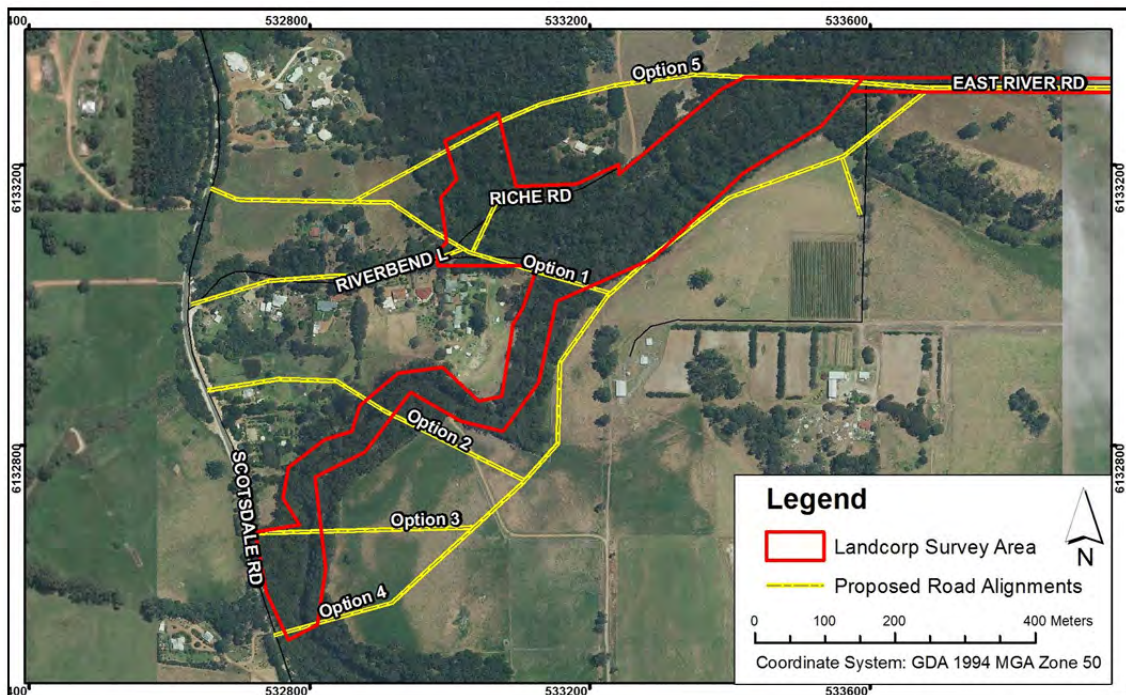


Figure 13: Map of Options 1 to 5 of the proposed road alignments & bridge sites.

COMMUNITY CONSULTATION OUTCOMES

As a result of consultations held with several SWALSC selected members of the Wagyl Kaip WC1998/070 Native Title Claim group **no new** ethnographic sites of significance as defined by section 5 of the AHA were identified to be located within the Denmark East Development Precinct.

As such the Shire of Denmark can proceed with their development plan without risk of a section 17 breach of the AHA occurring in relation to ethnographic sites and places.

In relation to Site ID 22081 Denmark River, the Wagyl Kaip WC1998/070 Native Title Claim group members consulted are prepared to **support a** section 18 consent notice to conduct geotechnical investigations, to construct roads and to construct a bridge over the Demark River conditional to the bridge not having pylons in the river, conditional to having the bridge abutments as far back from the water as possible, and conditional to minimising clearing of high value flora in particular mature Karri.

In relation to ranking the 5 options for the bridge locations it was advised that they all have the same value in relation to the effects that this work has upon the sacred beliefs held for the river as the Rainbow Serpent (*Waugal* or *Mardjit*) is omnipresent in the entire river and is believed to be responsible for maintaining the river.

In terms of other values held the Wagyl Kaip WC1998/070 Native Title Claim group members consulted identified Option 3 then Option 1 as their preference for the bridge as these options provided the best environmental outcomes in relation to clearing of high value flora.

Option 3 was preferred over Option 1 as this required less clearing of mature Karri and in particular a large old tree at the apex of Ritchie Road and Riverbend Lane. Should an Arborist report find that this tree has white ants that would limit its long term survival then Option 1 would then have a more equal rating with Option 3 as the preferred bridge location, as it was formerly where an old bridge had existed and as such was seen to be already disturbed.

As a result of the consultations the Wagyl Kaip WC1998/070 Native Title Claim group members consulted suggested that the new bridge be named 'Kwoorabup', the Noongar name for the Denmark River.

In terms of management of heritage values during construction the Noongar community requested that 2 monitors be appointed, 1 male and 1 female, to monitor earth works for artefacts where the archaeologist identifies where there is potential for subsurface material to be located. Should artefacts be found they are to be professionally recorded by an archaeologist and then relocated to an appropriate place along the river by the monitors in keeping with the wishes of the elders consulted.

In terms of managing environmental values all requested that clearing of the corridor be kept to a minimum, that Cockatoo habitat and nest sites be avoided and that pollutants and siltation be managed at bridge sites during construction. The group also wished the social amenity of the rivers foreshore maintained in particular the walk trail along the eastern embankments.

RECOMMENDATIONS

As a result of the survey the following recommendations are made in relation to the Western Australian *Aboriginal Heritage Act 1972*:

It is recommended that the Shire of Denmark makes application under section 18 of the AHA for ministerial consent to use the land located within the DAA registered site, Site ID 22081 Denmark River for the purpose of geotechnical investigations, road and bridge construction and services.

As the Wagyl Kaip WC1998/070 Native Title Claim group members consulted are supportive of the project **it is recommended** that this consent is granted conditional to the bridge not having pylons in the river, conditional to having the bridge abutments as far back from the water as possible, and conditional to minimising clearing of high value flora in particular mature Karri.

It is recommended that the Shire of Denmark engage Noongar monitors during clearing activities at the bridge site and where the archaeologist recommends that potential exists for subsurface archaeological material to exist.

Should archaeological material be identified **it is recommended** that it is reported to the DAA (section 15 of the AHA) and that an archaeologist is called in to record such material and seek advice from the DAA in regards to approvals that are required before proceeding further. Any material subsequently recorded should then be relocated to another location along the river and not be removed from the area.

In relation to the bridge location the Wagyl Kaip WC1998/070 Native Title Claim group members consulted advised that they preferred Option 3 and Option 1. This advice was given in relation to environmental issues as opposed to cultural values. As such **it is recommended** that the Shire of Denmark give due consideration to this request.

In terms of other issues **it is recommended** that:

- The new bridge is named 'Kwoorabup', the Noongar name for the Denmark River;
- That clearing of the corridor be kept to a minimum;
- That Cockatoo habitat and nest sites be avoided;
- That pollutants and siltation be managed at bridge sites during construction;
- The social amenity of the rivers foreshore maintained in particular the walk trail along the eastern embankments.

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**REPORT OF AN ARCHAEOLOGICAL ABORIGINAL HERITAGE
SURVEY OF THE DENMARK EAST DEVELOPMENT
PRECINCT: SHIRE OF DENMARK, WESTERN AUSTRALIA**



Figure 14: Looking west along East River Road from Denmark-Mt Barker Road intersection.

A report prepared for LandCorp and the Shire of Denmark

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September 2016

EXECUTIVE SUMMARY

An archaeological investigation for Aboriginal heritage sites was commissioned by LandCorp; to determine an appropriate location to construct a second bridge over the Demark River; to upgrade 6.5km of local roads; and to support the delivery of an industrial estate adjacent to McIntosh Road. The study area, that incorporates all four bridge crossing options, focuses on the northern part of Denmark township and extends eastwards.

It includes a section along the river bank measuring some 1.2km x 50 - 100m wide either side of the Denmark River 1.7km upstream of Denmark Bridge.

The five bridge crossings transect the river bank: at Riverbend Lane in the north; the second route continues through Agriculture College paddocks for 1.3km then crosses the river; the third route continues through Agriculture College paddocks for 1.7km then crosses the river; the fourth route continues through Agriculture College paddocks for 2km then crosses the river; the fifth route is the most northern route of 780m (added on 31st August 2016) which crosses the river north of Richie Road and joins East River Road.

The proposed route then runs along East River Road for 4.3km where it hits McIntosh Road and runs south for 2.5km culminating at the rubbish depot. The width of the road corridor is generally 20m. Subsequently the intersection of McIntosh and East River Roads was enlarged from its present status by 2.55ha on its southwestern boundary to allow turning lanes for articulated vehicles.

The field survey was undertaken on the 10th to 11th of July 2016 by Mrs Jacqueline Harris, senior archaeologist with Mr Wayne Webb, a Bibbulmun/Wardandi representative and senior field assistant, and Ms Toni Webb, a senior field assistant. A further survey was conducted on the 31st of August 2016 by Mrs Jacqueline Harris to include the proposed turning lane in the eastern section of the survey area. This survey incorporated revisiting each of the five bridge options from both sides of the river together with some fifteen Aboriginal custodians. The sample survey of the project area to identify any archaeological sites incorporated three persons walking the proposed four optional river crossing alignments, the road widening route and the Denmark River banks. Predictive intensive transects were conducted at potential areas of interest such as devegetated patches and river banks. It was estimated that the overall percentage coverage of the designated project area was around 50%. Ground visibility around the banks of the river was low at 10% and associated woodland, 20% on cleared paddocks and 30% on verges and tracks beside the roads throughout the route.

The verge along the alignment of East River and McIntosh Roads comprised ditches with low shrubs and tall trees along the edges of the road reserve. A transmission line followed the alignment on East River Road. The paddocks alongside the river were undulating, containing pasture and crops. They have been cleared of natural vegetation thoroughly and are surrounded by electric fencing with some remnant vegetation only along the windbreaks. There is a walking path meandering along the edge of the river on the eastern side. Access to private land on the western bank of Denmark River was limited.

The remains of a wooden bridge crossing are present in the first optional crossing. At the second optional crossing in close proximity there is a weir and monitoring devices to measure the volume of water flow. The vegetation is similar on either bank with a 50m thin band either side of the river with private cleared property on the west bank and cleared agricultural college land on the east bank.

An online search of the site register at Heritage and Culture Division, Department of Aboriginal Affairs, was undertaken on the 7th of July 2016 in order to determine if there were any Aboriginal heritage sites or heritage places that would affect the project. The search defined

that there were no archaeological but one ethnographic site that overlaid the project area. The ethnographic component is referred to in the first section of the report.

No archaeological site or heritage place was previously registered within the project area. Further no archaeological site or heritage place was located during the survey. Therefore there are no archaeological barriers present to affect the development along any of the proposed alignment corridors.

Because of the nature of artefact sites being generally located around rivers and the moderate to high likelihood that subsurface deposits may be present it is recommended that any ground disturbance or vegetation clearance in areas surrounding Denmark River is monitored by an archaeologist and two Aboriginal consultants during the removal of sediment and vegetation. The preferred areas for monitoring are immediately beyond the flood line of the river and within the 30m buffer zone of the high water mark and on the higher bank at the junction of several tributaries and Denmark River.

The most likely areas where archaeological sites, in particular, artefact scatters or burials, may occur are banks of creeks and exposed sandy deposits. The removal or excavation of large quantities of sediment increases the risk of disturbing archaeological sites that may lie beneath the ground surface. **It is recommended** that LandCorp inform any project personnel of their obligation to report any archaeological material, should this be encountered during earthmoving, as outlined under Section 15 of the *Aboriginal Heritage Act 1972*.

If LandCorp locate an archaeological site in the process of survey or ground excavation, **it is recommended** that work cease in the immediate area. Any skeletal material should be reported to Department of Aboriginal Affairs and the Western Australian Police Service. Any artefactual material should be reported to Heritage and Culture Division, Department of Aboriginal Affairs.

INTRODUCTION

PURPOSE

An archaeological investigation for Aboriginal heritage sites was commissioned by LandCorp; to determine an appropriate location to construct a second bridge over the Demark River; to upgrade 6.5km of local roads; and to support the delivery of an industrial estate adjacent to McIntosh Road.

Specifically a second bridge crossing over the Denmark River is required to accommodate local traffic movements for residents living to the north of the town's Central Business District and to provide an alternate access for the Denmark community in the event of a fire or another emergency. LandCorp propose to develop a road connection from Scotsdale Road to the airstrip and South Coast Highway (using the East River Road and McIntosh Road alignments) and an industrial area adjacent to McIntosh Road.

The scope of work was provided in a written document to Brad Goode & Associates Pty Ltd by Robert Fenn, Senior Development Manager, LandCorp.

The objective of the investigation was to establish if any archaeological sites were located in the vicinity of the proposed study area, determine the integrity of any sites and any effects the proposal may have over such sites. A report was required after completion of fieldwork.

STUDY AREA

The town of Denmark is located 420km south southeast of Perth in the Great Southern and 54km west of Albany. The study area, that incorporates all four bridge crossing options, focuses on the northern part of Denmark township and extends eastwards.

It includes a section along the river bank measuring some 1.2km x 50 - 100m wide either side of the Denmark River 1.7km upstream of Denmark Bridge.

The four bridge crossings transect the river bank:

- at Riverbend Lane in the north where it runs along the edge of river banks through Agriculture College paddocks for 700m then crosses the river with one option continuing along Riverbend Lane for 600m and the other 150m north running through private land for 600m;
- the second route continues along the edge of river banks through Agriculture College paddocks for 1.3km then crosses the river and runs through private property for 300m;
- the third route continues along the edge of river banks through Agriculture College paddocks for 1.7km then crosses the river and runs east west for 50m to Scotsdale Road;
- the fourth route continues along the edge of river banks through Agriculture College paddocks for 2km then crosses the river and runs east west for 50m to Scotsdale Road.
- the fifth route is the most northern route of 780m (added on 31st August 2016) which crosses the river north of Richie Road and joins East River Road.

The proposed route then runs along East River Road for 4.3km where it hits McIntosh Road and runs south for 2.5km culminating at the rubbish depot. The width of the road corridor is generally 20m. Subsequently the intersection of McIntosh and East River Roads was enlarged from its present status by 2.55ha on its southwestern boundary to allow turning lanes for articulated vehicles.

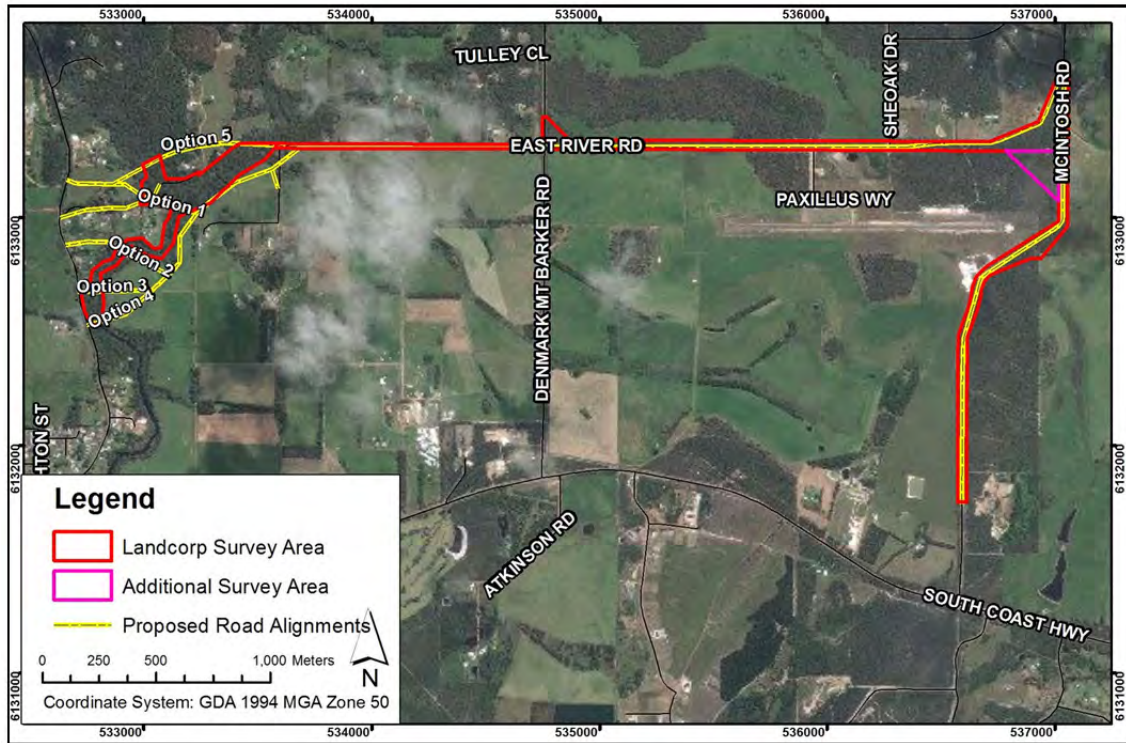


Figure 15: Map of the LandCorp Denmark East Development Project survey area.

ENVIRONMENT

Climate

The project area lies within the south-west region of Western Australia which is characterised as a dry Mediterranean climate consisting of hot, dry summers and mild, wet winters. The mean maximum temperature (at Denmark station) is 25.9°C and mean minimum temperature in July is 6.9°C. The region is a winter rainfall zone with annual rainfall ranges of 995mm, most of which falls between May and September. During winter the prevailing winds are the north westerlies and westerlies associated with lows and cold front activity (Beard 1981, WA Bureau of Meteorology).

Geology and Landform

The study area lies within the Yilgarn block, a stable Archaean granite and infolded metamorphic rock of migmatite. It is characterised by dissected undulating country of small relief, hard setting loamy soils alternating with leached sand soils. The coastal dunes are mantled in calcarenite and unconsolidated sands (Beard 1981).

The Denmark River in the Denmark Catchment encompasses a land mass of 800 square kilometres and comprises Denmark, Hay and Sleeman Rivers and their tributaries. It rises in the north from Pardelup and flows south for 60 kilometres where it drains into the Wilson Inlet at the Denmark townsite. The catchment area has an average rainfall of 650mL in the northern section to 1100mL along the coast (Guilfoyle 2011, p5).

Denmark River and Wilson Inlet are situated on a narrow coastal plain some 10km wide with coastal dunes to the south and moderate undulating hilly plains to the north leading to the catchment of the upper plateau dominated by low hills. Granite outcrops are present along the shores of Wilson Inlet and in the hilly terrain on the east and northeast of the catchment (Townley 2009)

Vegetation

The vegetation falls partially within Hay System of Menzies Subdistrict and Denmark System of Warren Subdistrict. In the former it is dissected with *jarrah-marri forest on the upper slopes and ridges and jarrah - Casuarina low forest on lower slopes and swamps in the valley*. There are *patches of karri in the south on riverine alluvial soils* but otherwise the forest is poor. *Valley-floor swamps* (on Denmark-Mt Barker Road) *consist of reeds with scattered shrubs* (Beard 1981 pp 191-2).

In the latter system *karri ..appears on the highest ground* and is often associated with granite where red soil dominates. Karri appears also on alluvial soils but mid and lower slopes are usually occupied by *jarrah - Casuarina* on sand and/ or laterite. Wide belts of swampland occupy flat valley bottoms. Apart from karri tall forest there are *jarrah-marri forest on laterite and yellow podzolic soils, jarrah or jarrah- Casuarina low forest on bleached sands and reed swamps* (Beard 1981 pp 193-4).

In general terms, 'the natural vegetation of the Denmark and Hay Rivers is predominantly forest with a great range of forms and diversity of species. Karri (*Eucalyptus diversicolor*) forest occurs in the hilly country, usually on loamy soils derived from granite outcrops or along incised mainstream valleys. Jarrah (*Eucalyptus marginata*) formations dominate over much of the area. Throughout the area there are broad swampy drainage lines which carry paperbark or banksia woodlands and reed swamps, with sandy flats subject to seasonal inundation bearing low woodland of jarrah, marri, wandoo or swamp yates' (South Coast Rivercare 2007).

The fringing vegetation of the river valleys represents a significant ecological corridor connecting patches of remnant bush along the banks of the river. In 1995 only 49% of the Denmark foreshore that bordered agricultural land was fenced off. The middle and lower sections of the river are very scenic. Points of erosion and subsidence and sections of extensive degradation however do occur. The increasingly saline upper half of the river is degraded, exhibiting erosion along fire breaks located within the floodplain of the river valley, siltation and some vegetation die-off, as a result of salinisation' (South Coast Rivercare 2007).

History

Archaeological evidence in the Albany-Denmark area indicates a history of occupation and use by Aboriginal groups extending from at least 18,000 years BP (Ferguson 1985). From the 1800s the area was intensively used by whalers and sealers, largely around the offshore islands and coastal strip. Exploration and sporadic settlement occurred in the 1820s and 1830s, with permanent European settlement in Denmark commencing in 1910. Parts of Denmark region contain dairy farms, while logging activities have been the main industry within the surrounding forests. The majority of the land surrounding the estuaries and rivers near the town is forest reserves and National Parks (Guilfoyle 2011 P7).

Integrity

The waters in Denmark River are currently used for farming including irrigation purposes and watering stock - for farmlands and the Denmark Agricultural College. Recreational uses, such as kayaking, canoeing and motor boating, are pursued in the lower reaches of the river near Wilson Inlet (Guilfoyle 2011 P7). The proposed road alignment routes transect banks of the river, previously constructed roads, woodlands and cleared paddocks. A greater portion of the banks of the Denmark River contain remnant vegetation and terrain as do sections of road reserve enclosing roadways.

ARCHAEOLOGICAL RESEARCH

DESKTOP STUDY

An online search of the site register at Heritage and Culture Division, Department of Aboriginal Affairs, was undertaken on the 7th of July 2016 in order to determine if there were any Aboriginal heritage sites or heritage places that would affect the project. The search defined that there were no archaeological but one ethnographic site that overlaid the project area. The ethnographic component is referred to in the first section of the report.

In order to encapsulate the heritage signature of the area, the register was again searched within the land mass contained within the Shire of Denmark. The shire concerns an area measuring some 60km east/west by 35km north/south. There were 18 registered sites and 26 heritage places recorded over the roughly 2100 square kilometres. These consisted of a rich array of types including artefacts scatters, fish trap, manmade structures, quarries, grinding patches, rockshelters, engravings, gnamma holes, lizard traps and a ceremonial and a mythological site. The majority of these sites and heritage places related to the southern most points- Wilson Inlet and Point Irwin.

REVIEW OF HERITAGE SURVEY REPORTS

Dortch C. 1988, *Aboriginal Survey of the Quickup Dam proposals and related features in the Denmark Water Supply*, Prepared for Water Authority.

The survey area included the proposed Quickup Dam at 3.5km mark above the confluence of Quickup & Denmark Rivers. The examination included other related features and three alternative points at the 0.8, 3.8 and 4.7 marks along the river. No artefacts were found in lateritic soil but six were found in red sandy clay and white sand along a 1.5km track though the density was low. The pipeline route did not reveal any artefacts.

It is suggested that the wooded hinterland surrounding the proposed dam may have been little utilized although dense undergrowth prevented a reasonable survey. However a comparison is made with the forested Darling Range near Perth where low water levels at dam sites revealed a collection of artefacts not in situ. The author opines that the focus for occupation was at Wilson Inlet where a rock shelter and fish traps were located.

Chown, R. & Mattner J. 2010, *Aboriginal Heritage Surveys & Section 18 Consultation for Proposed Cabling Denmark River*, Prepared for Western Power.

The survey was located immediately east of the township on a proposed route that crosses Denmark River from north to south bank. The survey was conducted with Traditional Owner Wayne Webb and extended north from the river to the track south of the Health Campus and south of the river across South Coast Highway and along the edge of Fyee Street. The search was conducted on both banks of river where it was proposed trenching for cabling would be undertaken to allow boring under the riverbed.

No artefacts were located as a result of dense vegetation along the river and over most of the route and severe ground disturbance within the narrow area of survey. The author felt the higher ground on the southern side of Denmark River was a more suitable place for Aboriginal activities but this area was more disturbed.

Guilfoyle, D. 2010, *Archaeological Investigations, Coalmine Beach Car Park*, Prepared for The Department of Environment and Conservation

The small survey area concerned Coalmine beach ramp and jetty. Several shovel test pits were dug within the area and several artefacts were identified. However no further statement is made concerning these artefacts. One artefact was found 75cm below the surface in association with

charcoal which was radiocarbon dated to 6561 ±30 BP years. The date however is questionable as the matrix was a Holocene homogenous sand dune formed during the last marine transgression and the artefact may have travelled within the loose sandy soils. The author suggests the area surrounding the inlet and associated waterways was used intensively and that the artefact demonstrated sub surface potential. Guilfoyle recommends that the whole inlet is designated a continuous site as a scatter of quartz artefacts were located along walk trails and blowouts and other exposed areas outside the project area suggesting that the whole area contains artefacts but they are camouflaged by vegetation.

Guilfoyle, D. 2011, *Aboriginal cultural heritage management plan for southern section of Kwoorabup Beelia (Denmark River)*, Prepared for Shire of Denmark and Department of Indigenous Affairs.

This report is a CHM model for Denmark River. Its objectives were to identify all Aboriginal heritage sites within the study area; and make recommendations on statutory and strategic procedures to protect Aboriginal Heritage at Denmark River foreshore. The document outlines the policies and procedures to be agreed upon by all parties in the implementation of the various management actions. It was completed with consideration given to the wider planning framework for the Denmark River foreshore and development activities that are likely to impact on the study area in the future.

Mitchell, M. & Guilfoyle D. 2012, *Aboriginal Cultural Heritage Assessment of Sections of Kwoorabup Beelia (Denmark River) and the Frankland River Carpark, Nornalup*, Prepared for Shire of Denmark.

The area of survey concerned three areas along Denmark River and one on the Frankland River at Nornalup. These proposed shire works comprising improvement and management proposals adjacent to rivers were all on areas designated heritage sites in accordance with the Heritage Act and thus permission was sought from the Traditional Owners so that the proponent may apply for a Section 18 for permission to disturb. Permission was granted unanimously allowing the council to proceed.

Goode, B. & Harris, J. 2005, *Kinjarling The Place of the Rain: The City of Albany*, Prepared for The City of Albany & Department of [Aboriginal] Affairs, Aboriginal Heritage

Research and ethnohistorical literature has established that Aboriginal settlement patterns flourished throughout the City of Albany. Whilst most areas were accessible and utilised for hunting, gathering and maintenance purposes some locations were preferable as longer duration or frequently revisited campsites. These areas such as woodland, coastline, rivers, estuarine and lakes were preferred locations while other areas such as forests were used intermittently in season but nevertheless throughout the year.

Access to all regional areas was achieved along established tracks along riverbanks, across river fords, ridges and hill passes. Movement was undertaken from water source to water source constantly to camps of short duration leaving an archaeological imprint of sparse but scattered campsites. Where trackways intersected or where a focal resource was present, was a prime camp site.

As jarrah marri forest expanded and contracted over millennium camp sites were similarly posited; therefore camp sites may be located in presently forested areas, woodland and/or farmland when conditions overtime improved and permitted. Present sites recorded along the coast and immediate hinterland is indicative of a time period of recent to several thousand years ago after sea level reached its present height.

The visibility factor is a constant problem in locating sites in forests, along rivers, creeks and valleys in the Albany region and these conditions are unlikely to improve or alter without disturbing the environment such as clearing or firing. Just as Dortch (1987) found east of Albany at Jerramungup District the evidence from previously recorded sites and research suggests the focus of Aboriginal activity was concentrated around lakes, river channels and estuarine with some visibly conspicuous activity along the immediate coast.

Analysing the limited site data lead to three major statements in accordance with site locations within the landscape:

- Archaeological sites are more likely to be located on the coast as a factor of their inherent high visibility and conspicuousness.
- All areas near a water source, fresh, salt or seawater, are potential prime site locations.
- Areas surrounding lakes are prime site locations.

Goode, B. & Harris, J. 2014, *Report of an Aboriginal heritage survey of proposed Denmark WS source augmentation project C-W02567*, Prepared for Water Corporation.

The survey concerned a corridor between Denmark River Dam and Quickup Dam where new water pipes were proposed as well as improvements to the infrastructure at Denmark Dam. The area was composed of cleared paddocks, densely grassed fields of pasture, riverine alluvial plains, firebreaks and tracks, transmission line, and a large dam, infrastructure and drains. The total route has suffered disturbance from clearing, pasture, tracks and firebreaks with little pristine terrain remaining. No archaeological site was located within the project area

ARCHAEOLOGICAL CONTEXT

The archival research identified that a number of surveys have been conducted in the area and that few sites, in particular, artefact scatters have been located within the immediate township of Denmark. The extremely dense vegetation is revealed to be the major obstacle in the location of sites. One researcher, however, endeavoured to negate the vegetation problem by undertaking a series of shovel test pits to examine the subsurface deposits. The outcome was limited in that one artefact was found and this was in a prime location on the coastal strip but it confirmed that where visibility is poor, there may be subsurface material present. Dortch (Guilfoyle 2010 & Dortch 1988) also noted artefacts within exposed areas but whether these were located in areas of high resource value is unclear. The artefact numbers recorded were too low to permit any definitive statements in relation to site function and/or intensity of site use.

Pertaining to the southern region Ferguson (1985) undertook a comprehensive archaeological study in the Albany region in a PhD thesis. His study area takes in the majority of the shire up to Stirling Ranges but omitting the far eastern sector of the City of Albany. His objective was to elaborate on Hallam's (1975) ethno-historic model of Aboriginal foraging in the southwest and their effect on the environment and Wyrwoll's (1979) model of changes in the environment. His hypothesis is that during the terminal Pleistocene and early Holocene the extreme southwest corner was progressively abandoned and that from 6,000 to 4,000BP the entire region was depopulated. This was as a result of a dramatic increase in rainfall which caused the spreading of forested areas and decline in open woodland habitats.

Ethnohistorical literature states that movements of Nyungars while random were centred around a focal point in circumscribed areas and along established routes. Over time these routes became well-worn tracks. These tracks followed corridors of easy movement along riverbanks or through mountain passes which connected camp sites, resource areas and fresh water sources. Camps were moved after several days for social and hygiene reasons. The pattern of constant movement, short durations and dispersed camps suggests the archaeological signature will be sparse and widely scattered. Prime campsites where tracks dissect or a focal resource point is present will have experienced disturbance from frequent usage in the general area. If the

campsite coincides with a quarry and reduction area a dense artefact scatter would have collected over time.

The distribution of forest has not been stable over time. Changes in climate have caused expansion and contraction of forest boundaries. This suggests that in the late Pleistocene arid phase large numbers of artefacts as a result of camping may be within the forest area while during the Mid Holocene wet phase areas frequented at contact may not have been utilised. Ferguson's model of Nyungar society is a highly mobile one using diverse and scattered resources resulting in a land use pattern of weak archaeological signals. He supports Hallam's model that the ethnographic Nyungar frequented the forested areas of the region far less than open woodland areas and that this is not a recent adaptation. Site density was found to be one and a half times higher in open vegetation systems than forests.

SITE SIGNIFICANCE

If any artefacts are located, a scientific assessment should be made of their significance. The significance of an archaeological site is determined by its ability to address regional and site-specific research questions and by its representativeness (Bowdler 1984). Significance is a mutable quality, changing as more sites are recorded, research questions are answered or new research directions arise. Research questions that sites in the Southwest may address include:

- a) the antiquity of colonisation of the southwest zone;
- b) social and technological changes that may have occurred in the mid-Holocene;
- c) specific patterns of occupation in regional zones; and
- d) dating of industrial sequences in the region.

SURVEY METHODOLOGY

The survey was conducted using a Garmin GPSmap 60CS on datum GDA and a 1:8,000 aerial map demarcating the proposed project corridor. The survey design was formulated using a combination of predictive and systematic transects throughout the project area with particular emphasis on devegetated areas and water sources.

The field survey was undertaken on the 10th to 11th of July 2016 by Mrs Jacqueline Harris, senior archaeologist with Mr Wayne Webb, a Bibbulmun/Wardandi representative and senior field assistant, and Ms Toni Webb, a senior field assistant. A further survey was conducted on the 31st of August 2016 by Mrs Jacqueline Harris to include the proposed turning lane in the eastern section of the survey area. This survey incorporated revisiting each of the four bridge options from both sides of the river together with some fifteen Aboriginal custodians.

The sample survey of the project area to identify any archaeological sites incorporated three persons walking the proposed four optional river crossing alignments, the road widening route and the Denmark River banks. Predictive intensive transects were conducted at potential areas of interest such as devegetated patches and river banks. It was estimated that the overall percentage coverage of the designated project area was around 50%. Ground visibility around the banks of the river was low at 10% and associated woodland, 20% on cleared paddocks and 30% on verges and tracks beside the roads throughout the route.

SURVEY AREA

The verge along the alignment of East River and McIntosh Roads comprised ditches with low shrubs and tall trees along the edges of the road reserve. A transmission line followed the alignment on East River Road. Along the transmission line track where the road diverges at the eastern end the sand was white/grey with poor visibility from the bark and wood strewn track. Some vegetation species represented are snotty gobblers, banksia, sheoak, jarrah and tea trees.

The paddocks alongside the river were undulating, containing pasture and crops. They have been cleared of natural vegetation thoroughly and are surrounded by electric fencing with some remnant vegetation only along the windbreaks. There is a walking path meandering along the edge of the river on the eastern side. The native vegetation includes karri, marri, jarrah, acacia, soapbush, snotty gobbler, tassel and native bamboo. Access to private land on the western bank of Denmark River was limited. Some paddocks at Denmark Agricultural College were difficult to access because of high voltage electric fencing.

The remains of a wooden bridge crossing are present in the first optional crossing. At the second optional crossing in close proximity there is a weir and monitoring devices to measure the volume of water flow. The vegetation is similar on either bank with a 50m thin band either side of the river with private cleared property on the west bank and cleared agricultural college land on the east bank.

On the second survey after a month and a half the conditions on the land had altered. At the first optional crossing which was the original wooden bridge crossing that had burnt down several decades ago, a very large old marri tree that lay on the eastern bank had fallen across the path and snapped into pieces, having been dislodged at its roots by seasonal flooding, thus obscuring the path and view to the opposite bank. Access to bridge crossing options 2, 3 and 4 using the waking trail on the east bank was not possible due to excessive flooding of the river that submerged the pathway. While access to preferred routes on private properties on the western bank was still unavailable, excellent viewing points from Scotsdale Road and Riverbend Lane were used to sight the proposed routes.

FIELD SURVEY RESULTS

The archival research established that the proposed development area does not impact upon any previously registered archaeological sites. No new archaeological site or heritage place, as defined by Section 5 of the *Aboriginal Heritage Act 1972*, was located within or in close proximity to the project area in the course of the survey. No isolated artefacts were located. It is considered that the survey techniques employed in the field survey were sufficient to have located any major archaeological site present and visible on the surface.

CONCLUSIONS

DISCUSSION

An archaeological investigation was conducted at several optional bridge crossings over the Demark River with associated road alignments; at an upgrade of 6.5km of local roads; and to support the delivery of an industrial estate adjacent to McIntosh Road.

An online search of the site register at Heritage and Culture Division, Department of Aboriginal Affairs, was undertaken. The search defined that there were no archaeological site or heritage places but one ethnographic site that overlaid the project area. A study of the archival consultancy and research reports in the region reveal a number of archaeological surveys have been undertaken. Few of these surveys however were able to locate any artefactual material on the surface. Isolated artefacts are more frequently identified but they do not constitute a site. From the synopsis of southwest sites it is determined that archaeological sites are more likely to occur within disturbed lands, in devegetated areas and in close proximity to water sources such as rivers, pools, swamps, creeks and lakes.

As at 2011, Guilfoyle lists 23 registered sites recorded in Denmark region. (Subsequent to this date there has been a review of sites at DAA where different criteria have been used to verify if the sites are classified as sites, heritage places or stored data.) At the present time there 18 registered sites and 26 heritage places recorded on the DAA register. In accordance with Guilfoyle's (2011) landform map the present study area fits into Kentdale System east of Denmark River and Walpole Hills System west of the river. Interestingly no sites are recorded in the Kentdale system, described as undulating rises on sandstone and siltstone, sandy gravel, non-saline wet soil with heath & jarrah-marri woodland and forest but the majority of sites fall within the Walpole Hills System which is described as granitic low hills with loamy gravel and jarrah-marri-karri forest woodland.

According to Ferguson (1985), archaeological evidence in the Albany-Denmark area indicates a history of occupation extending from 18,000 years BP. No open site however in Walpole-Denmark region has yet been dated to the Pleistocene. Several open air sites in coastal dune blow-outs include artefacts made from fossiliferous chert, suggesting that Aboriginal groups were present in the region well before sea-level rise around 6,000 years BP submerged sources of this raw material (Guilfoyle 2011 p9, Dortch and Gardner 1976).

Investigations of submerged artefact scatters on the floors of Lake Jasper and Broke Inlet confirm an Aboriginal presence that pre-dates 6,000 years BP (Dortch and Godfrey 1990; Dortch 1997). A recent study by Ingrid Ward (in prep. 2016) suggests that the paradigm used up till now to date fossiliferous chert artefacts in assemblages is flawed. The offshore theory for a source of this fossiliferous chert prior to sea rise appears erroneous due to: an absence of *Eocene age sedimentary strata on the continental shelf; faunal evidence showing the bryozoans imbedded in the Swan Coastal Plain chert having similar environmental affinities to bryozoans embedded in chert outcropping along the Nullarbor Plain sea cliffs; and evidence showing a similar geochemical fingerprint between artefacts from the Nullarbor Plain and Swan Coastal Plain. These findings not only have implications relating to the use of Eocene fossiliferous chert*

as a chronological marker for Late Pleistocene to early-Holocene age deposits but also for long distance trade to the east.

Many of the previously established well dated Southwest sites now require reassessment in light of Ward's findings. The evidence however from Dortch (1999) who investigated the formation of south coast estuaries by dating submerged tree stumps at Broke, Stokes and Wilson Inlet, is independent of the fossiliferous chert debate and thus provides evidence to indicate their formation around 6,500 to 7,300 years ago.

There is moreover a considerable data base on recent Holocene occupation. Dortch (1999) recovered large amounts of burnt shell and fish bones in an occupation deposit at least 2,000 years old at Katelysia Rockshelter near Wilson Inlet. He asserts that South Coast groups had developed fishing and procurement methods of resources associated with estuaries into a specialized and systematic strategy (Guilfoyle 2011). Further two coastal limestone rock shelters have deposits containing stone artefacts and abundant food remains. At Nookanellup Rock Shelter, 100km west of Walpole, several hundred artefacts and thousands of emu eggshell fragments date 2,600-700 years BP (Dortch and Kelly 1997, Guilfoyle 2011). Other faunal remains include fragments of marsupial bone, claws of freshwater crayfish, marine fish-bones, and marine shell fragments. Most of the faunal material is interpreted as the remains of human meals, indicating a diverse diet based on exploitation of nearby swamps, creeks, and littoral rock platforms; and short-term winter and summer occupations.

Archaeological sites generally manifest themselves in the Denmark region in areas of good visibility and conspicuousness such as on the coastline. Because of the dense forest and coastal heath that extends to the coastline thus obscuring the ground and access, a limited number of sites have been recorded. That Denmark was an important meeting place of two Aboriginal groups for trade and ceremonies is clear from the ethnographic evidence. There is evidence to suggest that groups used the waterways such as major rivers to travel from inland to the coast and from east of the river to west of the river (Ferguson 1985, Goode & Harris 2005). Denmark River is the major river in the area and as such it is a major thoroughfare. However because of natural agencies such as flooding and dense bark and leaf litter along the banks and artificial agencies such as farming and agriculture either side of the banks, it is considered any evidence of past Aboriginal occupation is camouflaged beneath the surface.

RECOMMENDATIONS

No archaeological site or heritage place was previously registered within the project area. Further no archaeological site or heritage place was located during the survey. Therefore there are no archaeological barriers present to affect the development along any of the proposed alignment corridors.

Because of the nature of artefact sites being generally located around rivers and the moderate to high likelihood that subsurface deposits may be present it is recommended that any ground disturbance or vegetation clearance in areas surrounding Denmark River is monitored by an archaeologist and two Aboriginal consultants during the removal of sediment and vegetation. The preferred areas for monitoring are immediately beyond the flood line of the river and within the 30m buffer zone of the high water mark and on the higher bank at the junction of several tributaries and Denmark River.

The most likely areas where archaeological sites, in particular, artefact scatters or burials, may occur are banks of creeks and exposed sandy deposits. The removal or excavation of large quantities of sediment increases the risk of disturbing archaeological sites that may lie beneath the ground surface. **It is recommended** that LandCorp inform any project personnel of their obligation to report any archaeological material, should this be encountered during earthmoving, as outlined under Section 15 of the *Aboriginal Heritage Act 1972*.

If LandCorp locate an archaeological site in the process of survey or ground excavation, **it is recommended** that work cease in the immediate area. Any skeletal material should be reported to Department of Aboriginal Affairs and the Western Australian Police Service. Any artefactual material should be reported to Heritage and Culture Division, Department of Aboriginal Affairs.

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APPENDIX 1: SITES REGISTER SEARCH



Search Criteria

1 Registered Aboriginal Sites in Shapefile - Landcorp_Denmark_River_2016

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Access and Restrictions:

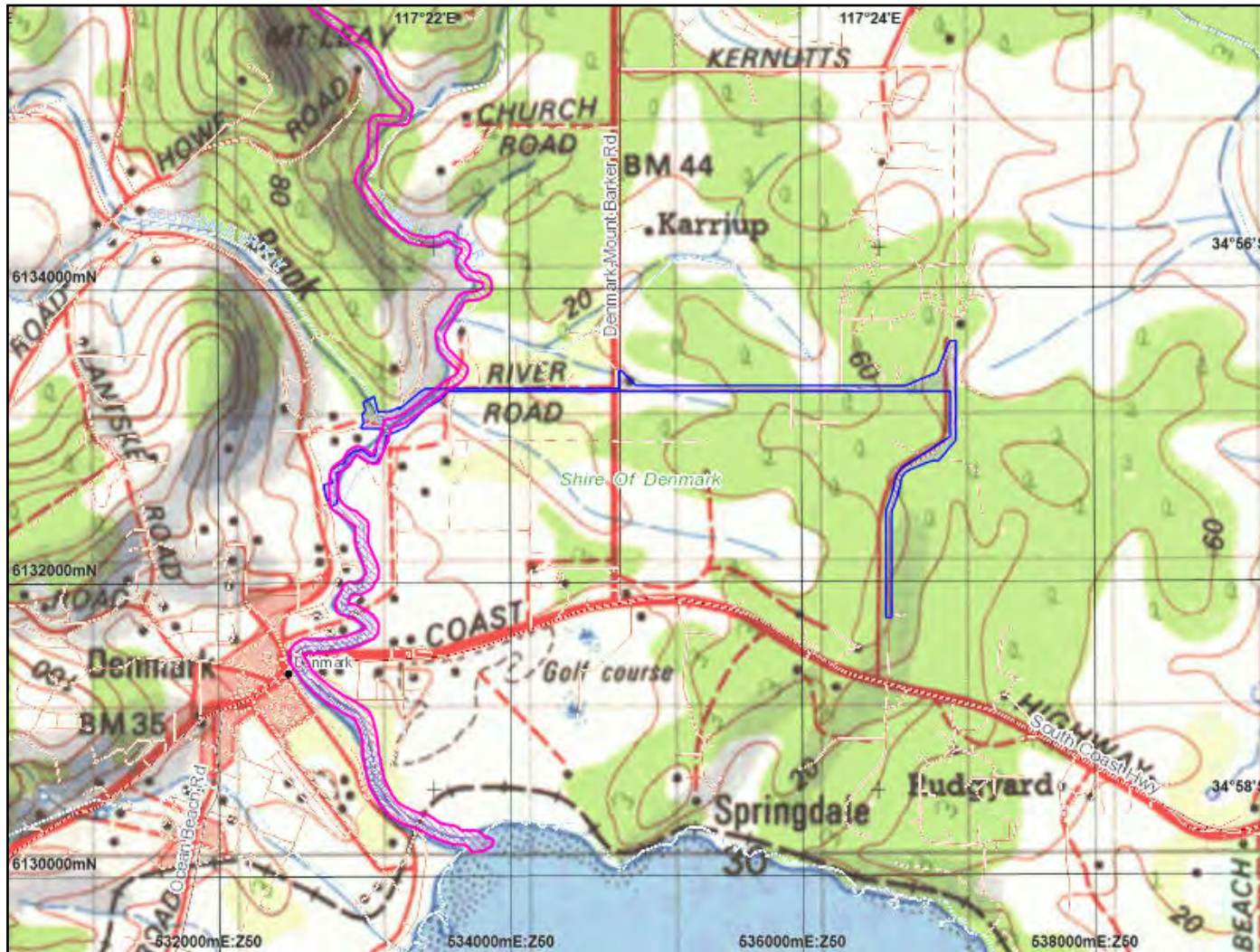
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
List of Registered Aboriginal Sites with Map

Site ID	Site Name	File Restricted	Boundary Restricted	Restrictions	Status	Status Reason	Origin Place ID	Site Type	Knowledge Holders	Coordinates	Legacy ID
22081	Denmark River	No	No	No Gender Restrictions	Registered Site			Mythological, Water Source	*Registered Knowledge Holder names available from DAA	525893mE 6145210mN Zone 50 [Reliable]	



Legend

Selected Heritage Sites

-  Registered Sites
-  Aboriginal Community Occupied
-  Aboriginal Community Unoccupied
-  Town
-  Search Area

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Search Criteria

No Other Heritage Places in Shapefile - Landcorp_Denmark_River_2016 (2)

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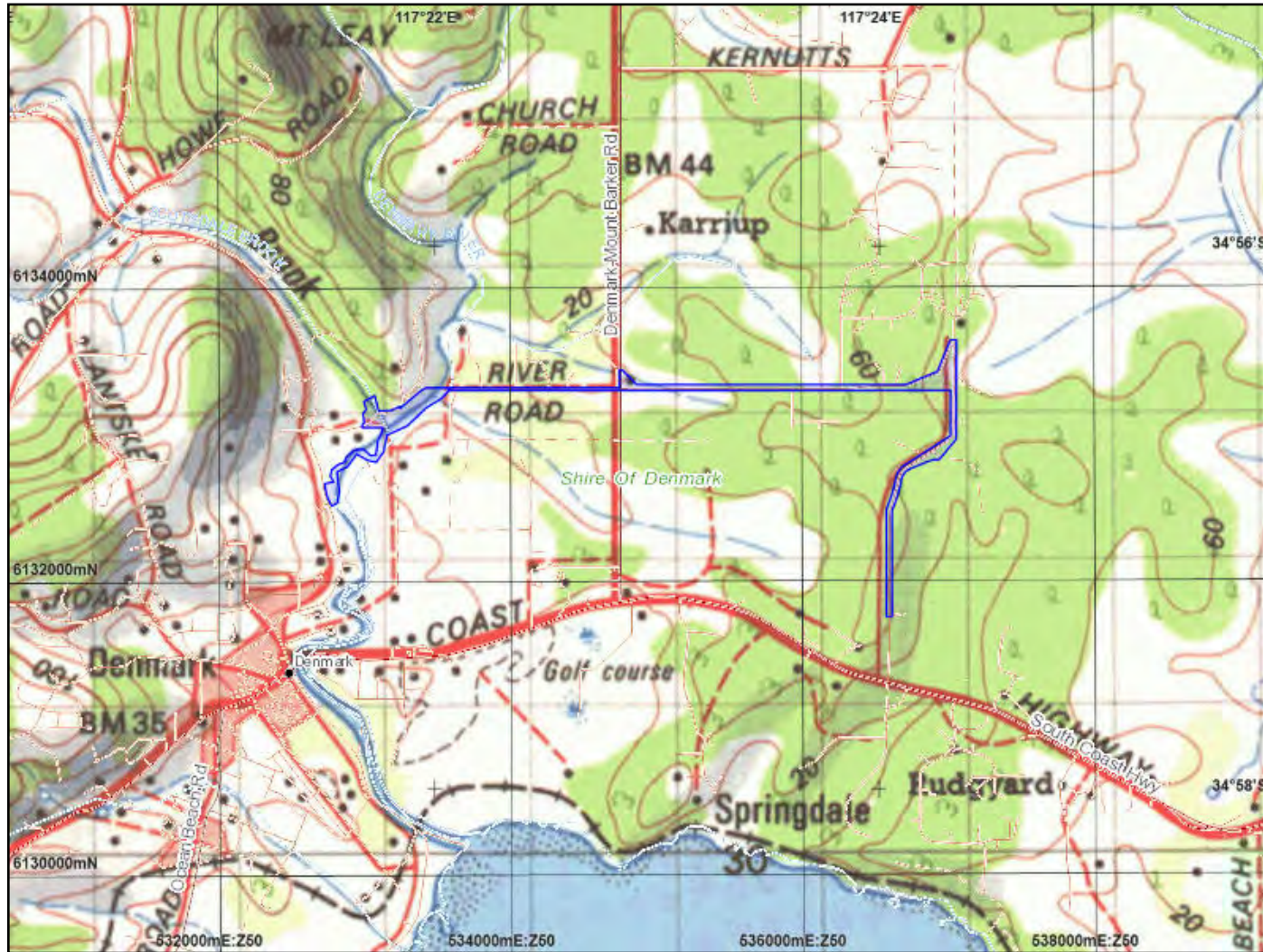
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

List of Other Heritage Places with Map

No Results



Legend

Selected Heritage Places

-  Other Heritage Places
-  Aboriginal Community Occupied
-  Aboriginal Community Unoccupied
-  Town
-  Search Area

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Search Criteria

No Registered Aboriginal Sites in Shapefile - Additional_Survey_Area

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List of Registered Aboriginal Sites with Map

No Results



Legend

Selected Heritage Sites

-  Registered Sites
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-  Aboriginal Community Unoccupied
-  Town
-  Search Area

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Search Criteria

No Other Heritage Places in Shapefile - Additional_Survey_Area (2)

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List of Other Heritage Places with Map

No Results



Legend

Selected Heritage Places

-  Other Heritage Places
-  Aboriginal Community Occupied
-  Aboriginal Community Unoccupied
-  Town
-  Search Area

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APPENDIX 2: LETTERS OF ADVICE

Brad Goode & Associates Pty Ltd
 Consulting Anthropologist
 Heritage Assessments

79 Naturaliste Terrace
 DUNSBOROUGH WA 6281
 (08) 9755 3716
 bradnlee@westnet.com.au
 ACN: 134 732 040
 ABN: 41 134 732 040

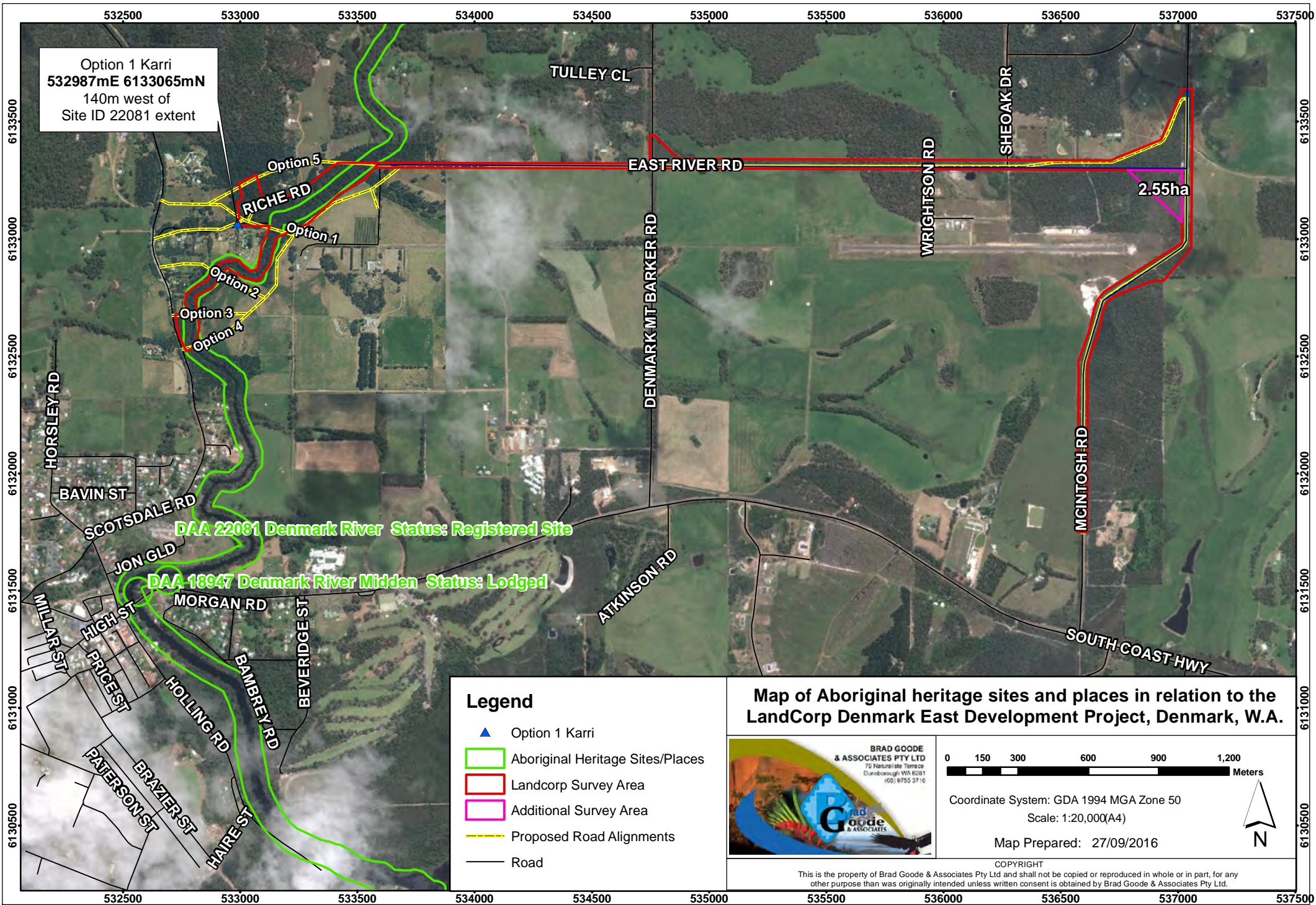
31st August 2016

We the undersigned have been consulted by Brad Goode & Associates Pty Ltd on behalf of LandCorp regarding the Denmark East Development Project proposed in the Shire of Denmark. We would like to make the following recommendations in relation to the Western Australian *Aboriginal Heritage Act 1972*:

- * The Nyungar community support a S-D consent to bridge Denmark Aulder
- Conditional to making no restrictions to water flow
- minimizing clearing & protect habitat
- * Prefer option 3 then 1
- * Monitor areas where arch identifies potential
- * Name as per Guilfoyle report 'Koojuppany'.

Wagyl Kaip WC1998/070 native title claim group		
Sue Kelly	31.8.2016	<i>SKelly</i>
Glen Colbung	31.8.2016	<i>Glen Colbung</i>
Alwyn Coyne	31.8.2016	<i>Alwyn Coyne</i>
Vernice Gillies	31.8.2016	<i>Vernice Gillies</i>
Stanley Loo	31.8.2016	<i>Stanley L.</i>
Avril Dean Treasie Woods	31.8.2016	<i>Treasie Woods</i>
Lynette Knapp	31.8.2016	<i>LK</i>
Irene Larsen	31.8.2016	<i>Irene Larsen</i>
Edith Penny	31.8.2016	<i>Edith Penny</i>
Sandra Woods	31.8.2016	<i>Sandra Woods</i>
Jeanice Krakouer	31.8.2016	<i>Jeanice Krakouer</i>

APPENDIX 3: MAP OF THE PROJECT AREA IN RELATION TO ABORIGINAL HERITAGE SITES



Option 1 Karri
 532987mE 6133065mN
 140m west of
 Site ID 22081 extent

DAA 22081 Denmark River Status: Registered Site

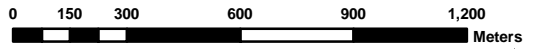
DAA 18947 Denmark River Midden Status: Lodged

2.55ha

Legend

- ▲ Option 1 Karri
- ▭ Aboriginal Heritage Sites/Places
- ▭ Landcorp Survey Area
- ▭ Additional Survey Area
- Proposed Road Alignments
- Road

Map of Aboriginal heritage sites and places in relation to the LandCorp Denmark East Development Project, Denmark, W.A.



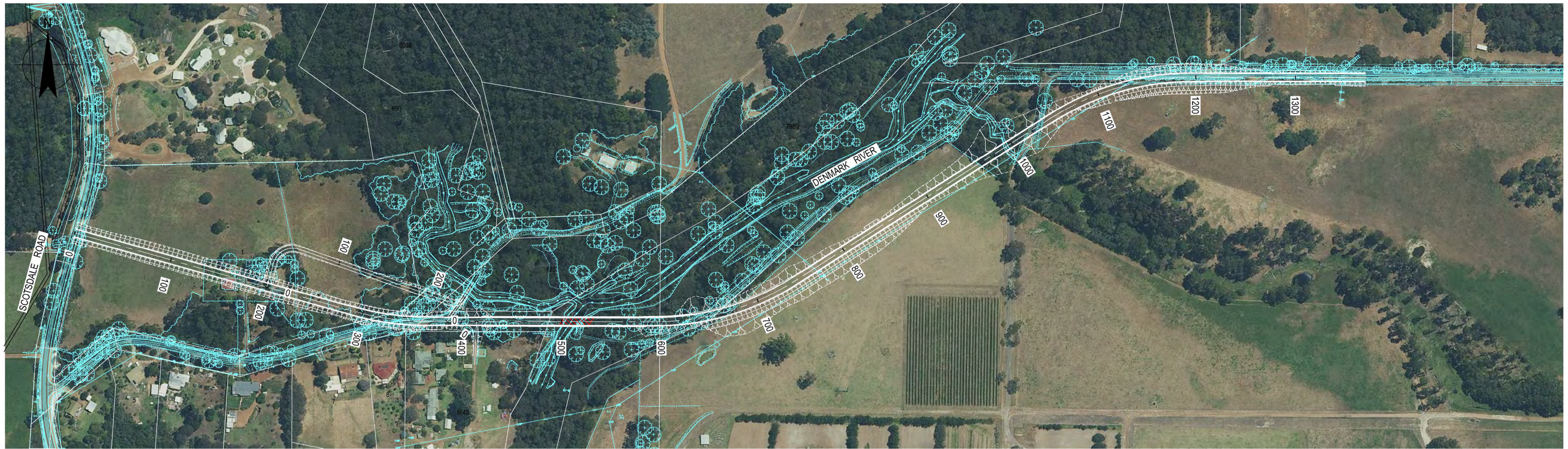
Coordinate System: GDA 1994 MGA Zone 50
 Scale: 1:20,000(A4)

Map Prepared: 27/09/2016



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APPENDIX 4: PROJECT DESIGN PLANS



PLAN
SCALE 1:2000

V.P.I. No.1
CHA. 0.000
ELE. 16.652
LVC ****
K ∞

V.P.I. No.2
CHA. 8.551
ELE. 16.550
LVC 10
K -1246/100

V.P.I. No.3
CHA. 84.522
ELE. 15.031
LVC 100
K 3274/100

V.P.I. No.4
CHA. 225.005
ELE. 16.513
LVC 115
K -1522/100

V.P.I. No.5
CHA. 390.781
ELE. 5.738
LVC 110
K 1618/100

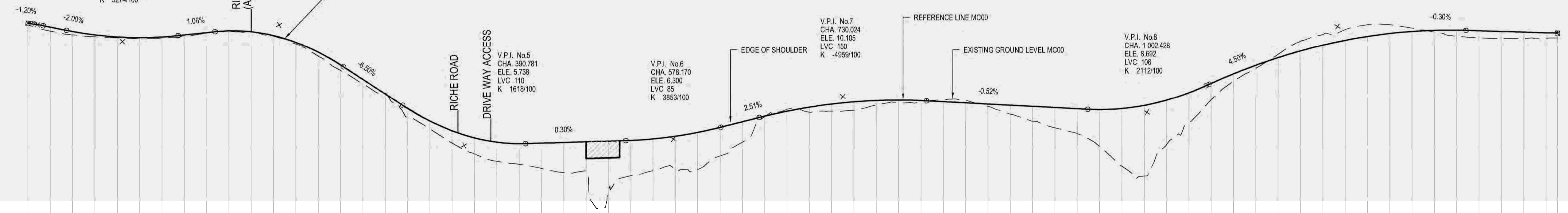
V.P.I. No.6
CHA. 578.170
ELE. 6.300
LVC 85
K 3853/100

V.P.I. No.7
CHA. 730.024
ELE. 10.105
LVC 150
K -4959/100

V.P.I. No.8
CHA. 1002.428
ELE. 8.662
LVC 106
K 2112/100

V.P.I. No.9
CHA. 1173.171
ELE. 16.375
LVC 230
K -4792/100

V.P.I. No.10
CHA. 1370.288
ELE. 15.784
LVC ****
K ∞

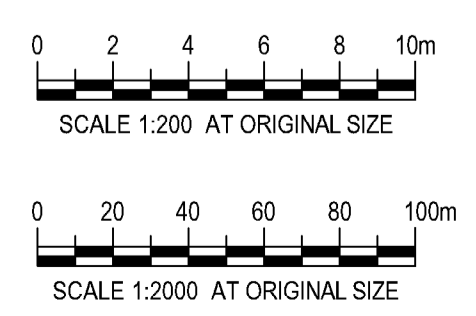


PROFILE
SCALE H 1:2000 V 1:200

	0	20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400	420	440	460	480	500	520	540	560	580	600	620	640	660	680	700	720	740	760	780	800	820	840	860	880	900	920	940	960	980	1000	1020	1040	1060	1080	1100	1120	1140	1160	1180	1200	1220	1240	1260	1280	1300	1320	1340	1360	1370																									
DESIGN TO GROUND LEVEL DIFFERENCE	0.000	-0.361	-0.301	0.172	-0.074	-0.106	-0.094	-0.086	0.044	-0.064	-0.001	-0.046	-0.139	-0.366	-0.507	-0.349	-0.068	0.815	-0.708	-1.083	-1.443	-1.717	-1.882	-2.286	-2.690	-2.709	-4.491	-3.148	-2.850	-2.970	-3.302	-2.565	-1.816	-0.043	-0.172	-0.449	0.637	-0.754	-0.405	-0.210	-0.112	-0.156	-0.203	-0.209	-0.801	-1.329	-1.811	-2.223	-3.290	-5.166	6.313	-3.957	-2.695	-1.478	-0.662	0.266	-0.297	-0.876	-0.291	-0.147	0.537	-0.635	-0.623	-0.571	-0.478																														
DESIGN LEVEL	16.652	16.321	15.926	15.620	15.437	15.276	15.437	15.616	15.827	15.987	15.902	15.555	14.945	14.072	12.596	11.638	10.338	9.044	7.920	7.043	6.413	6.031	5.886	5.945	6.005	6.065	6.125	6.188	6.322	6.580	6.903	7.348	7.849	8.348	8.789	9.149	9.429	9.627	9.746	9.783	9.740	9.639	9.535	9.431	9.327	9.201	9.030	8.930	8.780	8.648	8.539	8.310	8.120	7.900	7.744	7.549	7.344	7.144	6.944	6.744	6.544	6.344	6.144	5.944	5.744	5.544	5.344	5.144	4.944	4.744	4.544	4.344	4.144	3.944	3.744	3.544	3.344	3.144	2.944	2.744	2.544	2.344	2.144	1.944	1.744	1.544	1.344	1.144	0.944	0.744	0.544	0.344	0.144	0.000	
GROUND LEVEL	16.652	15.960	15.624	15.448	15.364	15.270	15.344	15.531	15.784	15.922	15.902	15.509	14.806	13.707	12.429	11.290	10.406	9.229	8.212	7.599	7.043	6.413	6.031	5.886	5.945	6.005	6.065	6.125	6.188	6.322	6.580	6.903	7.348	7.849	8.348	8.789	9.149	9.429	9.627	9.746	9.783	9.740	9.639	9.535	9.431	9.327	9.201	9.030	8.930	8.780	8.648	8.539	8.310	8.120	7.900	7.744	7.549	7.344	7.144	6.944	6.744	6.544	6.344	6.144	5.944	5.744	5.544	5.344	5.144	4.944	4.744	4.544	4.344	4.144	3.944	3.744	3.544	3.344	3.144	2.944	2.744	2.544	2.344	2.144	1.944	1.744	1.544	1.344	1.144	0.944	0.744	0.544	0.344	0.144	0.000
CHAINAGE (MC00)	0	20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400	420	440	460	480	500	520	540	560	580	600	620	640	660	680	700	720	740	760	780	800	820	840	860	880	900	920	940	960	980	1000	1020	1040	1060	1080	1100	1120	1140	1160	1180	1200	1220	1240	1260	1280	1300	1320	1340	1360	1370																									
HORIZONTAL GEOMETRY	D=291.556										R=260.000 L=70.432					D=231.792					R=260.000 L=147.682										D=306.151					R=260.000 L=147.682					D=174.992																																																						
VERTICAL GEOMETRY	P		R=3273.858 L=100.000		P		R=1522.194 L=115.000		P		R=1617.674 L=110.000		P=0.300%		R=3853.128 L=85.000		P		R=2112.127 L=150.000		P=-0.519% L=144.405		R=2112.127 L=106.000		P		R=4792.122 L=230.000		P=-0.300%		L=82.117																																																																
SUPERELEVATION	F=3.0%										F=4.0% F=4.0%					F=3.0%					F=4.0% F=4.0%										F=3.0%					F=4.0% F=4.0%					F=3.0%																																																						

PRELIMINARY

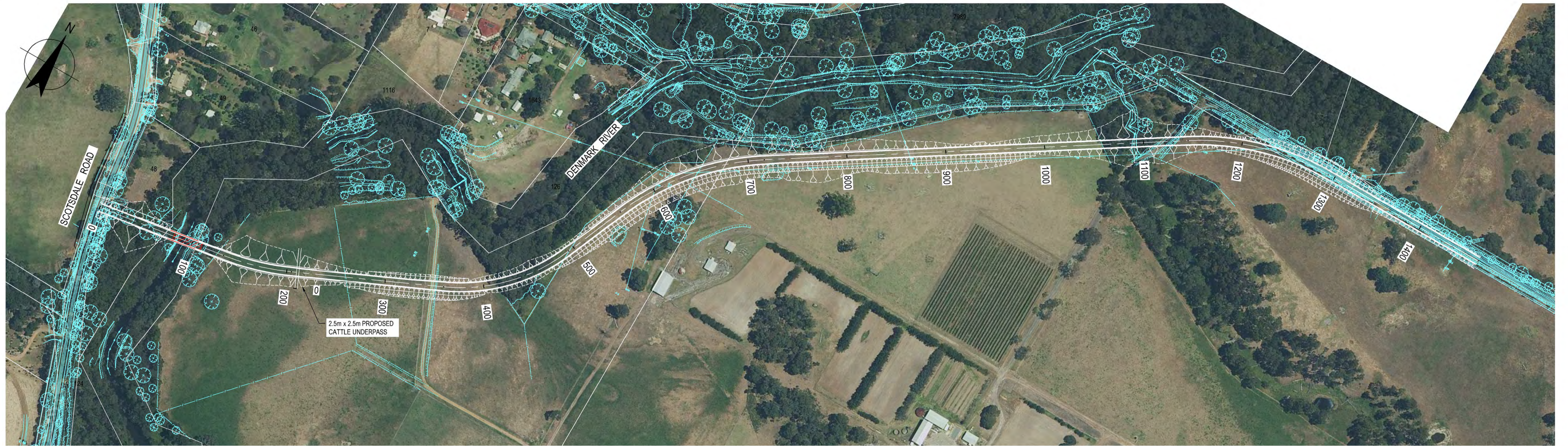
B	ISSUED FOR INFORMATION	SJD	23.09.16
A	ISSUED FOR INFORMATION	SJD	15.09.16
No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Date
Drawn	Job Manager	Project Director	Date



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Drawn	S. DE CEGLIE	Designer	S. MACKMAN
Drafting Check		Design Check	
Approved (Project Director)		Date	
Scale	AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

Client	LANDCORP
Project	DENMARK EAST DEVELOPMENT PRECINCT
Title	EAST RIVER ROAD - OPTION 3B PLAN AND PROFILE
Original Size	A1
Drawing No:	61-34836-SK-C-001
Rev:	B



PLAN

SCALE 1:2000

V.P.I. No.1
CHA. 0.000
ELE. 15.681
LVC ∞
K ∞

V.P.I. No.2
CHA. 8.682
ELE. 15.382
LVC 10
K 2278/100

V.P.I. No.7
CHA. 1 270.688
ELE. 15.376
LVC 230
K -4792/100

V.P.I. No.8
CHA. 1 467.780
ELE. 15.784
LVC ∞
K ∞

2.5m x 2.5m PROPOSED
CATTLE UNDERPASS

V.P.I. No.3
CHA. 280.000
ELE. 7.842
LVC 100
K 2408/100

V.P.I. No.4
CHA. 610.000
ELE. 11.880
LVC 95
K -4780/100

V.P.I. No.5
CHA. 815.083
ELE. 10.170
LVC 60
K 19068/100

V.P.I. No.6
CHA. 1 099.921
ELE. 8.692
LVC 106
K 2112/100

EDGE OF SHOULDER

REFERENCE LINE MC00

EXISTING GROUND LEVEL MC00

-3.44%

-3.00%

1.15%

-0.83%

-0.52%

4.50%

-0.30%

DATUM=-2.000

DESIGN TO GROUND LEVEL DIFFERENCE	0.092	2.447	5.102	9.043	11.818	11.641	8.972	6.713	6.135	5.287	4.048	2.751	1.616	0.838	0.483	0.046	-0.237	-0.270	-0.217	0.173	0.752	1.136	1.124	1.161	0.635	0.230	-0.024	-0.012	-0.065	0.057	0.354	0.674	0.890	0.907	0.667	1.227	1.955	0.990	-0.176	0.086	0.976	1.259	1.862	2.302	3.509	5.346	6.345	3.715	2.601	1.348	0.597	0.213	-0.390	-0.883	-1.032	-1.006	-1.048	-0.730	-0.229	0.192	0.554	0.639	0.614	0.559	0.466																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
DESIGN LEVEL	15.681	15.042	14.442	13.842	13.242	12.642	12.042	11.442	10.842	10.242	9.642	9.063	8.629	8.362	8.260	8.325	8.535	8.765	8.996	9.227	9.457	9.688	9.919	10.150	10.380	10.611	10.842	11.072	11.303	11.532	11.761	11.990	12.219	12.448	12.677	12.906	13.135	13.364	13.593	13.822	14.051	14.280	14.509	14.738	14.967	15.196	15.425	15.654	15.883	16.112	16.341	16.570	16.799	17.028	17.257	17.486	17.715	17.944	18.173	18.402	18.631	18.860	19.089	19.318	19.547	19.776	20.005	20.234	20.463	20.692	20.921	21.150	21.379	21.608	21.837	22.066	22.295	22.524	22.753	22.982	23.211	23.440	23.669	23.898	24.127	24.356	24.585	24.814	25.043	25.272	25.501	25.730	25.959	26.188	26.417	26.646	26.875	27.104	27.333	27.562	27.791	28.020	28.249	28.478	28.707	28.936	29.165	29.394	29.623	29.852	30.081	30.310	30.539	30.768	30.997	31.226	31.455	31.684	31.913	32.142	32.371	32.600	32.829	33.058	33.287	33.516	33.745	33.974	34.203	34.432	34.661	34.890	35.119	35.348	35.577	35.806	36.035	36.264	36.493	36.722	36.951	37.180	37.409	37.638	37.867	38.096	38.325	38.554	38.783	39.012	39.241	39.470	39.699	39.928	40.157	40.386	40.615	40.844	41.073	41.302	41.531	41.760	41.989	42.218	42.447	42.676	42.905	43.134	43.363	43.592	43.821	44.050	44.279	44.508	44.737	44.966	45.195	45.424	45.653	45.882	46.111	46.340	46.569	46.798	47.027	47.256	47.485	47.714	47.943	48.172	48.401	48.630	48.859	49.088	49.317	49.546	49.775	50.004	50.233	50.462	50.691	50.920	51.149	51.378	51.607	51.836	52.065	52.294	52.523	52.752	52.981	53.210	53.439	53.668	53.897	54.126	54.355	54.584	54.813	55.042	55.271	55.500	55.729	55.958	56.187	56.416	56.645	56.874	57.103	57.332	57.561	57.790	58.019	58.248	58.477	58.706	58.935	59.164	59.393	59.622	59.851	60.080	60.309	60.538	60.767	60.996	61.225	61.454	61.683	61.912	62.141	62.370	62.599	62.828	63.057	63.286	63.515	63.744	63.973	64.202	64.431	64.660	64.889	65.118	65.347	65.576	65.805	66.034	66.263	66.492	66.721	66.950	67.179	67.408	67.637	67.866	68.095	68.324	68.553	68.782	69.011	69.240	69.469	69.698	69.927	70.156	70.385	70.614	70.843	71.072	71.301	71.530	71.759	71.988	72.217	72.446	72.675	72.904	73.133	73.362	73.591	73.820	74.049	74.278	74.507	74.736	74.965	75.194	75.423	75.652	75.881	76.110	76.339	76.568	76.797	77.026	77.255	77.484	77.713	77.942	78.171	78.400	78.629	78.858	79.087	79.316	79.545	79.774	80.003	80.232	80.461	80.690	80.919	81.148	81.377	81.606	81.835	82.064	82.293	82.522	82.751	82.980	83.209	83.438	83.667	83.896	84.125	84.354	84.583	84.812	85.041	85.270	85.499	85.728	85.957	86.186	86.415	86.644	86.873	87.102	87.331	87.560	87.789	88.018	88.247	88.476	88.705	88.934	89.163	89.392	89.621	89.850	90.079	90.308	90.537	90.766	90.995	91.224	91.453	91.682	91.911	92.140	92.369	92.598	92.827	93.056	93.285	93.514	93.743	93.972	94.201	94.430	94.659	94.888	95.117	95.346	95.575	95.804	96.033	96.262	96.491	96.720	96.949	97.178	97.407	97.636	97.865	98.094	98.323	98.552	98.781	99.010	99.239	99.468	99.697	99.926	100.155	100.384	100.613	100.842	101.071	101.300	101.529	101.758	101.987	102.216	102.445	102.674	102.903	103.132	103.361	103.590	103.819	104.048	104.277	104.506	104.735	104.964	105.193	105.422	105.651	105.880	106.109	106.338	106.567	106.796	107.025	107.254	107.483	107.712	107.941	108.170	108.399	108.628	108.857	109.086	109.315	109.544	109.773	110.002	110.231	110.460	110.689	110.918	111.147	111.376	111.605	111.834	112.063	112.292	112.521	112.750	112.979	113.208	113.437	113.666	113.895	114.124	114.353	114.582	114.811	115.040	115.269	115.498	115.727	115.956	116.185	116.414	116.643	116.872	117.101	117.330	117.559	117.788	118.017	118.246	118.475	118.704	118.933	119.162	119.391	119.620	119.849	120.078	120.307	120.536	120.765	120.994	121.223	121.452	121.681	121.910	122.139	122.368	122.597	122.826	123.055	123.284	123.513	123.742	123.971	124.200	124.429	124.658	124.887	125.116	125.345	125.574	125.803	126.032	126.261	126.490	126.719	126.948	127.177	127.406	127.635	127.864	128.093	128.322	128.551	128.780	129.009	129.238	129.467	129.696	129.925	130.154	130.383	130.612	130.841	131.070	131.299	131.528	131.757	131.986	132.215	132.444	132.673	132.902	133.131	133.360	133.589	133.818	134.047	134.276	134.505	134.734	134.963	135.192	135.421	135.650	135.879	136.108	136.337	136.566	136.795	137.024	137.253	137.482	137.711	137.940	138.169	138.398	138.627	138.856	139.085	139.314	139.543	139.772	140.001	140.230	140.459	140.688	140.917	141.146	141.375	141.604	141.833	142.062	142.291	142.520	142.749	142.978	143.207	143.436	143.665	143.894	144.123	144.352	144.581	144.810	145.039	145.268	145.497	145.726	145.955	146.184	146.413	146.642	146.871	147.100	147.329	147.558	147.787	148.016	148.245	148.474	148.703	148.932	149.161	149.390	149.619	149.848	150.077	150.306	150.535	150.764	150.993	151.222	151.451	151.680	151.909	152.138	152.367	152.596	152.825	153.054	153.283	153.512	153.741	153.970	154.199	154.428	154.657	154.886	155.115	155.344	155.573	155.802	156.031	156.260	156.489	156.718	156.947	157.176	157.405	157.634	157.863	158.092	158.321	158.550	158.779	159.008	159.237	159.466	159.695	159.924	160.153	160.382	160.611	160.840	161.069	161.298	161.527	161.756	161.985	162.214	162.443	162.672	162.901	163.130	163.359	163.588	163.817	164.046	164.275	164.504	164.733	164.962	165.191	165.420	165.649	165.878	166.107	166.336	166.565	166.794	167.023	167.252	167.481	167.710	167.939	168.168	168.397	168.626	168.855	169.084	169.313	169.542	169.771	170.000	170.229	170.458	170.687	170.916	171.145	171.374	171.603	171.832	172.061	172.290	172.519	172.748	172.977	173.206	173.435	173.664	173.893	174.122	174.351	174.580	174.809	175.038	175.267	175.496	175.725	175.954	176.183	176.412	176.641	176.870	177.099	177.328	177.557	177.786	178.015	178.244	178.473	178.702	178.931	179.160	179.389	179.618	179.847	180.076	180.305	180.534	180.763	180.992	181.221	181.450	181.679	181.908	182.137	182.366	182.595	182.824	183.053	183.282	183.511	183.740	183.969	184.198	184.427	184.656	184.885	185.114	185.343	185.572	185.801	186.030	186.259	186.488	186.717	186.946	187.175	187.404	187.633	187.862	188.091	188.320	188.549	188.778	189.007	189.236	189.465	189.694	189.923	190.152	190.381	190.610	190.839	191.068	191.297	191.526	191.755	191.984	192.213	192.442	192.671	192.900	193.129	193.358	193.587	193.816	194.045	194.274	194.503	194.732	194.961	195.190	195.419	195.648	195.877	196.106	196.335	196.564	196.793	197.022	197.251	197.480	197.709	197.938	198.167	198.396	198.625	198.854	199.083	199.312	199.541	199.770	200.000
GROUND LEVEL	15.648	12.595	9.341	4.800	1.424	1.002	3.070	4.729	4.708	4.955	5.595	6.312	7.014	7.524	7.778	8.278	8.771	9.035	9.213	9.053	8.705	8.553	8.794	8.988	9.746	10.381	10.865	11.061	11.369	11.444	11.264	10.975	10.708	10.557	10.629	9.903	9.007	8.806	8.806	10.377	9.325	8.902	8.916	9.391	9.542																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								