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Lot 21 DP 714858 Hearnes Lake Road, Woolgoolga, NSW mid-north coast- Proposed residential development

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Archaeological test excavations

March 2009

Prepared on behalf of

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1 INTRODUCTION

1.1 Background

BBK Development Corporation Pty Ltd (BBK) proposes to develop Lot 21 DP 714858 Hearnes Lake Road, Woolgoolga (Figures 1 and 2) for residential subdivision purposes. Although no surface cultural materials were identified on Lot 21, an Aboriginal cultural heritage assessment prepared in 2007 (Collins 2007) recommended further investigation of a potentially sensitive ridge crest to determine the nature and significance of any undetected archaeological evidence within the proposed development footprint.

This report was commissioned by BBK and addresses the above recommendation. To avoid unnecessary repeat of background information, this report should be read in conjunction with the *'Lot 21 DP 714858 Hearnes Lake Road, Woolgoolga, NSW mid-north coast- Aboriginal cultural heritage assessment'* (Collins 2007). The 2007 and present reports will together form the Aboriginal cultural heritage assessment component of an Environmental Assessment for the Lot 21 residential subdivision proposal, to be submitted under the provisions of Part 3A of the *Environmental Planning and Assessment Act 1979*. Both reports are consistent with the general requirements of the (draft) '*Guidelines for Aboriginal cultural heritage impact assessment and community consultation'* (DECC 2005).

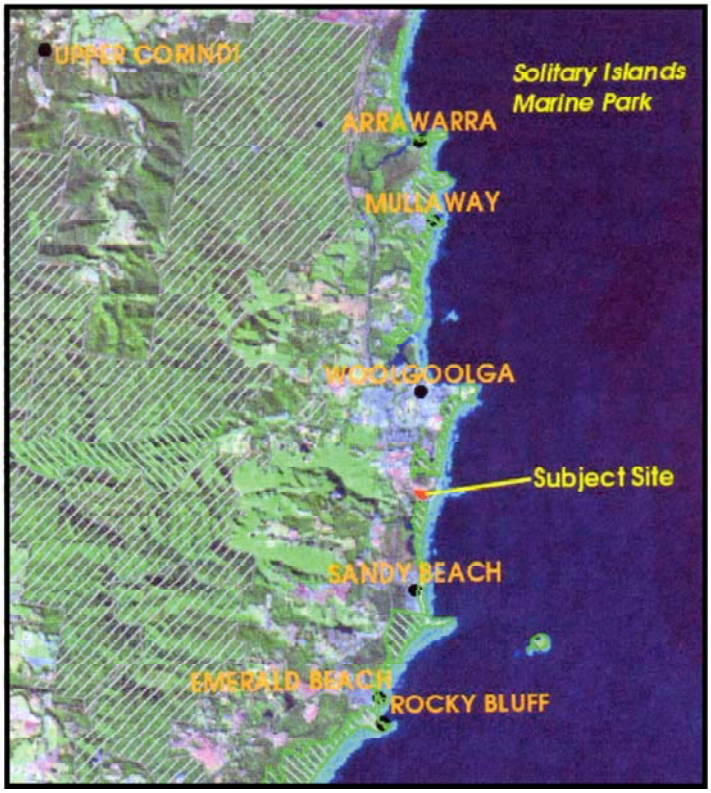

Figure 1. General location of Lot 21 DP 714858 Hearnes Lake Road, Woolgoolga

Figure 2. Lot 21 (pink), showing the location of the investigation area in relation to registered and reported Aboriginal sites in the locality (blue dots)
(extract from Moonee Beach 9537-4S 1:25,000 topographic map, Edition 3, NSW Department of Lands 2004)

Because the Lot 21 subdivision proposal has been accepted for approval under Part 3A of the *Environmental Planning and Assessment Act 1979*, an Aboriginal Heritage Impact Permit under Part 6, Section 87, of the *National Parks and Wildlife Act 1974* was not required to authorise the test excavations detailed in this report.

1.2 Location and environmental context of the investigation area

GDA map reference 519340 E 6666625 N (central point)
Moonee Beach 9537-4S, 1:25,000 topographic map, Edition 3

The investigation area is situated towards the south-eastern corner of Lot 21 (Figure 3), where it comprises the level/low-gradient crest of an undulating coastal ridge extending north-west from Holocene foredunes at the mouth of Hearns Lake, at an elevation of 8.5 to 10.0 metres AHD (Figure 4). The ridge forms part of the Megan Soil Landscape, an erosional landscape of low rolling hills based on Carboniferous meta-sediments of the Coffs Harbour Association, which have decomposed to produce strongly acid podzolic soils (Milford 1999). The meta-sediments that underlie the Woolgoolga/Hearns Lake area are composed chiefly of siliceous greywacke and argillite, but also contain small quantities of chert and jasper (Korsch 1980:4-5). These four materials are well-suited to the production of flaked stone tools, and outcrop on the coastal headlands and in pebble beds along the beaches. However, natural surface stone does not occur on Lot 21.

The investigated section of ridge is bordered to the north, east and west by hillslopes. Slopes to the north constitute an extension of the ridge crest, which rises moderately to a knoll on the central northern boundary of Lot 21, downcut and leveled to accommodate an existing house. To the east, the slopes fall steeply away to the banks of a small back-barrier lagoon of identified Aboriginal spiritual significance (DECC registered natural mythological site #22-1-232; cf Collins 2004, 2007; Figure 2). The lagoon and its immediate surrounds would be protected and rehabilitated within Lot 28 of the proposed residential subdivision (Figure 4). Moderate gradient hillslopes west of the subject section of ridge abut low-relief alluvial lowlands bordering the northern bank of the (often impounded) Hearns Lake estuary.

Although probably once covered in dry sclerophyll forest grading to the littoral rainforest still represented on the eastern dunes, the investigation area has been cleared of its natural vegetation, subject to long-term cattle grazing (and associated trampling), and currently supports open grassland with scattered regrowth banksias, paperbarks and eucalypts.

Insert Figure 3.

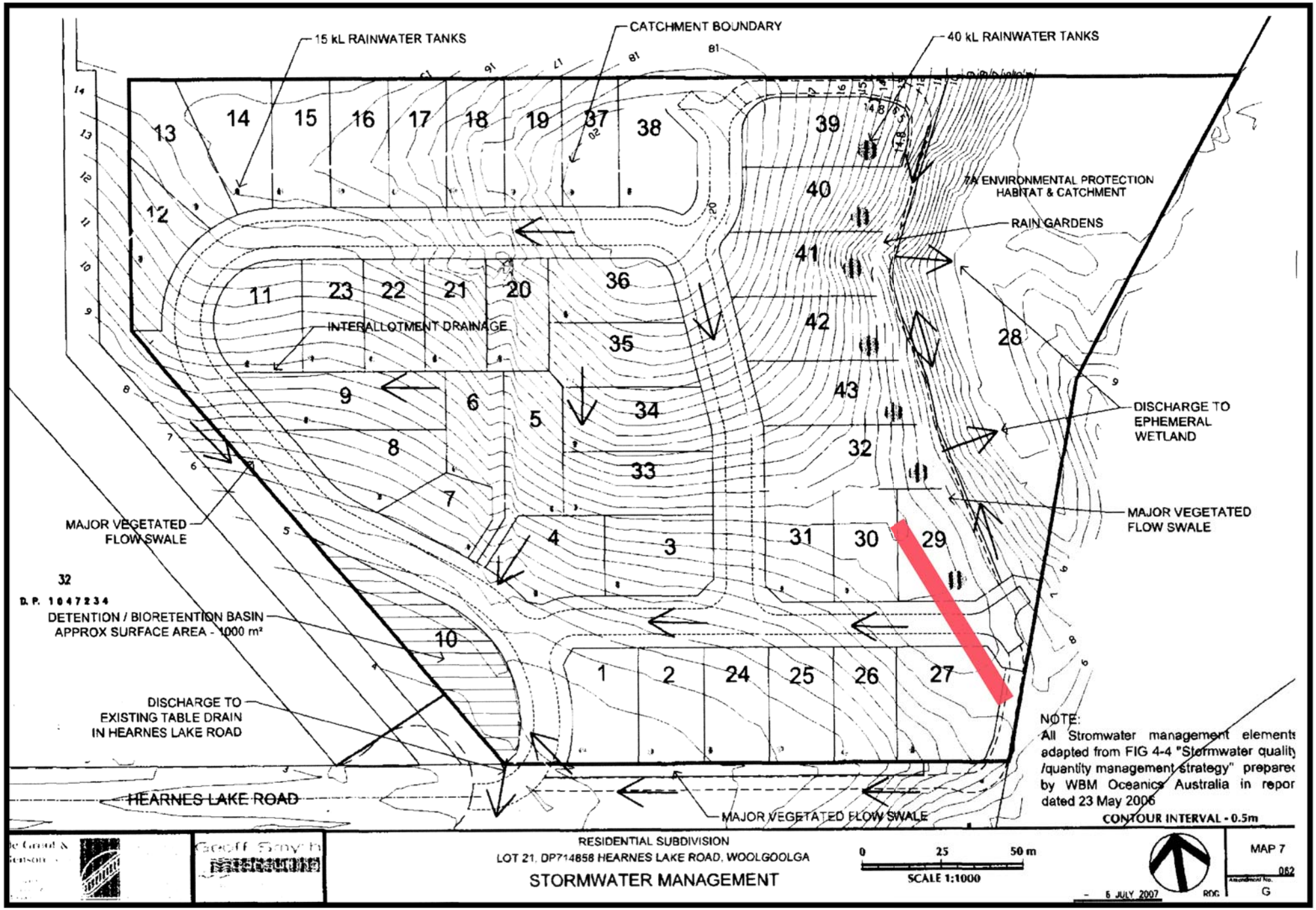

Figure 4. Lot 21 topography and investigation area location in relation to the subdivision concept design

2 ABORIGINAL INVOLVEMENT

2.1 DECC *Interim Community Consultation Requirements for Applicants*

The *Interim Community Consultation Requirements for Applicants* (DECC 2004) were implemented for the *'Lot 21 DP 714858 Hearnes Lake Road, Woolgoolga, NSW mid-north coast- Aboriginal cultural heritage assessment'* (Collins 2007), and resulted in the registration of four Aboriginal stakeholder groups- the Coffs Harbour and District Local Aboriginal Land Council (CHLALC), the Yarrawarra Aboriginal Corporation, the Garby Elders, and the Mudjay Elders.

To ensure comprehensive and all-inclusive Aboriginal involvement, an invitation to register interest was later extended to the more recently formed Bagawa Birra Murri Aboriginal Corporation. This invitation was accepted, such that the Bagawa Birra Murri Aboriginal Corporation was additionally endorsed as a registered stakeholder group.

No expression of stakeholder interest was lodged by the Gumbula Julipi Elders Aboriginal Corporation, the membership of which overlaps to a large extent with the CHLALC and/or the Bagawa Birra Murri Aboriginal Corporation. An invitation for the Gumbula Julipi Elders to be separately involved in the archaeological test excavations, site evaluation and the formulation of management recommendations was nevertheless accepted.

The recommended subsurface testing of the Lot 21 ridge crest was supported by the CHLALC, Yarrawarra Aboriginal Corporation, Garby Elders and the Bagawa Birra Murri Aboriginal Corporation. The Mudjay Elders advised that they had no objections to the test excavations, but that they would not require any planning, field, or subsequent involvement.

The test excavation methodology was developed in liaison with the stakeholder field representatives prior to commencement of the investigation on the 4th of February 2004, and was fully supported.

Draft copies of this report were forwarded to the CHLALC, Yarrawarra Aboriginal Corporation/Garby Elders and the Bagawa Birra Murri Aboriginal Corporation for review and comment prior to its finalisation.

2.2 Involvement in the archaeological test excavations

The archaeological test excavations detailed in this report were undertaken with the assistance of CHLALC sites officers Mark Flanders and Mark Ferguson; Manager of the Jalumbo Cultural Heritage Research Unit, Yarrawarra Aboriginal Corporation and Garby Elders representative Tim Cowan; Bagawa Birra Murri Aboriginal Corporation Chairperson Sue Hoskins; and Gumbula Julipi Elder Ken Craig on the 4th of February 2009.

2.3 Outcomes

On completion of the test excavations, the Aboriginal fieldwork team assessed the artefact site detected on the Lot 21 ridge to be of low cultural/social significance, and agreed that this site is not of sufficiently high significance to warrant either an amendment to the proposed development layout or more comprehensive archaeological investigation/salvage. As a result, the involved Aboriginal stakeholder groups advised that they have no objections to the proposed residential subdivision proceeding, providing the recommendations of the 2007 (Collins 2007) report (excluding Recommendation 2) and Recommendation 2 of this report (cf Section 7) are implemented (see Aboriginal stakeholder correspondence, Appendix A).

Gumbula Julipi Elder Ken Craig recommended that initial road construction earthworks across the site area be monitored with a view to collecting any artefacts thus exposed. However, field representatives of the registered stakeholder groups acknowledged that artefact detection and recovery under these conditions would be highly unlikely due to the overall low density of artefacts detected during test pitting, and for this reason did not endorse this recommendation.

To preserve socio-cultural values and attachments to the Hearns Lake area, the stakeholders request that they be given the opportunity to re-deposit cultural materials recovered during the test excavations within the nearby Environmental, Habitat and Catchment Protection area (proposed subdivision Lot 28), which is of Aboriginal spiritual significance in its own right (cf Collins 2004:7-8, 2007:12).

3 TEST EXCAVATIONS

3.1 Personnel

As outlined in Section 2.2, the archaeological test excavations were undertaken by the consultant with the assistance of Mark Flanders (CHLALC), Mark Ferguson (CHLALC), Tim Cowan (Yarrawarra Aboriginal Corporation/Garby Elders), Sue Hoskins (Bagawa Birra Murri Aboriginal Corporation) and Ken Craig (Gumbula Julipi Elders Aboriginal Corporation) on the 4th of February 2009. Mr Dino Slaverio (Affordable Bobcat Hire), who has extensive local mechanical archaeological excavation experience and artefact detection capabilities, operated the excavating machine and assisted with sieving.

3.2 Justification and research design

Owing to the identification of an artefact scatter further west along the same ridge (DECC #22-1-234) and a natural mythological site to the immediate north (DECC #22-1-232) (Collins 2004:19-21 and Figure 2), the level-low gradient terminal end of the Lot 21 ridge crest was considered to have the potential to contain undetected evidence of past Aboriginal occupation/use that may be significant in demonstrating aspects of traditional life in the Hearns Lake locality. As advised by the CHLALC and Yarrawarra Aboriginal Corporation/ Garby Elders, and endorsed by the consultant, the existence and significance of any archaeological materials on the subject section of ridge could only be reliably assessed via a subsurface investigation. That the ridge crest would be directly impacted by the construction of a roadway and up to three residential allotments (cf Figure 4) further justified the investigation, which offered the opportunity to more conclusively assess the affects of the residential subdivision proposal on Aboriginal sites and values.

From a development-related and Aboriginal stakeholder perspective, the primary purpose of the test excavations was to determine whether or not 'Aboriginal objects' would be affected by the Lot 21 development, and if so, to assess whether the significance of these objects is sufficient to warrant additional salvage or an amendment to the subdivision layout. The excavations were also designed to further assist BBK in meeting its obligations under the *Environmental Planning and Assessment Act 1979* and to avoid the unmitigated destruction of Aboriginal sites and values.

From a research perspective, it was envisaged that the test excavation results would provide information on the subsurface archaeological record to assist any future local or regional analysis/interpretation of traditional Aboriginal occupation/use of the coastal environment.

Specifically, the test excavations aimed to:

- Determine whether stone artefacts and/or other Aboriginal cultural materials would be affected by residential development of the Lot 21 ridge crest.
- Characterise the nature of any archaeological deposits.
- Recover a representative sample of artefacts/cultural material for analysis.
- Inform the need for any further mitigation measures (eg site salvage, Aboriginal monitoring of earthworks, amendments to the proposed subdivision layout/construction methodology) that would be warranted to provide further information ahead of or during the development works, or to enable Aboriginal objects to be entirely or partially conserved.

3.3 Methodology

Rationale and procedure

Although the Lot 21 ridge crest was considered worthy of subsurface investigation, it was necessary for the sampling methodology to accommodate the likelihood that this landform would contain the same type of low-density artefact scatter as found further west along the ridge (DECC #22-1-234). A small number of large test pits (rather than a larger number of small test pits) has been advocated as the most effective means of detecting low-density artefact distributions (ie less than five artefacts per square metre) (Kintigh 1988:702-3; Krakker *et al* 1983:479). Even so, it is recognised that in the end, subsurface sampling designs need to be developed in the light of localised conditions and what is known of the local archaeological record (Nance and Ball 1986:480).

In view of the extent of the area requiring testing (approximately 75 metres north/south by 10-15 metres east/west), the excavation of two square metre test pits at systematic 10 metre spacings was seen to offer an acceptable compromise between artefact detection capabilities, and the ability both to recover a representative sample of artefacts and interpret variable artefact densities. Given that sediments would in any case have required sieving to ensure that artefacts were detected if they were indeed present, this methodology was considered a better alternative than the simple removal of grass cover originally advocated (Collins 2007:22).

The subsurface investigation was confined to the level-low gradient crest of the ridge and its eastern upper slope falling within the proposed development impact area (Figure 4). Required test pit locations were

measured, marked out and mapped prior to commencement of the investigation, and each given an alpha-numeric code to facilitate recording. In all, 13 test pits, each two metres long and one metre wide, were dug at ten metre intervals along the length of the ridge in the locations shown on Figure 5. Four additional pits (TPs A/2/1 to A/2/4) were dug five metres to the north, south, east and west to investigate the extent of an artefact cluster detected in test pit A/2 (cf Figure 5).

All test pits were dug using a rubber-tracked 3.1 ton mechanical excavator mounted with a smooth-edged one metre wide bucket. Sediments were removed from each test pit in maximum 10 centimetre spits into the upper portion of the basal (B) soil horizon. Each spit was dry sieved separately through a (mechanically agitated) six millimetre mesh screen. Sieve residues were carefully examined for Aboriginal cultural material, with each find individually bagged and labelled for later analysis. Soil samples were taken from selected spits for Munsell determinations. Test pits were then backfilled with their own sterile sieve spoil as the investigation progressed.

Artefact analysis

On completion of the test excavations, a basic analysis of all recovered Aboriginal stone artefacts was conducted to a level concomitant with the small size and restricted information potential of the assemblage. This included raw material, size and spatial distribution, and any distinctive technological attributes. Stone artefact identification was based on the definition developed by Hiscock (1984:128), which maintains that an artefact is a fragment of stone that generally possesses one or more of the following characteristics-

- A positive or negative ring crack
- A distinct positive or negative bulb of force
- A definite eraillure scar in position beneath a platform
- Definite remnants of flake scars (ie dorsal scars and ridges)

With the exception of ground artefacts, these traits indicate the application of an external force to a core, and are characteristic of the spalls removed by humans using direct percussion.

Following analysis, the recovered artefacts were placed in appropriately labeled resealable plastic bags and are currently in the temporary care of the consultant. In line with Aboriginal stakeholder wishes, these artefacts will be handed to the CHLALC for safekeeping until such time as they can be re-deposited within the nearby Environmental, Habitat and Catchment Protection area (proposed Lot 28) once any required rehabilitation works are complete.

While not legally necessary under the provisions of Part 3A of the *Environmental Planning and Assessment Act 1979*, an application will be made to the DECC for a *'Care Agreement for Aboriginal Objects'* to allow the Land Council to care for the artefacts and to re-deposit them as proposed. As advised by the DECC, such an application would assist with its record-keeping responsibilities.

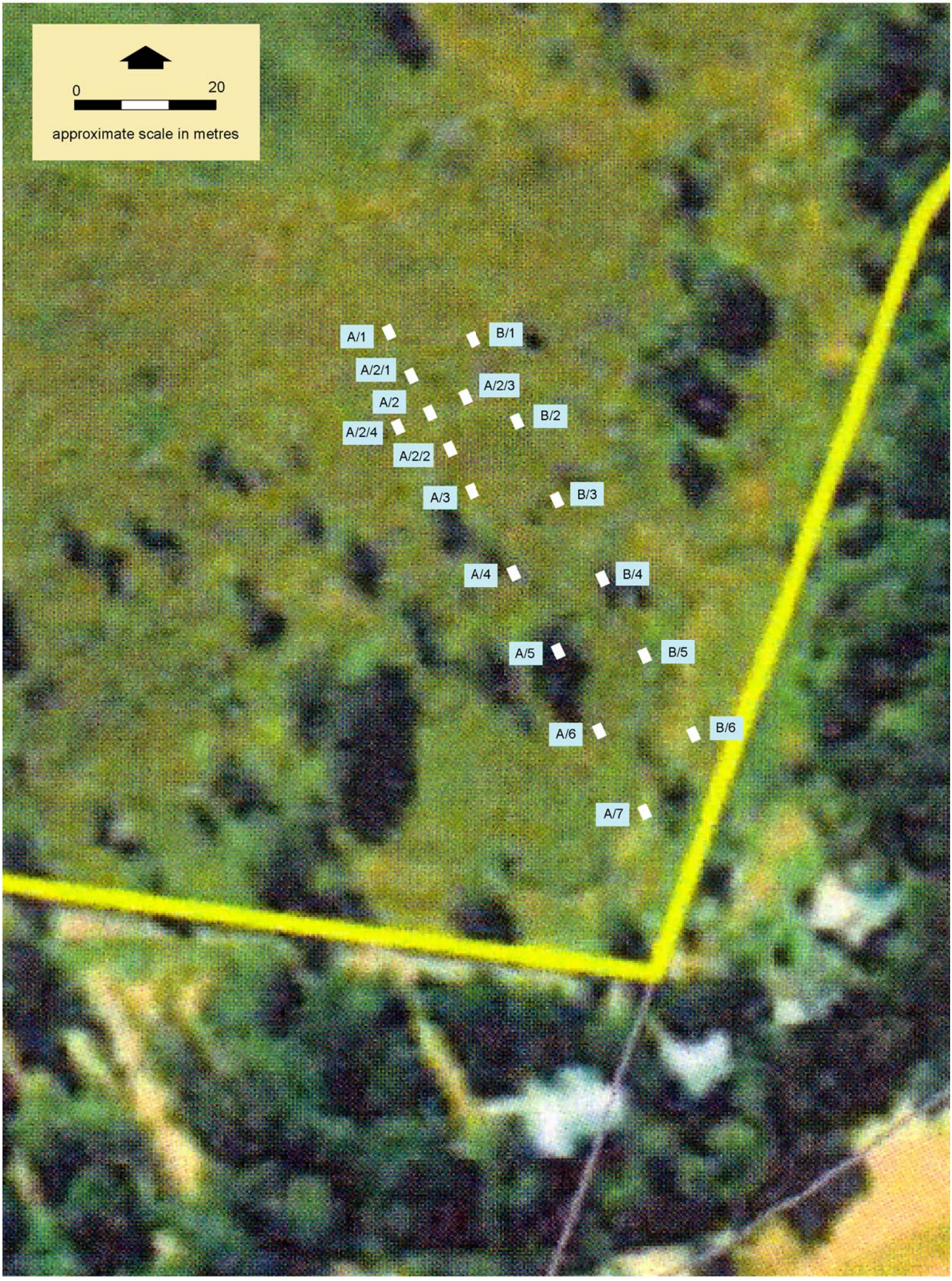

Figure 5. Location and recording code of test excavation pits

Plate 1. View south from ridge summit (occupied by an existing house) towards the investigation area. Test excavations in progress.

Plate 2. View south along the level-low gradient section of ridge subject to the test excavations.

Plate 3. Typical excavation procedure (TP B/6 on southern end of the investigation area).

Plate 4. Excavated sediments placed directly on mechanically-agitated sieve (TP B/6).

Plate 5. Excavated sediments placed directly on mechanically-agitated sieve (TP A/4 in central section of the investigation area).

Plate 6. Typical sieving procedure. Sediments sieved and residue inspected by the entire field team to facilitate artefact recovery (TP B/2 towards northern end of the investigation area).

4 TEST EXCAVATION RESULTS

Nineteen stone artefacts were recovered during the test excavations, demonstrating the existence of an Aboriginal site on the Lot 21 ridge crest. Locations of the artefact-bearing test pits are mapped on Figure 6.

4.1 Stratigraphy

As outlined in Section 3.3, the Lot 21 test pits (TPs) were taken down incrementally into the upper portion of the basal (B) soil horizon. The investigation revealed a topsoil layer of stiff very dark grayish brown loam (Munsell 2.5Y/3/2) grading to friable dark grayish brown sandy loam (Munsell 2.5Y/4/2) with distance south along the ridge. The topsoil varied in depth from a maximum of 30 centimetres in the north to a minimum of 15 centimetres in the south. In all but TP A/2/4, where a subsurface layer of introduced road gravel was encountered between five and 25 centimetres in depth and further excavation was abandoned, the topsoil was underlain by stiff very dark brown loam (Munsell 10YR/2/2) containing large quantities of disintegrating yellow/orange siltstone (Appendix B).

All identified and potential cultural materials recovered during test pitting lay within the topsoil, either within the grass roots (four stone artefacts and one shell fragment) or at the topsoil/basal soil interface (15 stone artefacts, one shell fragment and three pebble manuports). No cultural stratification was evident.

4.2 The stone artefact assemblage

As detailed in Appendix C and summarised in Table 1, the test pit stone artefact assemblage was restricted to flakes and flake fragments (#14), split pebbles (#3) and flaked pieces (#2). No formal ‘tools’ or retouched pieces were recovered.

Table 1. Summary of raw material and artefact types

Raw material	Flake/flake fragment	Split pebble	Flaked piece	Total	%	Artefacts with cortex
Meta-sediment	11	2	0	13	68.4	2
Volcanic	1	0	2	3	15.8	3
Siltstone	1	1	0	2	10.5	1
Mudstone	1	0	0	1	5.3	0
Total	14	3	2	19	100.0	6
%	73.7	15.8	10.5	100.0		31.6

The artefacts are made on raw materials available within the Hearns Lake locality, primarily meta-sediments (68.4 percent of recovered artefacts), with minor representation of siltstone, mudstone and volcanics. Although only one of the flaked artefacts retained identifiable pebble cortex, the presence of split and unmodified pebbles within the assemblage suggests the collection of raw materials from the nearby beach.

Despite use of a six millimetre sieve screen, no artefacts less than 19 millimetres in maximum dimension were recovered, pointing to a general paucity (or absence) of the type of small flaking debitage usually associated with on-site stone reduction. Whilst it is conceded that the detection of flaked pieces may have been constrained by the presence of disintegrating siltstone bedrock in the lower spits, this notion is supported by the recovery of only two positively identified flaked pieces. Even so, the recovery of a cluster of nine reasonably large unmodified flakes/flake fragments (all devoid of stone cortex) of visually identical coarse-grained meta-sedimentary stone in TP A/2 suggests that at least some on-site stone reduction did take place, at least within the TP A/2 locality.

4.3 Stone artefact density and distribution

The test excavations revealed an overall low density of stone artefacts on the investigated ridgeline. Ten of the 17 two square metre test pits were sterile, five contained a single artefact, one contained two artefacts and one contained 12 artefacts. This represents an average of 0.56 artefacts for every surface square metre excavated.

As shown on Figure 6, subsurface artefacts were found to occur intermittently along a 50 metre stretch of the ridge (on both the crest and its eastern upper slope), but were intercepted at highest frequency towards the northern end of the crest, where a density of six artefacts per square metre was identified in TP A/2. Test pits A/2/1, A/2/2, A/2/3 and A/2/4 were placed five metres from TP A/2 (to the north, south, east and west respectively) to explore the horizontal distribution of the A/2 artefact cluster. The recovery of only two artefacts from these supplementary test pits revealed the cluster to be horizontally discrete, and to most likely centre on TP A/2 itself. A gravel roadway was uncovered in TP A/2/4 to the west.

All 19 of the recovered artefacts were restricted to the topsoil, either within the grass roots (#4) or at the base of the topsoil horizon (#15) (Appendix B). Given the extent of tree clearing and long-term cattle grazing, these materials are not considered to have been chronologically stratified. With a mean maximum dimension of 27.5 (range 22-30) millimetres for those within the grass roots, and a mean maximum dimension of 40.3 (range 19-86) millimetres for those at the topsoil base, the vertical artefact distribution cannot be reasonably attributed to ploughing, which characteristically results in a consistent size reduction with depth (Boismier 1991:18; Schofield 1991). This conclusion is supported by the absence of any discernable plough tine marks or substantial sediment mixing within any of the test pits.

On the other hand, the vertical distribution of both artefacts and 'manuport' pebbles is consistent with the accepted effects of natural soil bio-turbation (ie the movement of sediment by flora and fauna), which results in artefact assemblages (and other cultural and non-cultural materials) overwhelmingly concentrated at the topsoil/basal soil interface (cf Mitchell 1988). These effects are likely to have been accelerated by modern tree clearing and cattle grazing within the investigation area.

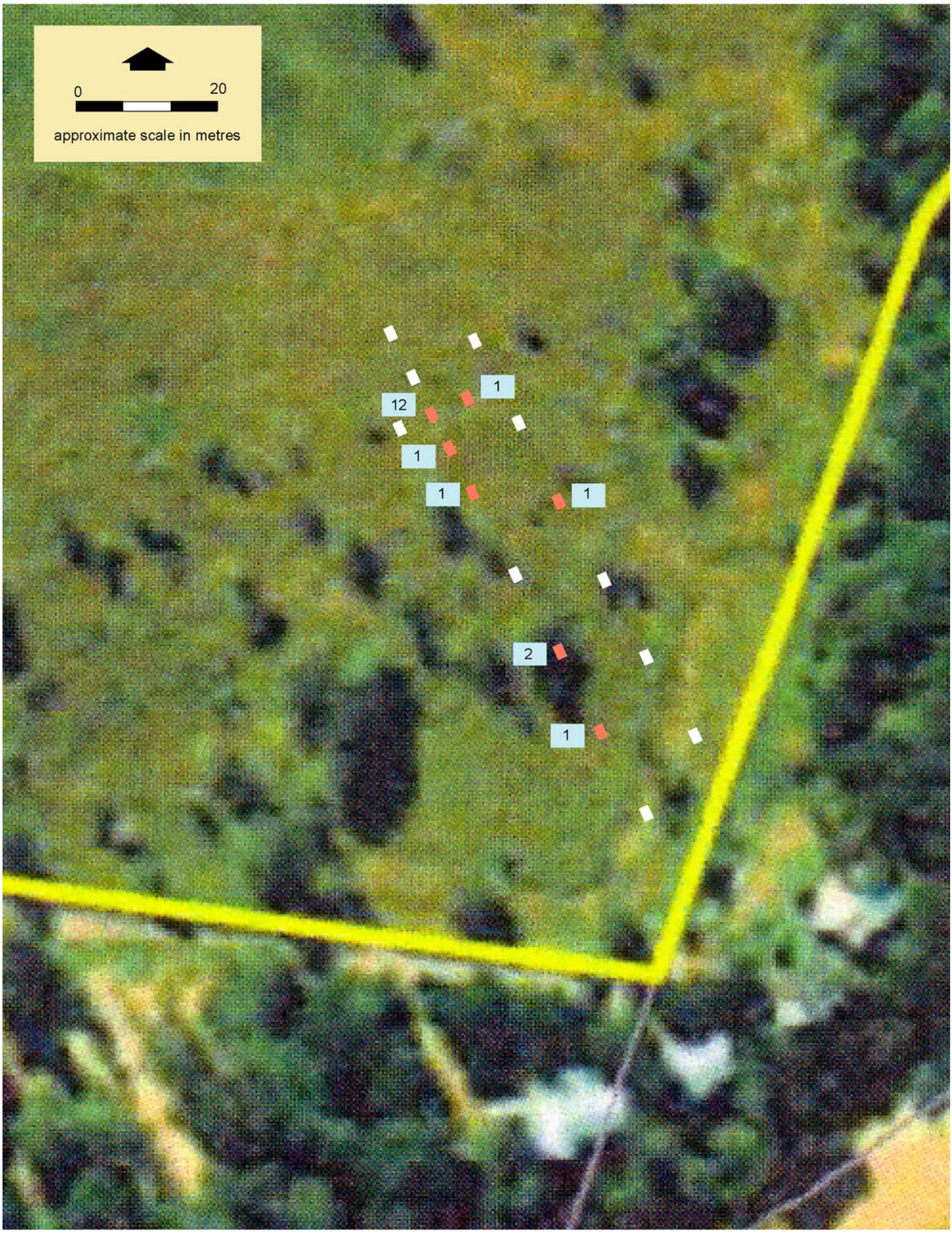

Figure 6. Number of stone artefacts recovered from test excavation pits

Test pit with stone artefacts (number shown)

Sterile test pit

4.4 Shell material

Two large shell fragments attributed to Aboriginal deposition were recovered from the test excavation pits. These comprise the columella of a cartrut (*Thais orbita*) shell at the topsoil base in TP A/3, and a fragment of turban (*Turbo torquatus*) shell in grass roots in TP B/4 (refer to Figure 5 for test pit locations). Both of these rock platform-dwelling gastropod species could have been collected at low tide from nearby Flat Rock Point.

4.5 Unmodified pebbles

Three unmodified pebbles tentatively identified as being of meta-sedimentary stone material were recovered in the basal topsoil spits of test pits A/5 (in association with a flake) and A/2/3 (in association with a split pebble). In the absence of any other reasonable explanation, it is concluded that Aboriginal people collected these pebbles from the adjacent beach and deposited them on the ridge for the purposes of future tool manufacture.

4.6 Other cultural material

No charcoal, bone, or other potential Aboriginal cultural materials were recovered during the test excavations. With the exception of introduced gravel apparently associated with a former roadway intercepted by TP A/2/4, no European cultural materials were recovered.

4.7 Results assessment

The test excavations revealed Aboriginal stone artefacts, occasional shell fragments and unmodified pebble 'manuports' to be present on the investigated section of ridge crest and its eastern upper slope to be affected by the development of proposed residential subdivision Lots 27 and 29, and a roadway separating these allotments (cf Figure 4). All cultural materials were confined to the topsoil, which has been subject to disturbance stemming from tree clearing, cattle trampling and natural bio-turbation, such that no chronological stratification was either apparent or likely.

In all, 19 stone artefacts were recovered during the test excavations. These reflect a restricted range of activities and are dominated by unmodified flakes and flake fragments. With the exception of a discrete cluster of 12 artefacts (six per square metre) identified in TP A/2 towards the northern end of the level-low gradient crest (within proposed Lot 29), the artefact distribution is of a very low density only (mean of 0.22 artefacts per square metre off TP A/2). The horizontal extent of the artefact scatter, in tandem with its low but variable density, suggests that it formed as a result of repeated rather than a single use episode (cf Chatters 1987:346). While not strictly supported by the available evidence (in the absence of any micro-flaking debitage, flaked pieces or primary or secondary flakes of the same coarse-grained meta-sedimentary material), the small artefact cluster identified in TP A/2 is interpreted as a single short-term stopping event involving the reduction of raw stone materials collected from shoreline pebble beds.

The recovery of several split and unmodified pebbles and two fragments of rock platform-dwelling gastropod shell demonstrates a connection with the nearby coastline, but the paucity of these materials, absence of animal bone and low density and unfocussed distribution of the artefacts argues against the ridge having been

used for any sustained camping, stone reduction or food preparation/consumption purposes. Rather, the available evidence points to off-site use of the ridge, probably by small groups engaged in localised resource-gathering activities, or travelling between the coast and ranges. Coastal campsites occupied by these people are likely to have been destroyed by sandmining (cf Collins 2007:Appendix A).

5 SIGNIFICANCE ASSESSMENT

5.1 Aboriginal cultural/social significance

Because Aboriginal archaeological sites contain material evidence of prior occupation/use of the landscape, Aboriginal stakeholders consider all sites within their territory to have at least some educational and general heritage value. However, following a consideration of the test excavation results, Aboriginal field representatives assessed the Lot 21 ridge site to have a low level of cultural/social significance, and advised that this significance is not sufficient to warrant an amendment of the proposed subdivision layout or development procedure.

5.2 Scientific/archaeological significance

The test excavation results indicate that the archaeological record of the Lot 21 ridge is restricted to a widespread but generally low-density distribution of stone artefacts, shell fragments and unmodified beach pebbles within the topsoil. The identified archaeological site is not chronologically stratified and opportunities for dating are limited. Due to its lack of vertical integrity and low contents diversity, the site has very little further potential in terms of scientific research or analysis.

Despite its likely cultural and temporal associations with other registered and reported sites in the Hearns Lake locality, including the #22-1-234 artefact scatter further west along the same ridge (cf Figure 2), the Lot 21 ridge site is assessed to have a low level of archaeological/scientific significance.

6 DEVELOPMENT IMPACT AND MITIGATION STRATEGIES

The Lot 21 residential subdivision development (Figure 4) would result in the destruction of the artefact scatter detected during the test excavations, either as a direct outcome of subdivision development works, or during the course of later building and driveway construction, services installation and landscaping on proposed Lots 27 and 29.

The investigated section of ridge contains an overall low-density distribution of artefacts, with a higher-density but horizontally discrete cluster towards the northern end. Based on results from adjacent pits, most of this artefact cluster appears to have been intercepted by (and salvaged from) TP A/2, but additional small artefact clusters may well occur on other parts of the ridge not intercepted by the test pits. The systematic test pitting methodology will nevertheless have provided a representative sample of cultural materials present on the ridge, all of which were found in an unstratified context within the topsoil. Information of further cultural and/or

scientific value is thus unlikely to be gained as a result of a more comprehensive investigation or salvage program.

Due to its close proximity to a site of acknowledged Aboriginal spiritual significance (natural mythological site #22-1-232 [to be preserved within proposed Lot 28]), CHLALC, Yarrawarra Aboriginal Corporation/Garby Elders and Bagawa Birra Murri Aboriginal Corporation stakeholders considered the Lot 21 ridge to be of potential significance, and recommended the subsurface investigation as a means of assessing this significance (Collins 2007:20). On completion of the test excavations, these stakeholders advised that their cultural concerns have now been satisfactorily addressed, and that the results have provided information of community educational value sufficient to offset loss of the ridge site during the course of the proposed residential development. The site's low assessed level of cultural/social and scientific/archaeological significance is not considered to warrant an amendment of the proposed subdivision layout or development procedure. To mitigate loss of the site, the Aboriginal stakeholders instead request that cultural materials recovered from the test pits be returned to the adjacent Environmental, Habitat and Catchment Protection area (proposed Lot 28) once any required rehabilitation works are complete.

7 MANAGEMENT RECOMMENDATIONS

The following management recommendations were developed in liaison with Aboriginal stakeholders and **replace Recommendation 2** of the '*Lot 21 DP 714858 Hearnes Lake Road, Woolgoolga, NSW mid-north coast- Aboriginal cultural heritage assessment'* (Collins 2007). All other recommendations made in that report remain current.

Recommendation 1:

It is recommended that development of the Lot 21 ridge (as per Figure 4) be allowed to proceed without further Aboriginal cultural heritage constraints.

Recommendation 2:

In line with Aboriginal stakeholder wishes, all cultural materials recovered during the test excavations described in this report should be re-located (by the stakeholders) to the proposed Lot 28 Environmental, Habitat and Catchment Protection area once any required rehabilitation works are complete. Details of the re-deposition location should be supplied to the Department of Environment and Climate Change (DECC) for its records.

REFERENCES

Boismier, W.A. 1991 *The role of research design in surface collection: An example from Broom Hill, Braishfield, Hampshire*. In, A. J. Schofield (ed), Interpreting Artefact Scatters: Contributions to Ploughzone Archaeology. Oxbow Monograph 4, Oxford.

Chatters, J.C. 1987 *Hunter-gatherer adaptations and assemblage structure*. Journal of Anthropological Archaeology, 6:336-375.

Collins, J. 2004 *Development control plan, Hearns Lake, NSW mid-north coast. Aboriginal heritage assessment*. Report to Coffs Harbour City Council.

2007 *Lot 21 DP 714858 Hearnes Lake Road, Woolgoolga, NSW mid-north coast- Aboriginal cultural heritage assessment*. Report to BBK Development Corporation Pty Ltd.

Hiscock, P. 1984 *A preliminary report on the stone artefact from Colless Creek Cave, northwest Queensland*. Queensland Archaeological Research, 1:120-151.

1993 *Bondaian technology in the Hunter valley, NSW*. Archaeology in Oceania, 28(2):65-76.

Kintigh, K. 1988 *The effectiveness of shovel testing: A simulation approach*. American Antiquity, 53(4):686-707.

Korsch, R.J. 1980 *Geology of the Coffs Harbour district*. In Department of Continuing Education (ed), The Natural History of the Coffs Harbour District. University of New England, Armidale.

Krakker, J., M. Shott and P. Welch 1983 *Design and evaluation of shovel-test sampling in regional archaeological survey*. Journal of Field Archaeology, 10:469-480.

Milford, H. 1999 Coffs Harbour Soil Landscape Sheet 9537, 1:100,000. NSW Department of Land and Water Conservation.

Mitchell, P. 1988 *The influences of vegetation, animals and micro-organisms on soil processes*. In H.A. Viles (ed), Biogeomorphology. Basil Blackwell Ltd, Oxford.

Nance, J. and B.F. Ball 1986 *No surprises? The reliability and validity of test pit sampling*. American Antiquity, 51(3):457-483.

Schofield, S.J. 1991 Interpreting Artefact Scatters: Contributions to Ploughzone Archaeology. Monograph 4, Oxbow, Oxford.

GLOSSARY

ASSEMBLAGE
A set of artefacts found in association with each other and therefore assumed to belong to the one phase or one group of people (Champion 1980:11).

BROAD PLATFORM
A platform which, when viewed from above, obscures the body of the flake. Usually produced by detaching the flake by striking well behind the platform margin (Witter 1992:110).

CORE
A piece of stone which has been used as a source for flake production. Cores are thus generally characterised by negative flake scars (Morwood and L'Oste-Brown 1995:162).

CORTEX
The natural weathered surface of rock, not the result of human activity (McCarthy 1976:101).

CREST
Landform element standing above all or most points in the adjacent terrain. Usually smoothly convex (Speight 1990:13).

DISTAL
The opposite end of an artefact to the platform end. The blade of an edge-ground axe or the working edge of other implements form the distal end (McCarthy 1976:101).

DORSAL
The face of a flake that was exposed on the core before removal of the flake (Phagan 1976:39).

FEATHER TERMINATION
Is identified on the distal end of a flake which terminates in a sharp edge with a minimal margin. Feather terminations are an indicator of good knapping control (Crabtree 1972:64).

FLAKE
A piece of stone detached from a larger mass by the application of force and having a feather, hinge or step termination and a bulb of percussion. A platform may be present if the proximal end is unbroken (Crabtree 1972:64).

FLAKED PIECE
Chipped artefacts with negative flake scars which cannot be classified as a flake, core or retouched flake (Hiscock 1988:64).

FOCAL PLATFORM
A platform having a small area such that when viewed from above, most of the remaining body of the flake can be seen. Focalised platforms are produced by striking close to the platform edge (Witter 1992:110).

HINGE TERMINATION
Is identified on the distal end of a flake which terminates in a blunted or rounded right angled break. Hinge terminations occur when inadequate percussive force is applied and are thus an indicator of poor knapping control (Hiscock 1986b:49).

LATERAL MARGINS
The sides of an artefact- between the proximal and distal ends (McCarthy 1976:101).

LENGTH
Maximum dimension of a core or flaked piece in any direction; maximum distance along the percussion axis of a flake from the platform to the distal margin (Witter 1986:2).

META-SEDIMENT
A metamorphosed sedimentary rock in which the original texture is still recognisable (Lapidus 1987:345).

MUDSTONE
A commonly-used synonym for Mudrock. A fine-grained sedimentary rock composed chiefly of particles in the silt-clay size range. Mudrock/mudstone is a general term used to distinguish the finer-grained sedimentary rocks from sandstones or limestones (Lapidus 1987:362).

MULTI-PLATFORM [ROTATED] CORE
A core with at least one negative scar running in a different direction to the remainder. Multi-directional scars indicate that the core has been rotated to get the most economical use of the raw material (Hiscock 1986a:49).

NEGATIVE FLAKE SCAR
Concave surface resulting from the removal of a flake (Phagan 1976:39).

OVERPASS TERMINATION
Is identified on the distal end of a flake whose fracture plane (ventral surface) curves markedly away from the core face (dorsal surface) and continues directly into the core, removing the base of the core and giving the flake a J shape in longitudinal cross section (Hiscock 1988:86).

PEBBLE
Stone worn and rounded by water and other natural forces (McCarthy 1976:101).

PLATFORM
The plane or surface against which force is applied in order to detach a flake from a core. The platform may be the natural surface of the stone, or cortex, it may be a surface produced by the prior removal of one or more flakes, or a surface produced by grinding or abrading (Phagan 1976:11).

PLATFORM PREPARATION
Accomplished when the knapper strikes or brushes the edge of the core platform and removes small flakes from the edge. This prevents the platform from shattering (Hiscock 1988:86).

REJUVENATION FLAKE
A flake removed to refurbish the working edge of an artefact by exposing a fresh edge (Morwood and L'Oste-Brown 1995:170).

RETOUCH
The alteration to the primary termination of a flake caused by deliberate secondary flaking in order to resharpen or modify the edge (Crabtree 1972:89).

RIDGE
A compound landform element comprising a narrow spine crest and its immediately adjoining slope with the spine length being greater than the width (Packard 1992:100).

SILTSTONE
A fine-grained sedimentary rock principally composed of silt-grade material. Intermediate between sandstone and shale, siltstone contains less clay than shale and lacks its fissility and fine laminations (Lapidus 1987:474).

STONE ARTEFACT
Fragment of stone that generally possesses one or more of the following characteristics:
• Positive or negative ring crack
• Distinct positive or negative bulb of force
• Definite eraillure scar in position beneath a platform
• Definite remnants of flake scars (ie dorsal scars and ridges)
These traits indicate the application of an external force to a core, and are characteristic of the spalls removed by humans using direct percussion. Stone artefacts which have none of the above may be identified as such if they possess ground facet/s characteristic of human industry (Hiscock 1984:128).

THICKNESS
The greatest dimension perpendicular to both the length and width of an artefact (Witter 1986:2).

UPPER SLOPE
A slope landform element adjacent below a crest or flat but not adjacent above a flat or depression (Speight 1990:11-34).

VOLCANIC ROCK
Very fine-grained or glassy igneous rock produced by volcanic action at or near the earth's surface, either extruded as lava or expelled explosively (Lapidus 1987:535).

WIDTH
The maximum distance between the lateral margins of an artefact, measured at right angles to the length (Witter 1986:2).

Glossary References

Champion, S. 1980 A Dictionary of Terms and Techniques in Archaeology. Facts on File Inc, New York.

Crabtree, D. 1972 *An introduction to the technology of stone tools. Part II*. Occasional Papers of the Idaho State Museum, No 28.

Hiscock, P. 1984 *A preliminary report on the stone artefacts from Colless Creek Cave northwest Queensland*. Queensland Archaeological Research, 1:120-151.

1986a *Raw material rationing as an explanation of assemblage differences: a case study of Lawn Hill, northwest Queensland*. In G.K. Ward (ed), Archaeology at ANZAAS Canberra 1984. Canberra Archaeological Society. Pp 178-190.

1986b *Technological change in the Hunter Valley and its implications for the interpretation of late Holocene change in Australia*. Archaeology in Oceania, 21:40-50.

1988 *Technological change at Platypus rockshelter (KB:A70), southeast Queensland.* Queensland Archaeological Research, 5:63-89.

Lapidus, D.F. 1987 Dictionary of Geology. Collins, London.

McCarthy, F.D. 1976 Australian Aboriginal Stone Implements. The Australian Museum, Sydney.

Morwood, M.J. and S. L'Oste-Brown 1995 *Chronological changes in stone artefact technology*. In M.J. Morwood and D.R. Hobbs (eds), Quinkan Prehistory: The Archaeology of Aboriginal Art in Southeast Cape York Peninsula, Australia. Tempus 3. University of Queensland, St Lucia.

Packard, P. 1992 *An archaeological assessment of State Forests in the Kempsey and Wauchope Forestry Management Areas*. Report to the NSW Forestry Commission.

Phagan, C.J. 1976 *A method for the analysis of flakes in archaeological assemblages: A Peruvian example.* Unpublished Ph D Thesis, Ohio State University.

Plog, S., F. Plog and W. Wait 1978 *Decision making in modern surveys*. In M. Schiffer (ed), Advances in Archaeological Method and Theory, 1:383-421.

Speight, J.G. 1990 *Landform.* In R.C. McDonald, R.F. Isbell, J.G. Speight, J. Walker and M.S. Hopkins (eds), Australian Soil and Land Survey: Field Handbook. Inkata Press, Sydney. Pp 9-57.

Witter, D.C. 1986 *Detailed stone artefact recording.* Report to the NSW National Parks and Wildlife Service, Hurstville.

1992 *Regions and resources*. Unpublished Ph D Thesis, Australian National University, Canberra.

APPENDIX A

Aboriginal stakeholder correspondence

Bagawa Birra Murri
Aboriginal Corporation

Susan Hoskins
31 Soren Larsen Cr

Boambee East
NSW 2452
PH: 66584878

MOB:04053409102

27th Febuary 2009

Attention : Jackie Collins

Consultant Archaeologist

11 Camden Head Road

Dunbogan

NSW 2443

Re: Draft Report of Aboriginal and Archaeological Survey and Assessment

Lot21 DP 714958, Hearns Lake Woolgoolga

Dear Jacqui,

Thank you for providing a draft copy of your report for comment from the Bagawa Birra Murri.

This letter is to confirm that the Bagawa Birra Murri Aboriginal Corporation supports the proposed housing development at the above site.

Bagawa Birra Murri Aboriginal Corporation holds no constraints for this development proceeding, provided all recommendations are strictly adhered to and that the opportunity, for further advice from the Bagawa Birra Murri Aboriginal Corporation be recognized for the duration of this development, as this area of the coastline is extremely significant to both the local Aboriginal community and the Bagawa Birra Murri group.

If you have any further question on this matter please do not hesitate to call the under signed on the above numbers

Yours Truly

Susan Hoskins

Chairperson

Coffs Harbour & District Local Aboriginal Land Council

Cnr Pacific Highway & Arthur Street, Coffs Harbour 2450
PO Box 6150, Coffs Harbour Plaza NSW 2450
Phone: (02) 6652 8740 Fax: (02) 6652 5923

13th March 2009

Attention: Jackie Collins

Adise Heritage Consultants Pty Ltd
11 Camden Head Road
Dunbogan NSW 2447

Re: Archaeological Test Excavations – Lot 21 DP 714858 Hearnes Lake Road, Woolgoolga.

Dear Mrs Collins,

Thank you for providing your draft report in relation to the above listed matter.

I am pleased to inform you that after consultation with Land Council's Cultural Heritage Officer's who assisted in the completion of the test excavating that the report recommendations capture the field discussions held during this activity.

In summary the Coffs Harbour and District Local Aboriginal Land Council concludes that the report should be endorsed in its current form and that the Land Council is please to provide its endorsement of this report.

If you have any questions in relation to this matter please contact the undersigned on the number listed above.

Yours truly,

Chris Spencer
Chief Executive Officer

e-mail: coffs.harbour.lalc@bigpond.com

YARRAWARRA ABORIGINAL CORPORATION
LOT 170 RED ROCK RD CORINDI BEACH NSW 2456

Telephone
0266 492758

CULTURAL HERITAGE
JALUMBO
RESEARCH UNIT

Facsimile
0266 491097

Wednesday 18th March 2009

Jacqueline Collins
(consultant archaeologist)
11 Camden Head Road
Dunbogan
Nsw 2443

RE Lot 21DP 714858 Hearns Lake Road, Woolgoolga ,NSW, Proposed residential development

To Whom it may concern,

I was on site for the Archaeological test excavation on the above address and as a result of our finding very little cultural material and reading the report and speaking to the Elders we have no problems with the above address.

Yours sincerely,

Tim Cowan
Manager Jalumbo

APPENDIX B

Content of test excavation pits

APPENDIX B. Content of test excavation pits

Test pit	Depth (cm)	Sediment description	Disturbance indicators	# stone artefacts	Other material
A/1	0-10	Stiff very dark grayish brown loam		0	
	10-20	Stiff very dark grayish brown loam		0	
	20-30	Stiff very dark grayish brown loam		0	
	30-35	Stiff very dark brown loam with orange siltstone		0	
A/2	0-10	Stiff very dark grayish brown loam		0	
	10-20	Stiff very dark grayish brown loam		0	
	20-25	Stiff very dark grayish brown loam		12	
	25-30	Stiff very dark brown loam with orange siltstone		0	
A/3	0-10	Friable very dark grayish brown loam		1	
	10-20	Friable very dark grayish brown loam		0	1 shell fragment
	20-25	Stiff very dark brown loam with orange siltstone		0	
A/4	0-10	Friable very dark grayish brown loam		0	
	10-20	Friable very dark grayish brown loam		0	
	20-25	Stiff very dark brown loam with orange siltstone		0	
A/5	0-10	Friable very dark grayish brown loam		1	
	10-20	Friable very dark grayish brown loam		1	1 manuport pebble
	20-25	Stiff very dark brown loam with orange siltstone		0	
A/6	0-10	Friable dark grayish brown sandy loam		1	
	10-15	Friable dark grayish brown sandy loam	Tree roots	0	
	15-20	Stiff very dark brown loam with orange siltstone		0	
A/7	0-10	Friable dark grayish brown sandy loam		0	
	10-15	Friable dark grayish brown sandy loam		0	
	15-20	Stiff very dark brown loam with orange siltstone		0	
B/1	0-10	Stiff very dark grayish brown loam		0	
	10-20	Stiff very dark grayish brown loam		0	
	20-25	Stiff very dark grayish brown loam		0	
	25-30	Stiff very dark brown loam with orange siltstone		0	
B/2	0-10	Stiff very dark grayish brown loam		0	
	10-20	Stiff very dark grayish brown loam		0	
	20-25	Stiff very dark grayish brown loam		0	
	25-30	Stiff very dark brown loam with orange siltstone		0	
B/3	0-10	Friable very dark grayish brown loam		1	
	10-20	Friable very dark grayish brown loam		0	
	20-25	Stiff very dark brown loam with orange siltstone		0	
B/4	0-10	Friable very dark grayish brown loam		0	1 shell fragment
	10-15	Friable very dark grayish brown loam		0	
	15-20	Stiff very dark brown loam with orange siltstone		0	

APPENDIX B. Content of test excavation pits

Test pit	Depth (cm)	Sediment description	Disturbance indicators	# stone artefacts	Other material
B/5	0-10	Friable very dark grayish brown loam		0	
	10-15	Friable very dark grayish brown loam		0	
	15-20	Stiff very dark brown loam with orange siltstone		0	
B/6	0-10	Friable dark grayish brown sandy loam		0	
	10-15	Friable dark grayish brown sandy loam		0	
	15-20	Stiff very dark brown loam with orange siltstone		0	
A/2/1	0-10	Stiff very dark grayish brown loam		0	
	10-20	Stiff very dark grayish brown loam		0	
	20-25	Stiff very dark grayish brown loam		0	
	25-30	Stiff very dark brown loam with orange siltstone		0	
A/2/2	0-10	Stiff very dark grayish brown loam		0	
	10-20	Stiff very dark grayish brown loam		0	
	20-25	Stiff very dark grayish brown loam		1	
	25-30	Stiff very dark brown loam with orange siltstone		0	
A/2/3	0-10	Stiff very dark grayish brown loam		0	
	10-20	Stiff very dark grayish brown loam		0	
	20-25	Stiff very dark grayish brown loam		1	2 manuport pebbles
	25-30	Stiff very dark brown loam with orange siltstone		0	
A/2/4	0-5	Friable very dark grayish brown loam		0	
	5-25	Introduced gravel (road)	Introduced gravel	0	

APPENDIX C

Stone artefact catalogue

APPENDIX C. Stone artefact catalogue

Test pit	Depth (cm)	Artefact type	Raw material	Length (mm)	Width (mm)	Thickness (mm)	Platform type	Termination type	Cortex (%)	Retouch	Comment
A/2	20-25	Flake	Cg metasediment	40	25	7	Broad	Snapped	0	0	3 dorsal -ve scars
		Flake	Cg metasediment	38	24	8	Focal	Overpass	0	0	Platform prep. 2 dorsal -ves
		Flake	Cg metasediment	20	21	3	Broad	Feather	0	0	2 dorsal -ve scars
		Flake	Cg metasediment	28	20	4	Focal	Feather	0	0	Split cone. 1 dorsal -ve
		Flake	Cg metasediment	42	27	10	Focal	Feather	0	0	4 dorsal -ve scars. Core rejuvenation flake (rotated)
		Flake	Cg metasediment	26	27	9	Broad	Feather	0	0	2 dorsal -ve scars
		Flake	Cg metasediment	31	14	6	Broad	Feather	0	0	2 dorsal -ve scars
		Flake	Cg metasediment	19	19	6	Broad	Snapped	0	0	1 dorsal -ve scar
		Flake fragment	Cg metasediment	21	23	7		Feather	0	0	1 dorsal -ve scar
		Split pebble	Cg siltstone	86	30	13			90	0	Longitudinal split
		Split pebble	Fg metasediment	61	36	20			80		Longitudinal split
		Flaked piece	Volcanic	22	20	5			Indet.		
A/3	0-10	Flaked piece	Volcanic	28	19	8			20		
A/5	0-10	Flake	Volcanic	30	20	7	Focal	Overpass	10	0	5 dorsal -ve scars
	10-20	Flake	Cg metasediment	32	32	7	Nil	Overpass	0	0	2 dorsal -ve scars
		Unmodified pebble	Fg metasediment?	115	45	34					
A/6	0-10	Flake	Siltstone	23	30	5	Broad	Hinge	0	0	1 dorsal -ve scar
B/3	0-10	Flake	Mudstone	18	22	4	Broad	Snapped	0	0	2 dorsal -ve scars
A/2/2	20-25	Flake	Cg metasediment	32	62	12	Broad	Feather	0	0	2 dorsal -ve scars
A/2/3	20-25	Split pebble	Fg metasediment	68	72	30			80	0	Transverse split
		Unmodified pebble	Cg metasediment?	93	57	20					
		Unmodified pebble	Cg metasediment?	97	54	23					