# NEWCASTLE INNER CITY BYPASS – RANKIN PARK TO JESMOND
# ABORIGINAL ARCHAEOLOGICAL SALVAGE EXCAVATION

**State Significant Infrastructure Approval (SSI 6888)**

Prepared for Transport for NSW

Newcastle and Lake Macquarie Local Government Areas

August 2022

Ref. 1911

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## Executive Summary

Transport for NSW (formerly Roads and Maritime Services NSW) is proposing to construct the fifth section of the Newcastle Inner City Bypass. The project involves construction of a new 3.4 kilometre four lane divided road between Lookout Road, New Lambton Heights and Newcastle Road, Jesmond. The project is designated as Critical State Significant Infrastructure (SSI 6888) and was assessed under Part 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Secretary's Environmental Assessment Requirements (SEARs) for preparation of an Environmental Impact Statement (EIS) were issued for the project on 3 March 2015. Following preparation of the EIS, the project was approved on 15 February 2019.

A Cultural Heritage Assessment Report (CHAR) was prepared by Kelleher Nightingale Pty Ltd (KNC) to inform the EIS, in accordance with the project SEARs, Heritage NSW [formerly Office of Environment and Heritage (OEH)] *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* and the Roads and Maritime *Procedure for Aboriginal Cultural Heritage Consultation and Investigation*. The assessment included a comprehensive consultation process with Registered Aboriginal Parties (RAPs) for the project.

Four Aboriginal archaeological sites were identified within the project area: RP2J AFT 3, RP2J AFT 4, RP2J IF 1 and RP2J IF 2. The CHAR identified that all four sites would be impacted by the project. Archaeological significance of the identified sites was defined by the information exhibited by each site. A mitigation program comprising surface collection and archaeological salvage, undertaken prior to construction, was determined as suitable mitigation where portions of at least moderately significant Aboriginal sites would be impacted by the proposal. Mitigative salvage excavation and surface collection was recommended for site RP2J AFT 3, which exhibited moderate archaeological significance. The remaining three archaeological sites (RP2J AFT 4, RP2J IF 1 and RP2J IF 2) all displayed high disturbance levels and limited archaeological information; as a result, all three sites exhibited low archaeological significance. The CHAR recommended surface collection of Aboriginal objects at these locations.

Project Approval was issued in February 2019 and included salvage requirements for Aboriginal sites as detailed in the CHAR. This report documents the findings of the salvage program carried out to comply with the conditions of approval for SSI 6888.

A total of 38 Aboriginal stone artefacts (plus 357 heat shatter pieces) were recovered during the salvage program. A total of 55m$^2$ was excavated at RP2J AFT 3 (Phase 1= 1m$^2$, Phase 2=54m$^2$). Phase 1 salvage excavation confirmed the southern extent of the site boundary. This Phase 1 investigation coupled with previous test excavation results informed the placement of two subsequent Phase 2 (open area) excavations. The open areas were placed at the top of the elevated flat, and toward the lower slope of the same landform, to establish the presence of artefacts and their relationship to the geomorphology of the landform. Open Area 1 on the top of the elevated flat contained the majority of the artefactual assemblage (n=27, 71%) and Open Area 2 contained 29% of the artefact assemblage (n=11).

The overall artefact density per square metre for RP2J AFT 3 was low at 0.7/m$^2$. The predominant material type was a local silicified tuff, with small amounts of quartz, silcrete and a potential rhyolite flake. Overall, the material types represented are comparable to other sites of the region. The assemblage comprised angular fragments (n= 21, 55%), flakes (n=7, 18%), two cores, and the remaining assemblage consisted of flake fragments. Retouched artefacts were absent as were artefacts under 5mm in size, indicating that this was not a primary knapping location.

Allowing for land use disturbance, there is a pattern of artefact discard within the study area that reflects differences in human behaviour. These differences most likely relate to the way Aboriginal people were accessing and using different resources across individual landform types and the wider landscape. In the wider region, elevated sites situated on ridgetops and crests near significant coastal, estuarine or lagoon resources demonstrate larger sites, with indications of more complex, long-term occupation. The undulating to rolling hills, crests and slopes of the hinterland are more often associated with axe grinding grooves and rock engravings, and typically contain less frequently identified low density sites. Subsurface investigations of this intervening landscape have not previously been a focus of archaeological enquiry in the region, however the landforms and environmental contexts they display form an important connector between more heavily used parts of the landscape. RP2J AFT 3 represents a location where a subsurface artefact deposit reflecting this type of transitory behaviour has been preserved, showing use of a highly localised raw material resource with low intensity knapping. The site is typical of an isolated, temporary camp set up in transit: it represents part of the archaeological connection between places of significance and across the cultural landscape.

The salvage program completed for Newcastle Inner City Bypass thus contributes to our understanding of the interconnectedness of sites in the Newcastle region and its significant Aboriginal cultural heritage story.

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# 1 Introduction

## 1.1 Project background

Transport for NSW ('Transport'; formerly Roads and Maritime Services) is undertaking construction of the fifth section of the Newcastle Inner City Bypass, west of Newcastle, NSW. The Newcastle Inner City Bypass is part of Transport's long term strategy to provide an orbital road within Newcastle's road network to connect the Pacific Highway at Bennetts Green with the Pacific Highway at Sandgate. The fifth section of the Bypass ('the project') involves construction of a new 3.4 kilometre four lane divided road between Lookout Road, New Lambton Heights and Newcastle Road, Jesmond. The Rankin Park to Jesmond section of the Newcastle Inner City Bypass would provide traffic relief to the surrounding road to network, in particular the existing route of Lookout Road, Croudace Street and Newcastle Road.

The project was designated as Critical State Significant Infrastructure (SSI 6888), subject to assessment and approval under Part 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Secretary's Environmental Assessment Requirements (SEARs) for preparation of an Environmental Impact Statement (EIS) were issued for the project on 3 March 2015. Following preparation of the EIS, the project was approved on 15 February 2019.

## 1.2 Assessment context

Transport engaged Kelleher Nightingale Consulting Pty Ltd (KNC) to undertake Aboriginal cultural heritage assessment for the project. Initial assessment included preparation of an Aboriginal archaeological assessment (KNC 2017) in accordance with Stage 2 of the Roads and Maritime *Procedure for Aboriginal Cultural Heritage Consultation and Investigation* (PACHCI) (Roads and Maritime 2011) and the requirements of the Office of Environment and Heritage (OEH) [now Heritage NSW].

Two Aboriginal archaeological sites (RP2J AFT 3 and RP2J AFT 4) and two areas of potential archaeological deposit (RP2J PAD 1 and RP2J PAD 2) were identified during the survey of the project area as part of PACHCI Stage 2 investigations. The PACHCI Stage 2 assessment recommended a program of archaeological test excavation to obtain further information in regards to the nature and significance of the Aboriginal cultural heritage resource and how it may be affected by the project.

Preparation of an Aboriginal Cultural Heritage Assessment Report (CHAR) was subsequently undertaken to inform the EIS (KNC 2018). The CHAR assessment addressed the Aboriginal heritage requirements identified in the project SEARs. The objectives of the CHAR combined Aboriginal community consultation with an archaeological investigation in accordance with:

- Project SEARs;
- Roads and Maritime PACHCI;
- *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (OEH 2010a);
- *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* (OEH 2011); and
- *Aboriginal cultural heritage consultation requirements for proponents 2010* (OEH 2010b).

Archaeological test excavation of the identified areas within the project boundary was subsequently undertaken in accordance with the SEARs and *Code of Practice*. The archaeological test excavation identified the presence of subsurface archaeological deposit at all four sites:

- RP2J AFT 3
- RP2J AFT 4
- RP2J IF 1 (formerly RP2J PAD 1)
- RP2J IF 2 (formerly RP2J PAD 2).

The CHAR identified that all four Aboriginal archaeological sites would be impacted by the project (Figure 1).

Archaeological significance of the identified Aboriginal sites was defined by the information exhibited by each site. A mitigation program comprising surface collection and archaeological salvage, undertaken prior to construction was determined as suitable mitigation where portions of at least moderately significant Aboriginal sites would be impacted by the proposal. Mitigative salvage excavation and surface collection was recommended for site RP2J AFT 3, which exhibited moderate archaeological significance. The remaining three archaeological sites (RP2J AFT 4, RP2J IF 1 and RP2J IF 2) all displayed high disturbance levels and limited archaeological information; as a result, all three sites exhibited low archaeological significance. The CHAR recommended surface collection of Aboriginal objects at these locations.

Project Approval was issued in February 2019 and included salvage requirements for Aboriginal sites as detailed in the CHAR. This report documents the findings of the salvage program carried out to comply with the conditions of approval for SSI 6888.


**Figure 1. Impacted Aboriginal archaeological sites within the project area**

# 2 Aboriginal Community Involvement

## 2.1 Stakeholder Consultation

Transport is committed to effective consultation with Aboriginal communities regarding activities which may impact on Aboriginal cultural heritage. The PACHCI has been developed to provide a consistent means of effective consultation for Transport activities across NSW. The PACHCI is compliant with Heritage NSW requirements and guidelines.

Registered Aboriginal stakeholders have been involved in previous assessment of the project and preparation of the CHAR (KNC 2018). The stakeholder registration and consultation process followed the *Aboriginal cultural heritage consultation requirements for proponents 2010* (OEH 2010b) and has been conducted in accordance with the requirements of the PACHCI.

A full discussion and log of all Aboriginal community consultation is available in the CHAR (KNC 2018).

## 2.2 Registered Aboriginal Stakeholders

As listed in the CHAR, investigations for the Newcastle Inner City Bypass between Rankin Park and Jesmond have included consultation with 17 Aboriginal community groups and individuals. Table 1 lists the registered Aboriginal stakeholders for the project.

## 2.3 Participation in Archaeological Salvage Excavation Program

Fieldwork took place between 22 February and 5 March 2021. Representatives from the registered Aboriginal stakeholders were involved in the salvage excavation activities.

# 3 Landscape Context

## 3.1 Landform, geology and soils

The project area is located within the Lower Hunter Valley, a northern physiogeographic region of the Sydney Basin. The Sydney Basin is a large geological feature that stretches from Batemans Bay to Newcastle and west to Lithgow. The formation of the basin began between 300 to 250 million years ago when river deltas gradually replaced the ocean that had extended as far west as Lithgow. The oldest, Permian layers of the Sydney Basin consist of marine, alluvial and deltaic deposits that include shales and mudstone overlain by coal measures.

The topography of the project area is characterised by crest, flat, open depression and slope landforms of a prominent ridgeline which forms the watershed for the catchments of Dark Creek in the north, Ironbark Creek in the west and Styx Creek in the east (Figure 2). The northern portion of the project area is associated with low slopes descending from the crests of the central portion of the project area. The southern portion of the project area is made up of moderate to steep slopes ascending to the crest occupied by Kookaburra Circuit, McCaffrey Drive and Lookout Road.

The underlying geology of the project area is predominantly formed from subgroups of the Newcastle Coal Measures, with the northern portion of the project area containing Tomago Coal Measures (Figure 3). The northern low lying hill landforms are formed from Tomago Coal Measures (Pt) geology which consists of siltstone, sandstone, coal, tuff, claystone, conglomerate and minor clay. Waratah Sandstone (Pnw) is a subgroup of the Newcastle Coal Measures that underlies the flat landforms of the Dark Creek flood plain and is characterised by medium grained sandstone. The Lambton Subgroup (Pnl) of the Newcastle Coal Measures is present within the lower elevations of the ridgeline south of Dark Creek and is characterised by sandstone, siltstone, claystone, coal and tuffaceous sandstone. The highest elevations of the ridgeline in the southern portion of the project area are formed from the Adamstown Subgroup (Pna) of the Newcastle Coal Measures and comprise conglomerate, tuff, sandstone, siltstone, claystone and black coal.

Soil landscapes in the area are closely related to the basal geology and topography of the project area (Figure 3). The predominant soil type is the Killingworth erosional soil landscape which includes shallow to moderately deep Yellow Podzolic Soils, yellow Soloths, Gleyed Podzolic soils and gleyed Soloths on the crests and hillslopes of the project area. Structured Loams, Bleached Loams and Lithosols are also present on some crests. Cedar Hill colluvial soil landscapes are present on the steep slopes in the southern portion of the project area. These soil types include moderately deep to deep well to imperfectly drained Brown Podzolic and Yellow Podzolic soils. Structured loams which are moderately deep and well drained are also present.

Beresfield residual soils overlie Tomago Coal Measures in the northern portion of the project area. These soils occur on crests, are moderately deep and moderately well to imperfectly drained Yellow Podzolic soils, brown Podzolic soils and brown Soloths. Well drained Red Podzolic soils and red Soloths occur on upper slopes with brown Soloths and yellow Soloths occurring on side slopes. Lower slopes in this soil landscape are characterised by imperfectly to poorly drained Yellow Podzolic soils.

The majority of the project area has not been affected by contemporary land clearing and is currently covered by uncleared open forest with some open woodland. Several unsealed access tracks and utility easements have been constructed through the vegetated areas. Urban development with associated infrastructure is present in the northern and southern portions of the project area while the John Hunter Hospital precinct is located adjacent to the eastern boundary of the project area. Historically, mining activity has also resulted in land disturbance, clearing and changes to watercourses.

The spur south of the Dark Creek floodplain was also the location of the former Hollywood shanty town. The settlement developed during the Great Depression of the 1930s around a north south aligned track and was inhabited by 70 to 80 families by 1949. The settlement is believed to have continued into the mid to late 1950s when it was cleared by the local council (Baker Archaeology 2016: 17).

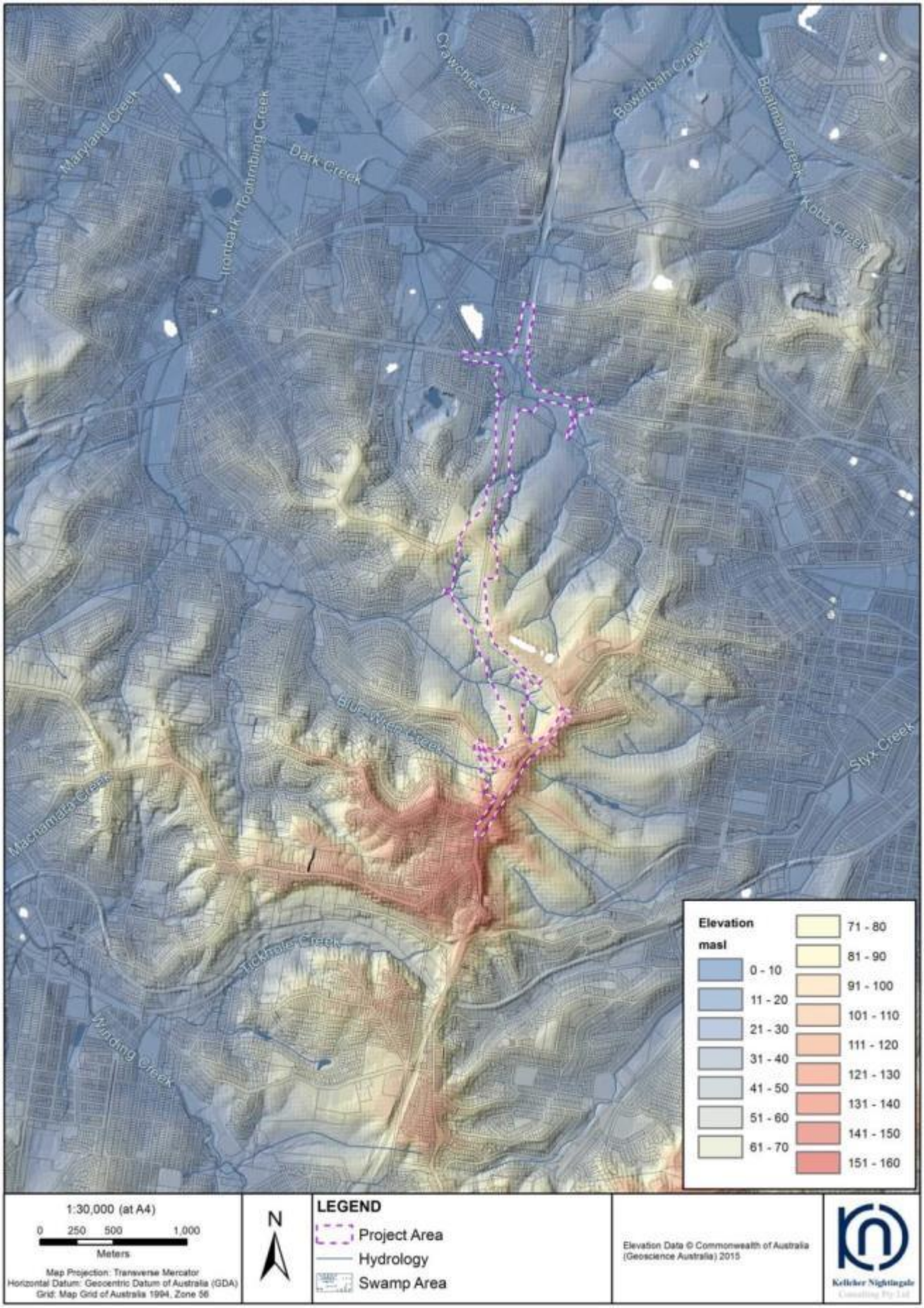



**Figure 2. Topography of the project area**

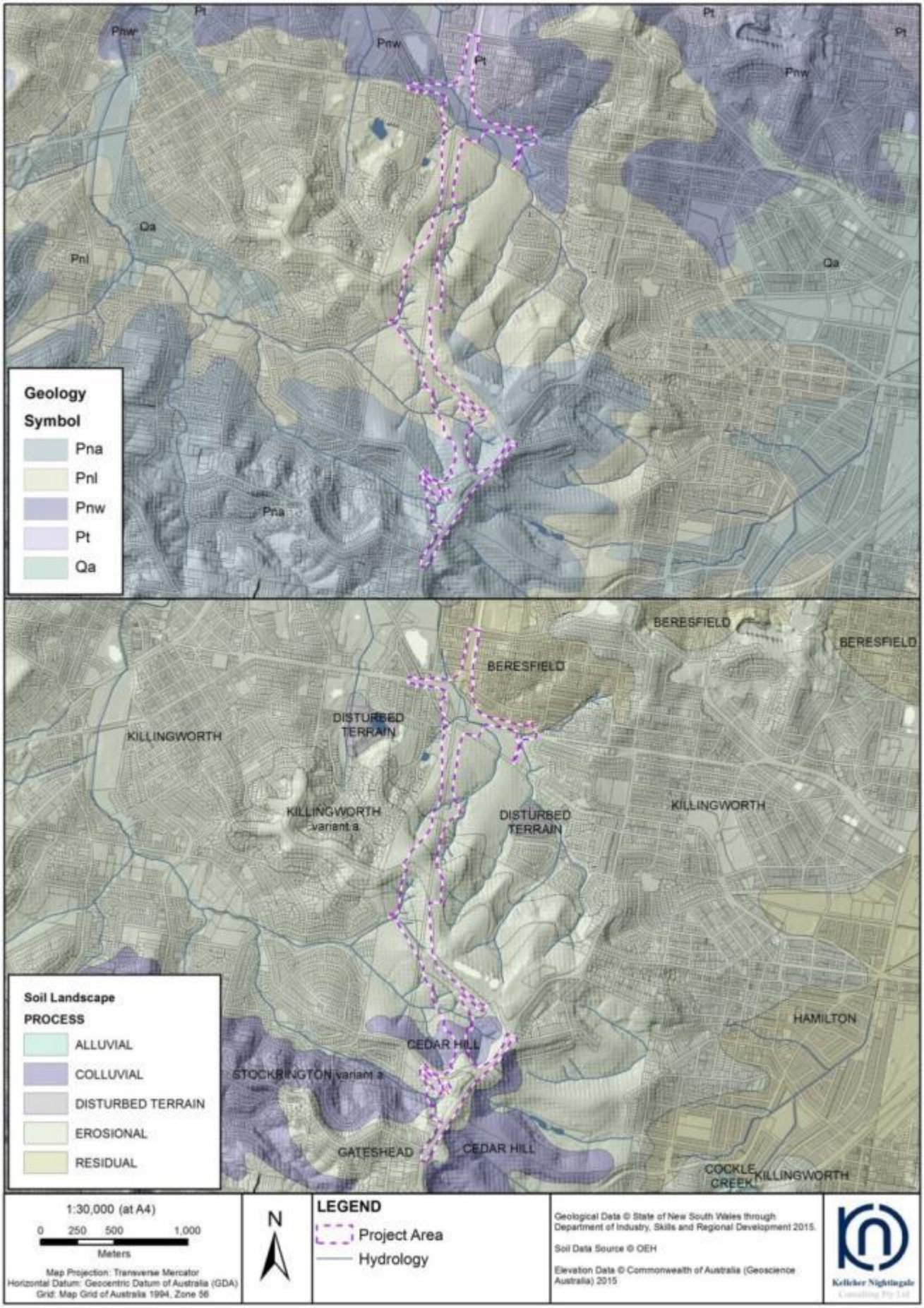



**Figure 3. Geology and soil landscapes of the project area**

# 4 Ethnohistoric Context

Although the specific project area is not recorded directly in ethnographical accounts, historical accounts were made of the Aboriginal people living in the region at the time of initial European exploration and settlement in the late eighteenth and early nineteenth centuries (cf. Brayshaw 1987; Maynard 2015). These historical accounts describe a landscape which was important to and intensively used by Aboriginal people. Contact with Europeans introduced diseases that drastically altered the size and structure of the Aboriginal population, whilst the establishment of a penal colony and later settlement at Newcastle subsumed the traditional areas used to meet subsistence needs and displaced the Aboriginal people inhabiting these areas.

Early historical observations described several Aboriginal groups within the region associated with particular areas of land. The project area is located within the territory of the Awabakal. The area inhabited by the Awabakal is estimated to have covered 1,800 square kilometres from Newcastle and the Hunter River in the north to Wyong in the south (Maynard 2015). Aboriginal people appear to have been organised into small groups of families or 'bands' who participated in communal subsistence gathering activities and formed part of a larger clan or descendant group that held ties to that area of Country.

James Grant, a lieutenant in the Royal Navy who visited the area in 1801-1802 on board HMS The Lady Nelson, observed the fires of Aboriginal people opposite Ash Island (Grant 1803: 155). J.W. Fawcett, writing on the Wonarua who inhabited the Hunter Valley west of the Awabakal, noted that the locations of camp sites were periodically reused from generation to generation and that "in choosing the site [for their camps], proximity to fresh water was one essential, some food supply a second, whilst a vantage ground in case of attack from an enemy was a third" (Fawcett 1898: 152). The shelters used by Aboriginal people were depicted in a painting of Aboriginal people camping near the mouth of the Hunter River by Joseph Lycett in the early nineteenth century. In the painting, the shelters can be seen as being constructed of bark sheeting while Aboriginal people are depicted gathered around fires which are situated at the entrances to the shelters.

Thomas Skottowe, while Commandant of the Newcastle penal settlement from 1811 to 1814, collected several Aboriginal items from the region which were drawn by T.R. Browne. The items include spears, a shield, a spearthrower, clubs, an axe with a European iron blade, a boomerang, a basket, a water-carrier, a twined dilly bag, and a fishing line with shell hook. The depicted items illustrate the use of various perishable materials including bark, wood and grasses that are rarely preserved in the archaeological record and would have constituted a large portion of the items used by past Aboriginal people.

Early historical sources also note that an abundant supply of fresh water and marine resources were available in the region from the Hunter River, the estuary towards the mouth of the Hunter River and the coast of the South Pacific Ocean (cf. Grant 1803). Aboriginal people were observed exploiting marine resources of the coast and Hunter River by fishing and gathering shell fish while terrestrial resources such as kangaroos, bandicoots, snakes and lizards were hunted in the hinterland areas (Grant 1803: 55; Fawcett 1898: 152; Threlkeld in Gunson 1974:54-55). Historical sources also recorded some of the uses of artefacts which are found within archaeological contexts would have had. Hatchets were constructed from hard stone which was chipped and then ground to an edge before being hafted while stone knives were documented as being used for cutting up meat and stone chips or shells used for skinning animals (Miller 1886: 353).

The Newcastle region remains important to local Aboriginal people, who have maintained their traditional ties to the area through the sharing of knowledge and lore down generations. The consultation process identified a number of people who have indicated their interest in the Newcastle area, demonstrating the tangible link that members of the contemporary Aboriginal community retain to the land. Awabakal Traditional Owners Aboriginal Corporation (letter dated 30/10/2017) stated that:

> Although the impact of European invasion dramatically changed Aboriginal life in Australia forever, the recent history of the Newcastle Region is also characterised by the cultural resilience of Aboriginal Peoples, for both those who have retained connection to Country and those that are reconnecting to Country. Recent history is also characterised by the movement of other Aboriginal Peoples into the Country of the Awabakal and Guringai and the development of their own more recent attachments to the area. Whilst a diversity of attachment and experience is recognised, it is also recognised that the landscape, vegetation and watercourses of the Newcastle Region form part of an Aboriginal cultural landscape of traditional and contemporary cultural and spiritual value to many Aboriginal People.
>
> Aboriginal lore requires that the Aboriginal cultural landscape (which includes Aboriginal heritage sites, landscape features of cultural value, the plants, animals and water) of the Newcastle Region is cared for so that it will survive for future generations of our Peoples.

# 5 Archaeological Context

## 5.1 Previous investigations in the local area

Previous archaeological investigations within the vicinity of the project area have generally taken the form of large scale Aboriginal heritage studies or archaeological investigations for proposed infrastructure and major development projects. A summary of relevant local investigations is presented in this section. Specific to the current project, an archaeological survey of the project area was undertaken during the PACHCI Stage 2 assessment (see Section 5.2). A subsequent test excavation of the sites and areas of potential archaeological deposit identified during the PACHCI Stage 2 within the project area was undertaken for the CHAR (see Section 5.3).

**Newcastle Coastline**
Dyall (1971) published the results of archaeological fieldwork undertaken along the Newcastle coastline and adjacent areas to the east of the current project area. The majority of Aboriginal sites identified were open camp sites comprising stone artefacts and/or shell midden while five axe-grinding groove locations were identified between Newcastle and Redhead. Open camp sites were generally found in close proximity to marine, estuarine and lagoon resources with large midden sites found where both ocean beach and tidal reef resources were available. The axe grinding groove sites were located on sandstone creek beds and included two locations located approximately 500 metres east of the current project area. Stone artefacts were predominantly made from chert with tuff/mudstone and quartzites also identified. Dyall identified quarry sites with small boulders of good quality chert at Nobbies, Merewether and Glenrock approximately six kilometres north east of the current project area. The quarry site at Glenrock was associated with broken boulders and implements made from the lumps of chert (ibid: 159).

**Newcastle LGA**
An Aboriginal Heritage Study of the Newcastle Local Government Area (LGA) was undertaken by AMBS in 2005. The study aimed to synthesise and evaluate existing information about Aboriginal heritage in the LGA, integrating both physical/material expressions (archaeological sites) and intangible expressions (social and cultural values) to allow the development of a framework for the strategic conservation and management of Aboriginal cultural heritage. The heritage study included an assessment of Aboriginal archaeological sensitivity across the LGA within defined regions based on a landscape model incorporating the distribution pattern of known sites and terrain integrity. The Awaba Hills region, in which the project area is located, encompassed the undulating and low rolling hills in the southern portion of the Newcastle LGA. The spatial distribution of recorded sites within the region was characterised by low density sites along ridges and hillslopes with increased site complexity and density in proximity to coastal landforms. Smaller quantities of axe grinding grooves, quarries and ceremonial sites were also identified within the region and the study noted that sources of tuff/mudstone were present within the Glenrock Nature Reserve approximately three kilometres south east of the current project area. The archaeological sensitivity modelling determined that the lower slopes of the Glenrock Nature Reserve had moderate sensitivity while the upper slopes were assessed as having low archaeological potential (AMBS 2005; 89).

**Bluegum Vista**
In 2002, Umwelt (2002a) undertook an archaeological excavation for the Bluegum Vista residential estate project approximately three kilometres to the north of the project area. A total of 3001 flaked stone artefacts were recovered from 316 square metres. Fine grained siliceous tuff/mudstone and silcrete were the most dominant raw material types. Artefact types included flakes, broken flakes, retouched flakes, flaked pieces, cores, hammerstones, an anvil and a grinding stone fragment. Three areas (hillock/headland, open spur crest and sheltered spur crest) were determined to be of very high significance, with the hillock/headland and sheltered spur crest being recommended for conservation.

**Glendale**
Dean-Jones (1989) conducted an archaeological constraints assessment, including a field survey, of 90 hectares of land along Winding Creek at Glendale approximately 4 kilometres west of the current project area. The field survey identified nine Aboriginal archaeological sites comprising eight artefact scatters and one culturally modified tree. One artefact scatter consisted of a concentration of 53 artefacts made up of predominantly tuff/mudstone flakes, flaked pieces and cores. The remaining seven sites had less than 10 pieces of flaked stone each.

**John Hunter Hospital**
Brayshaw and Kerr (1983) undertook archaeological survey of the then Rankin Park Hospital adjacent to the eastern boundary of the current project area. Although the survey did not identify archaeological evidence of Aboriginal occupation, it was recommended that any further development which may impact upon creek lines involve further archaeological investigation to examine the potential for unrecorded grinding grooves.

Archaeological investigations were also undertaken by Umwelt (2002b) for a proposed new access road to John Hunter Hospital. The area was considered to be heavily disturbed by activities associated with the use of an existing service track. No Aboriginal archaeological sites or area of potential archaeological deposit was identified during the survey and the area was determined to be of low archaeological significance.

**Newcastle Inner City Bypass (formerly State Highway 23)**
Brayshaw and Associates (1984) undertook an archaeological survey of three potential routes for the State Highway 23 including portions of the current project area. The survey area extended from Lookout Road at New Lambton Heights to Newcastle Road at Jesmond Park. No Aboriginal archaeological sites were identified during the survey. Visibility was assessed as very low with the majority of the survey area having visibility below 5%.

ERM undertook archaeological survey of the intersection of Lookout Road and McCaffrey Drive, New Lambton within the southern boundary of the current project area. No Aboriginal archaeological sites were identified within the surveyed area. In addition, no areas of archaeological sensitivity were identified due to past land uses and associated disturbances to the landscape (ERM 2002: 18).

Umwelt (2006) conducted an Aboriginal archaeological assessment for three proposed routes for State Highway 23 including portions of the current project area. The assessment comprised background research of the environmental context and cultural context including previous archaeological investigations and an archaeological survey. The assessment noted that based on previous archaeological investigations in the region, artefact scatters (open camp sites) and axe grinding grooves were the sites types most likely to occur within the assessment. Predicative modelling determined that the assessment area would have had transient use by past Aboriginal people with low levels of artefact discard.

## 5.2 Newcastle Inner City Bypass – Rankin Park to Jesmond: PACHCI Stage 2 report

An Aboriginal archaeological survey report (PACHCI Stage 2 survey report) was prepared by KNC in 2017. The assessment comprised an archaeological survey in addition to a desktop review of previous archaeological investigations and the environmental context. The desktop review included a search of the Aboriginal Heritage Information Management System (AHIMS) and other heritage registers and lists. The AHIMS search identified two grinding groove sites which were located approximately 360 metres south east of the project area; however, no registered Aboriginal archaeological sites or Aboriginal places had been recorded or declared in the project area. No Aboriginal heritage items or places were listed on other heritage registers and lists within or in the vicinity of the project area.

The desktop review of previous archaeological investigations demonstrated that the region was utilised for a diverse range of activities by past Aboriginal people. Archaeological sites in the region were predominantly artefact scatters that were spatially more frequent and contained higher densities of stone artefacts in close proximity to marine, estuarine and fresh water resources. Lower density sites occurred along ridges and hillslopes. The location of grinding groove and quarry sites were determined by the local geology. Grinding grooves had been identified in the region on exposed sandstone outcrops bordering creek lines while sources of stone artefact raw material were available at Glenrock approximately three kilometres south east of the current project area.

A review of the environmental context of the project area determined that it was located within a landscape with varying levels of natural and human disturbance. The construction of roads, utilities and structures in addition to historic mining, clearance of native vegetation, landscaping and natural process such as erosion had disturbed both subsurface deposits and remove old growth trees. The desktop review determined that while aboriginal objects were unlikely to survive in situ within these contexts ground surface visibility was often increased by these processes, leading to increased identification of surface artefacts in these areas.

The survey was undertaken with representatives from the Awabakal Local Aboriginal Land Council and the Awabakal and Guringai People (former Native Title Claimants). The survey closely inspected any areas of surface exposure for artefacts and any mature trees for evidence of Aboriginal bark removal or modification. In addition, bedrock outcropping was inspected for grinding grooves, art and occupation shelters. Surface exposure across the project area was generally low and visibility within surface exposures was high. Surface exposure frequency varied across the project area and was dependant on vegetation density, natural processes such as erosion and modern land use practices. Despite the lack of surface visibility, it was still possible to assess the archaeological potential based on landform.

The survey identified four new archaeological sites (RP2J AFT 1, RP2J AFT 2, RP2J AFT 3 and RP2J AFT 4) and two potential archaeological deposits (PAD) (RP2J PAD 1 and RP2J PAD 2). Artefacts identified during the survey included flakes, flaked pieces and fragments. Artefacts were made from mudstone/tuff, silcrete and greywacke.

Sites RP2J AFT 1 and RP2J AFT 2 were highly disturbed artefact scatters within offsite informal tracks. The surface artefact scatter at site RP2J AFT 1 comprised one silcrete flake and two greywacke flakes that were identified on a gravel track. The surface artefact scatter at site RP2J AFT 2 comprised a tuff medial flake fragment and one silcrete flake that were identified along an eroded track. The sites exhibited low archaeological value as no subsurface deposit was present and the artefacts were found within imported gravels. RP2J AFT 1 and RP2J AFT 2 were located outside of the project area and proposed impact area and were not considered further.

Site RP2J AFT 3 was a low density artefact scatter located on an elevated flat overlooking the junction of two unnamed north east flowing ephemeral creeks. The surface artefact scatter comprised one tuff/mudstone flake and two pieces of a tuff/mudstone flake which were identified on a BMX track. The site exhibited variable levels of disturbance with low to moderate levels of disturbance from the ad hoc construction of the BMX track and associated dirt mounds, while the adjacent areas contained remnant native vegetation and little visible evidence of subsurface disturbance.

Site RP2J AFT 4 was a low density artefact scatter situated on the crest and north facing slope of a ridge spur. The surface artefact scatter comprised a single silcrete proximal flake fragment and a cluster of six artefacts comprising flakes and flake fragments of silcrete and tuff/mudstone that were identified within surface exposures on an unsealed track. The site was assessed as having low to moderate archaeological potential due to a mixture of negative factors: erosion, historic disturbance and positive factors: favourable landform, good proximity to resources and identified artefacts.

RP2J PAD 1 and RP2J PAD 2 were two areas of PAD situated on the crest of localised highpoint on a north west running ridge that forms the watershed separating the catchments of Ironbark Creek in the south and Dark Creek in the north. The two areas of PAD exhibited archaeologically favourable topography and soils, combined with a relative proximity to water and known archaeological sites. The crest displayed low levels of transferential particle movement, with soils cycling (horizontally) in situ. Subsequent to the completion of the PACHCI Stage 2 report a single artefact (heat affected tuff flake) was identified on the crest of RP2J PAD 2.

Beyond the identified Aboriginal sites and PADs, the remainder of the project area displayed low archaeological potential due to combinations of archaeologically unfavourable topography, geology, erosion, fluvial activity or disturbance from land use practices. The PACHCI Stage 2 assessment recommended that if Aboriginal sites/PADs could not be avoided by the proposed works, an archaeological test excavation at these locations was required to obtain further investigation to understand the nature and significance of the Aboriginal cultural heritage resource and how this may be affected by the project.

### 5.3 Newcastle Inner City Bypass – Rankin Park to Jesmond: PACHCI Stage 3 test excavation and CHAR

Further Aboriginal archaeological investigations were undertaken during preparation of the CHAR (PACHCI Stage 3 report) for the project in 2017-2018 (KNC 2018). Investigations included a program of test excavation and a process of Aboriginal community consultation. The two Aboriginal archaeological sites (RP2J AFT 3 and RP2J AFT 4) and two areas of potential archaeological deposit (RP2J PAD 1 and RP2J PAD 2) identified during the survey of the project area were assessed as part of the CHAR.

Archaeological test excavation of the identified areas within the project boundary was undertaken in accordance with the project SEARs and *Code of Practice for the Archaeological Investigation of Aboriginal Objects in New South Wales*. The archaeological test excavation identified the presence of subsurface archaeological deposit at all four areas, defining the following four sites confirmed within the study area (Table 1, Figure 5):

- RP2J AFT 3
- RP2J AFT 4
- RP2J IF 1 (formerly RP2J PAD 1)
- RP2J IF 2 (formerly RP2J PAD 2).

RP2J AFT 3 and RP2J AFT 4 were located on raised landforms overlooking the junction of unnamed first order ephemeral creeks and two isolated artefacts (RP2J IF 1 and RP2J IF 2) were identified during testing of the PAD areas on the crest of a localised highpoint on a north west running ridge. Archaeological deposit at RP2J AFT 3 was found to be intact and exhibited moderate archaeological information (Figure 4). The remaining three sites (RP2J AFT 4, RP2J IF 1, RP2J IF 2) all exhibited disturbed soils with low levels of archaeological information and low archaeological potential.

**Table 1. Summary of sites identified within project area (KNC 2018)**

| | |
|---|---|
| RP2J AFT 3<br>AHIMS ID 38-4-1943 | Low density surface artefact scatter with subsurface archaeological deposit located on an elevated flat overlooking the junction of two unnamed north east flowing creeks |
| RP2J AFT 4<br>AHIMS ID 38-4-1945 | Low density surface artefact scatter located within a disturbed context on the crest and north facing slope of a ridge spur |
| RP2J IF 1<br>AHIMS ID 38-4-1944 | Isolated artefact located on the crest of localised highpoint on a north west running ridge that forms the watershed separating the catchments of Blue Wren Creek in the south and Dark Creek in the north. |
| RP2J IF 2<br>AHIMS ID 38-4-1940 | Isolated artefact located on the crest of localised highpoint on a north west running ridge that forms the watershed separating the catchments of Blue Wren Creek in the south and Dark Creek in the north. |

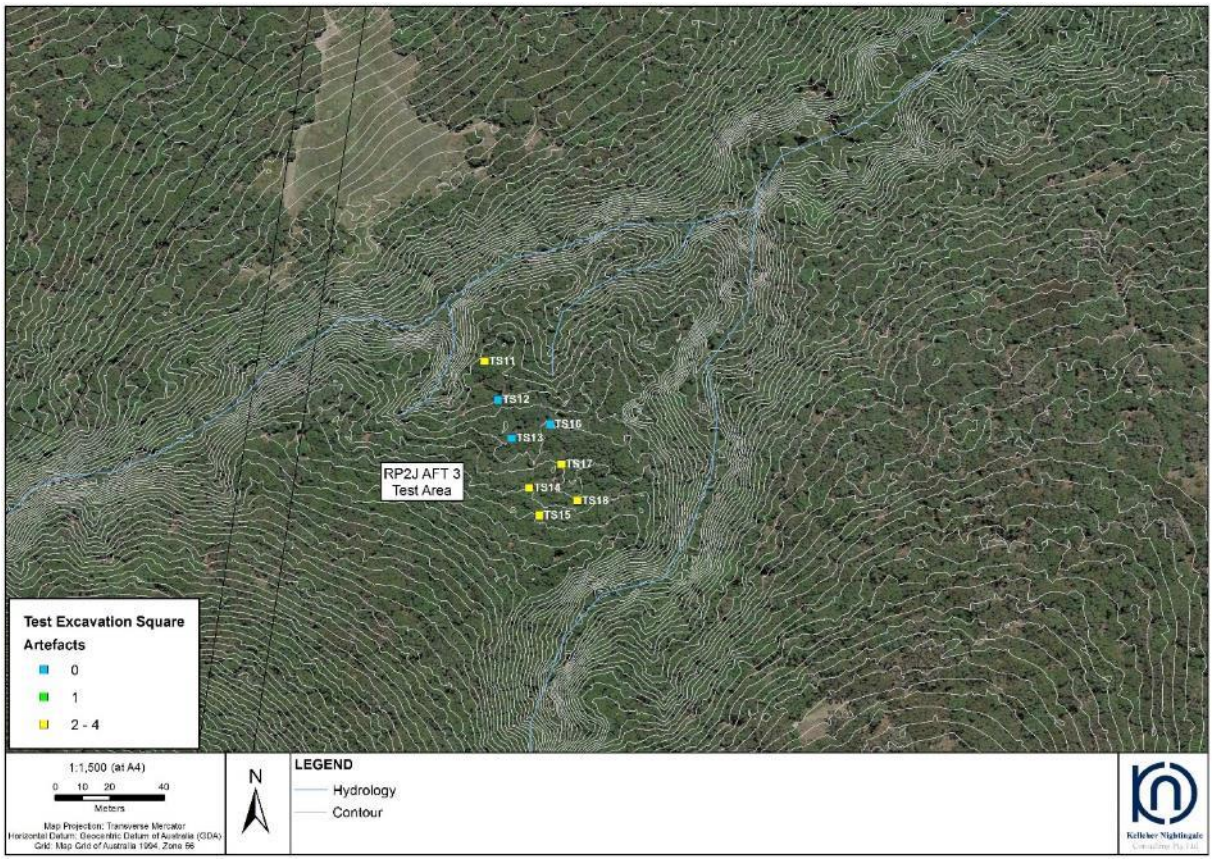



**Figure 4. RP2J AFT 3 test excavation results**

The CHAR included consultation with Aboriginal stakeholders undertaken in accordance with the SEARs and the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*. The project area and surrounding region are known to have been important to and extensively used by past Aboriginal people. Aboriginal people's use of the region is well-documented in historic accounts, as are local groupings such as the Awabakal. Members of the contemporary Aboriginal community continue to experience connection with the area through cultural and family associations. Aboriginal cultural significance was attributed to the impacted archaeological sites and project area as a whole. Consultation with Aboriginal stakeholders determined that the loss of intrinsic Aboriginal cultural value of impacted sites cannot be offset; however, mitigation including the collection of surface artefacts and the safekeeping of salvaged artefacts was recommended by the Aboriginal community.

A significance assessment of cultural/social, historical, aesthetic and scientific values was undertaken for the four sites. Scientific (archaeological) significance assessment focussed on the intactness, representativeness and research potential of these sites within the landscape. RP2J AFT 3 was assessed as displaying moderate significance, with the remaining three sites assessed as displaying low significance. Aboriginal stakeholders assessed all four sites as displaying high cultural significance as part of the holistic and interconnected cultural landscape of the project area.

Impact assessment determined that all four sites would be impacted by construction of the proposal and suitable mitigation and management measures for the sites were developed in consultation with registered Aboriginal stakeholders. It was recommended that mitigative salvage excavation be undertaken at moderately-significant site RP2J AFT 3, with surface artefact collection at all four of the impacted sites. A salvage excavation methodology for RP2J AFT 3 was developed as part of the CHAR process.

Project Approval was issued in February 2019 and included salvage requirements for Aboriginal sites as detailed in the CHAR. The following Sections document the findings of the salvage program carried out to comply with the conditions of approval for SSI 6888.


**Figure 5. Identified archaeological sites within the project area**

# 6 Salvage Methodology

The archaeological salvage methodology prepared for project as part of the CHAR assessment process is presented below (KNC 2018: Appendix D). Salvage excavation for RP2J AFT 3 was conducted in accordance with this methodology.

## 6.1 Research Aims

The main aims of the proposed salvage excavation program are:

- To salvage a representative sample of the identified archaeological site RP2J AFT 3 prior to construction impact.
- To analyse the salvaged archaeological material to gain and conserve knowledge and understanding of the scientific and cultural information exhibited by the activities associated with landforms adjacent to a creek junction.
- Analysis of the geomorphological history of the project area, specifically examining the impacts of erosional forces on the archaeological record (taphonomy and chronology).

The further scientific aim of the salvage excavation program would be to determine the subsurface integrity, extent, spatial distribution and nature of the cultural deposit and the specific types of associated archaeological/cultural activities.

- Determining the integrity of the deposit involves assessing the degree of disturbance which is present.
- Determining the statistical extent of the sites and/or activity areas involves identifying the boundaries associated with the identified archaeological deposit.
- Assessing the spatial distribution involves identifying the presence/absence of archaeological material across the identified archaeological sites.
- The nature of the sites refers to the type of activities indicated by the artefactual material (e.g. primary production, tool maintenance, domestic knapping, hunting camps). The goal would be to retrieve entire assemblages from specific activities if such activities were present.
- Retrieved assemblages would be compared with the results from other relevant archaeological projects in order to assess significance.

## 6.2 Research Question

The results of the proposed salvage excavation would increase our understanding of subsurface archaeology of the project area. In particular, research would focus on the archaeologically-identifiable cultural activities that took place on elevated landforms adjacent to a creek junction addressing questions about past activity events and survivability of the deposit.

> **Question 1**: What cultural activities are archaeologically identifiable at site RP2J AFT 3 and how do these potentially differ from archaeological sites on other landforms in the Newcastle urban area or region?
>
> **Question 2**: What are the taphonomic features of archaeological site RP2J AFT 3? What does this indicate about site integrity and artefact survivability for sites on similar landforms especially within urban environments?

**What can we expect?**

It is anticipated that differences in stone tool assemblages may be related to different cultural activities (e.g. primary reduction vs maintenance flaking). The science of archaeology is paramount to any research question and it is important to stress that the goal for the salvage program for all excavated sites is straight forward: to retrieve a viable sample for comparative analysis using established techniques (see 6.3 Field Methods below). In this regard interpretation would not precede data collection. The proposed archaeological program would systematically sample the relevant areas using standard techniques with the outcome being a viable, robust and comparable sample. Analysis of the sample would follow and interpretations would be made distinctly separate from the results.

## 6.3 Field Methods

The goal of the field excavation program is to recover significant assemblages of artefacts. Salvage excavation was undertaken on identified archaeological site RP2J AFT 3. Salvage excavation of the site focussed on the extraction of collections of artefacts related to activity areas and geomorphic information.

In order to achieve the most robust and comparable result, KNC advocates an open area salvage excavation. The first phase in open area salvage is to establish the statistical boundaries of the previously identified archaeological deposit. In other words, recording the spread of activities across the site/landscape. This approach is designed to salvage the spatial properties of the site as shown in the lithic continuum.

### 6.3.1 *Previous testing and Phase 1 salvage*

For the current program, previous test excavation effectively described the spatial extent of the site and spread of activities across the landscape (KNC 2017).

Additional Phase 1 salvage is intended to augment the existing test results. GDA 94 coordinates would be recorded for the Phase 1 square to enable three dimensional modelling. Statistical salvage following this method is highly beneficial because it creates a robust inter-site sample, sufficiently random, critical for regional comparative analysis. No other method is as efficient or effective.

Individual excavation squares measuring 1 $m^2$ were hand excavated in stratigraphic units (Unit A, Unit B, etc.). Squares would be excavated until the basal layer or culturally sterile deposit is reached (usually 25-35 cm). Test excavation of the area indicates no archaeological stratigraphy within units. As such the A1 and A2 soil layers are culturally one layer (suffering from cyclical soil transfer resulting in a mixed cultural profile within the soil) and can be salvaged as one unit where possible. All excavated deposit would be wet sieved using nested 5.0 mm and 2.5 mm sieves. Where potential micro-debitage is recovered 1.0mm sieves will be utilised.

The location of each excavated square would be identified on a plan of the site. Stratigraphic sections detailing the stratigraphy and features within the excavated deposit would be drawn and all squares would be photographed. Soil samples as well as thin section profiles (where feasible) would also be collected. The stratigraphy of all excavated areas would be fully documented and appropriate records archived.

### 6.3.2 *Phase 2 open area salvage*

Open area salvage of significant deposit follows the test excavation and Phase 1 assessment. Additional 1 $m^2$ squares, constituting an open area ('OA'), will be excavated around information bearing deposits along the excavation grid. Information bearing deposits are identified by triggers such as: significant quantities of artefacts, variations in raw material, unusual artefacts, chronological material and/or taphonomic indicators. In this context chronologic material is anything that can be used to date artefacts or deposit: charcoal or charcoal bearing deposit (e.g. hearth ash), sandy deposit, gravels (e.g. aluminium feldspar). Phase 2 open area investigation would expand to encompass entire activity areas. The location of Phase 2 open area investigation would be based on test and Phase 1 results.

Where possible, carbon samples will be collected and analysed for material relating to both the archaeology and geomorphology. Where appropriate cosmogenic and radiometric dating of soils and rock surfaces will be applied (Nishiizumi et al. 1986, 1993).

### 6.3.3 *Surface Collection*

Surface collection will be undertaken at sites: RP2J AFT 3, RP2J AFT 4, RP2J IF 1 and RP2J IF 2. The collected objects will be recorded as part of the excavation report and included in the excavation assemblage for long term storage.

> *Surface collection was undertaken at sites RP2J AFT 3, RP2J AFT 4, RP2J IF 1 and RP2J IF 2 during the archaeological salvage program in March 2021. Surface collection was undertaken in accordance with the methodology and conditions of project approval*

### 6.3.4 *Artefact Analysis*

Artefacts would be analysed on a comparable level with previous analyses of excavated assemblages. Information derived from this analysis, in particular the identification of specific artefact types and their distributions and associations; would be used to put together interpretations about how sites were used, where sites were located across the landscape, the age of sites and to assess cultural heritage values. By comparing different areas, it would be possible to determine whether there were differences in the kinds of activities carried out and if different activities were related to different landforms.

A range of stone artefacts may be present across the salvage area and the analysis would expand accordingly to account for artefact variability. All information would be recorded in database form (MS Excel). Various types of evidence would be used to determine the kinds of activities that were carried out. A short description of the proposed analysis in outlined below.

- Field analysis would record basic data, such as material type, number and any significant technological characteristics, such as backing or bipolar techniques; added to this would be any provenance data such as pit ID and spit number. The purpose of the field recording is twofold: 1) establish a basic recording of artefacts retrieved and 2) to allow on-going assessment of the excavation regime (e.g. whether higher stratigraphic resolution is required while digging).
- Detailed (laboratory) analysis would entail recording a larger number of characteristics for each individual artefact. These details would be recorded in matrices suitable for comparative analysis (e.g. multivariate and univariate) of the excavated assemblage on a local and regional basis.
- Lithic characteristics to be recorded cover a range of basic information but are not limited to these categories (see example below). For transparency, terms and category types would in large part be derived from Holdaway and Stern (2004).

| **Sample Categories** | | |
|---|---|---|
| Record Number | % Cortex | Flake Type |
| Square ID | Length | Termination Type |
| Spit Number | Width | Core Type |
| Count | Thickness | Number of Scars (Core) |
| Raw Material | Weight | Scar Type (Core) |
| Colour | Modification | Shape of Flake |
| Quality | Reduction Type | Platform Type |

- Minimum Number of Flake (MNF) calculations formulated by Hiscock (2002) would be undertaken where applicable (although past experience indicates MNF calculations would not be required for this excavation program).

The analysis of artefacts recovered during the excavation program would be undertaken in a transparent and replicable fashion so as to permit the comparison of the entire excavated assemblage with data from other areas. This would also allow for an interpretation of the project area's archaeological significance.

In some instances post depositional processes have affected the stone artefact assemblage. Heat damage occurs post depositionally when the tightly held molecular water retained in pores of rock heats and expands. When the pore structure of the rock is such that the steam cannot evacuate, then the pressure causes the rock to explode and fracture (Schmidt 2013). A heat shatter is a piece of stone which was broken through this process. Heat shatters may be rounded to elliptical pot lids (flat on one surface and dome-shaped on the opposite surface), or pieces with potlid scars. Some heat shatters have rough and crenated surfaces.

In this analysis heat shatters were identified only on material which was similar to the artefactual material from the site, and no longer had artefactual markers. These are considered non-diagnostic items which could not be conclusively identified as flaked artefacts. These did not include crenated fracture pieces with remnant flaked surfaces. These heat shatters have not been included in the total artefact count as they are not artefactual. The reason that heat shatters were only recorded on artefactual raw material types is that there is some possibility that they are cultural in ultimate origin, but the spatial patterning requires mapping to assess this. In some cases, this assessment is inconclusive.

Phase 1 square excavation in progress

Laying out squares for OA1 salvage area, ready for hand excavation

Wet sieving artefacts by hand

Completion of Phase 2 open area excavation

**Figure 6. Excavation phases and techniques**

**Table 2. Common raw material types in RP2J AFT 3 assemblage**

| | Raw Material Type | | |
|---|---|---|---|
|  | **Siliceous Tuff (IMT)** is hard fine grained rock formed of fragments deposited by volcanic processes and re-deposited in sedimentary contexts as stone. Artefacts within the assemblage had smooth cortex, often with ring cracks indicating that cobbles were sources from stream beds. The colour varied from beige, pale browns, yellow to reddish yellow, pink, red and grey. |  | **Quartz** is the most abundant mineral found at Earth's surface that humans use. It is a crystallized form of silica, *i.e.* silicon dioxide. It is transparent or translucent. Examples were primarily milky quartz- that is an opaque white. |
|  | **MGS** included a generic medium grained siliceous stone. |  | **Silcrete** is a brittle and resistant material consisting of fine detrital quartz grains embedded in a replaced clay matrix. Artefacts were red and displayed a smooth cobble cortex. |

# 7 Salvage Excavation Results

## 7.1 RP2J AFT 3 (AHIMS 38-4-1943)

Site RP2J AFT 3 was a low density artefact deposit situated on an elevated flat overlooking the junction of two unnamed north east flowing ephemeral creeks (Plate 1). The site was located in the south western portion of Lot 1 DP774078 approximately 300 metres south east of Minimbah Close. The PACHCI Stage 2 survey identified a surface artefact scatter at the site that comprised one tuff/mudstone flake and two pieces of a tuff/mudstone flake which were located on a BMX track.

An archaeological test excavation was undertaken at the site by KNC in August 2017. The program excavated eight test squares within the previously defined site extent. A total of 13 artefacts were recovered from five of the eight test excavation squares. The test excavation program demonstrated that an intact archaeological deposit was present at the site within the proposed impact area.

| *RP2J AFT 3 Quick Reference* | |
|---|---|
| **Hydrology** | **Landform** |
| Less than 50m-2nd order creek | Elevated flat |
| **Phase 1 sample** | **Phase 2 sample** |
| 1 square<br>Total 1 m² | OA1: 38 squares<br>OA2: 16 squares<br>Total 54 m² |
| **Phase 1 artefacts** | **Phase 2 artefacts** |
| 0 total artefacts | OA1: 27 artefacts<br>OA2: 11 artefacts<br>Mean density 0.7/m² |

An additional 1m² was excavated during the Phase 1 salvage to confirm the previously identified site boundary. The previous test excavations (KNC 2018) were primarily used to inform the Phase 2 salvage locations. The Phase 2 archaeological salvage comprised two open areas expanded around two former test units, TS 11 and TS 17. Phase 2 open area excavations covered a total of 54m² across the two locations, with 36 artefacts retrieved in total. TS 11 was located at a higher elevation of the landform, and TS 17 was located at the lower slope of the landform. These two locations were selected to understand the relationship between the landform, the archaeological deposit and the geomorphological implications for the archaeological assemblage. Raw materials recovered during the excavation were consistent with lithic assemblages identified during test excavation at the site and the wider local area.

**Plate 1. (Main picture) View across site area, gazebo indicates location of OA1, facing south. (Lower left) OA1 with excavation in progress, facing northeast. (Lower right) Excavated OA2, at completion facing north.**

## 7.2 Phase 1 Results

Salvage excavations at RP2J AFT 3 were carried out between 22 February to 5 March 2021. Phase 1 salvage aimed to further investigate the spread of archaeological material across the identified site area, to complement the existing information from the test program. Initial Phase 1 comprised one square placed to the south of the prior tested area to confirm the southernmost edge of artefact density as it related to the slope (Figure 7). The total Phase 1 sample was completed at 1m$^2$ and did not yield additional artefacts. No further Phase 1 squares were excavated, as it was considered that previous testing identified the key salvage target locations.

***Soils, landform and disturbance***

Previous testing identified that the soil depth at RP2J AFT 3 was moderately deep with the majority of test squares containing deposits with a maximum depth greater than 40 centimetres. The soil profile was characterised by humic sandy loam topsoil overlying sandy loam on top of sandy clay. Disturbance from natural factors was present within the test squares and included tree roots, animal burrows and bioturbation (earthworms, grubs) throughout the deposit. The RP2J AFT 3 site area was vegetated with remnant native trees and bushes with a dense covering of leaf litter and tree detritus. The site exhibited areas of visible disturbance from the removal and redeposition of soil from the construction of a BMX track and associated dirt mounds. The test excavation program at site RP2J AFT 3 demonstrated that the disturbance from these activities was limited to the immediate vicinity of the track and mounds while the remaining areas of the site retained relatively undisturbed deposits.

Phase 1 salvage confirmed that the soil profile was consistent with previous testing (Plates 2 and 3). The upper 0-10 cm of the deposit comprised a loosely compacted humic mid grey brown sandy loam, overlying a pale grey brown leached sandy loam, with increasing mixed gravels (<5%). Fine grass roots and some remnant tree roots were present through the full depth of the profile (20cm).

**Plate 2.Phase 1 unit, 703E, 594N. View east.**

**Plate 3. Section Phase 1 unit, 703E 594N, north section.**

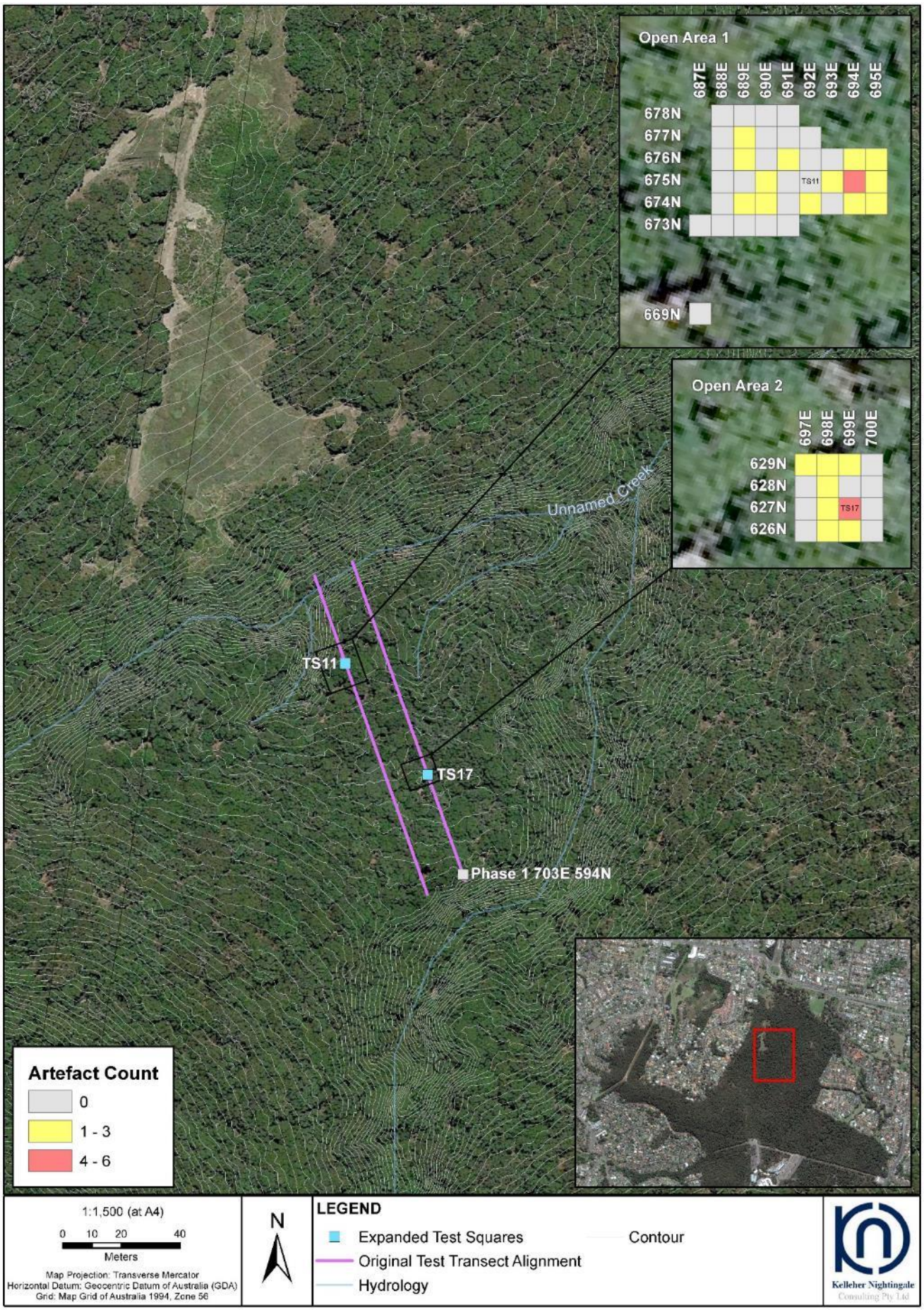



**Figure 7. RP2J AFT 3 salvage excavation results**

## 7.3 Phase 2 Results

Phase 2 salvage targeted previous test excavation units that displayed greater artefact numbers (TS 11 n=3 and TS 17 n=4). The Phase 2 salvage excavations aimed to identify inter and instraspatial patterns of stone artefact presence, as well as the nature and extent of technology represented by the site. The Phase 2 open areas were located at different elevations of the landform (Figure 7), to investigate how post depositional processes may have influenced the artefacts' current spatial distribution.

### *7.2.1 Open Area 1 (OA 1)*

Open Area 1 was located in the northern portion of the salvaged site area and represented the extension of TS 11 (692E 675N), which produced isolated but sufficiently high artefact frequencies (n=4) during test excavation. A total of 38 1x1m squares were excavated at Open Area 1. Fourteen of these subsequent Phase 2 excavation units were found to contain artefacts. One square (687E 669N) was offset to the south of the contiguous open area. This was positioned to investigate the consistency of the soil profile further to the south of OA1 based on the gentle slope of the landform identified at the top of the flat.

***Soils, landform and disturbance***

Phase 2 locations (OA1) across the top of the elevated flat were moderately deep with most units measuring 20cm in maximum depth. Typical soil profiles comprised an A1 mid brown sandy loam (averaging from 0-10cm in depth) to a leached pale grey brown sandy loam, overlying a yellowish brown clay B horizon substrate. Previous test excavation within the site indicated that duplex soils were present, and so the units were excavated in spit levels of 10cm. Moderately deep soils were encountered on the elevated flat, with sandy loams to an average depth of 20cm (A1/ A2), with colour variation (representative of leaching) at 10cm, and increasing ironstone gravels with depth. The majority of the recovered cultural material was from the top 10cm of the soil profile, however the A1/A2 units are considered to represent one cultural layer. Occasional scattered charcoal fragments and baked clay were present in the deposit, however it was not possible to confirm whether this derived from cultural hearths, given the lack of intact or identifiable features at this location. Instead, the evidence of heating at Open Area 1 suggests that the archaeological deposit has been impacted by some form of disturbance, the most likely being bushfire.

The humic layer indicated modern topsoil development was occurring, and that the A horizon containing artefacts may have sustained some erosion of sediments based on the deepest extent of deposit measuring an average of 20cm across the site.

A typical soil profile comprised the following:

I. 0-10 cm: Humic layer, loose mid brown sandy loam topsoil, occasional grass roots, leaf litter, diffuse to clear boundary to:

II. 10-20 cm: Pale greyish brown fine silty loam, occasional small sub-angular gravels and coarse fragments, sporadic <10%, occasional thin roots, diffuse boundary to:

III. Base (~20cm): yellow brown clay.

Plates 4-7 illustrate the soil profile and conditions across the Open Area 1.

**Plate 4. Typical soil profile section at OA1.**

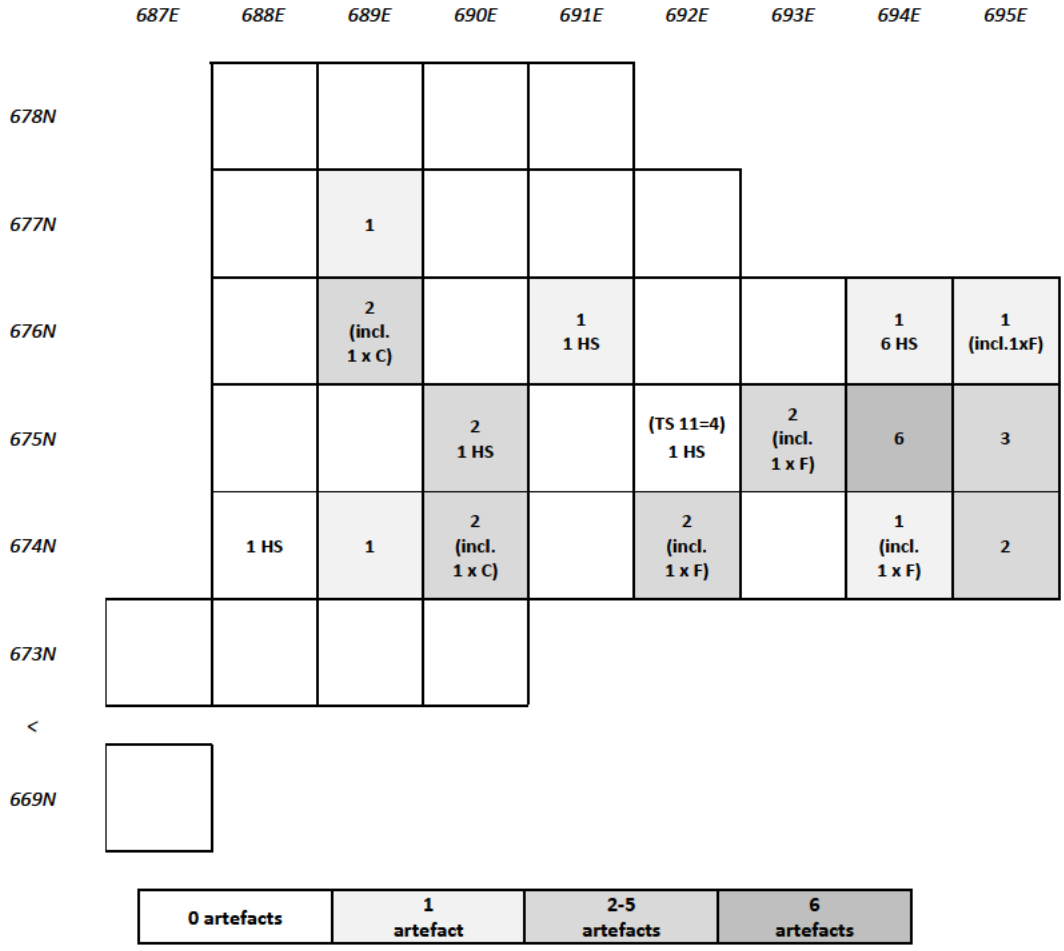
**Plate 5. Completed OA1, facing east, range pole at northern section. Scale = 20cm.**

**Plate 6. Completed OA1, facing northwest, range pole at north west corner demonstrating the start of the slope landform.**

**Plate 7. Completed Open Area 1, facing north.**

***Artefact Distribution***

A total of 27 artefacts were recovered from Phase 2 excavation of OA1 (Figure 8), excluding heat shatter (n=10) and artefacts previously recovered from TS 11 (n=4). Fourteen of the excavated squares contained artefacts (Table 3). The majority of the artefacts were identified in the top 10cm of the deposit (n=21, 78%), with fewer artefacts in the lower 10cm (spit 2 n=4, 15%, and spit 3 n=2, 7%). Artefacts were primarily located within the mid brown fine sandy loam of the A horizon.




**HS = Heat shatter count. C = Core, F= Flake.**

**Figure 8. Open Area 1 artefact distribution.**

**Table 3. Phase 2 Open Area 1 artefact density.**

| n | 0 | 1 | 2-5 | 6 | No. Squares | Total No. Artefacts | Mean Density |
|---|---|---|---|---|---|---|---|
| RP2J AFT 3 Open Area 1 | 24 | 6 | 7 | 1 | 38 | 27 | 0.7/m² |

The highest artefact count was located in square 694E 675N with a total of 6 artefacts. The majority of squares contained zero artefacts (just over 60% of the total excavated squares) confirming that the site is of low density. There were 6 squares with a single artefact (n=6, 15%), and 7 squares which contained between two and five artefacts (n=7, 18%). The overall low density is evidenced by the low spread of artefacts with a diffuse cluster to the west, and a more concentrated cluster to the east. The largest artefacts were located in the diffuse cluster in the western section of OA1, including one large core in 689E, 676N. There was no indication of layered deposit and it appeared that artefactual material was mixed throughout, with artefacts moving downward through the deposit likely via moderate erosion of the landform and soils. No further artefacts were recovered from the 1 metres expansion of previous test square TS 11.

***Lithics***

A total of 27 artefacts were recovered from the RP2J AFT 3 Open Area 1 salvage excavations. Ten heat shatters were also identified. Heat shatters are not artefactual, however are heat crenated fractures are made of the same material as the artefacts. The artefacts constitute a low density artefact deposit that has sustained post depositional heat damage to just under half of the artefacts (n=13, Table 7). The location represents a primary knapping area, with tertiary elements absent from the assemblage. It is likely to represent a small localised transitory knapping location, not a sustained location of knapping for a specific activity.

Siliceous tuff was the most common lithic material comprising 74% of the assemblage (n= 20) (Table 4). Quartz and silcrete formed 11% and 14% respectively (n=3 and n=4). The siliceous tuff varied in colour, with, pale grey, pale yellow brown, grey and dark brown colour varieties present (Plates 8 and 9). Silcrete was relatively rare, but where present was fine grained well sorted red material. The quartz material was white and translucent. Cortical retention was low, with 24 artefacts in the assemblage retaining no cortex (Table 6). Cortex was present on siliceous tuff, and silcrete only. Cortex types included patinated and weathered cortex on siliceous tuff, and cobble cortex on silcrete.

**Plate 8.L-R (Clockwise); silcrete, grey siliceous tuff flake, small pale grey siliceous tuff fragment, and heat crenated siliceous tuff fragment. Scale = 1cm**

**Plate 9. L-R (Clockwise): siliceous tuff dark grey, mid grey, pale yellow, quartz, silcrete and light grey siliceous tuff. Scale = 1cm**

Size classes varied widely for siliceous tuff (Table 5). Artefacts ranged in maximum dimensions from 15mm in length to greater than 100mm. The largest artefact was a siliceous tuff core weighing 241.1g. Silcrete artefacts ranged between 15mm and 34mm. The overall lack of very small artefacts, that is, less than 5mm indicates that it is unlikely that this site was a location of sustained knapping activity. This varied size range of siliceous tuff material indicates that siliceous tuff source material may be easily accessible close to the site.

**Table 4. Phase 2 Open Area 1 lithic materials and reduction types**

| Reduction Type | Quartz | Silcrete | Siliceous Tuff | Total | % |
|---|---|---|---|---|---|
| Angular Fragment | 1 | 2 | 11 | 14 | ***51.8*** |
| Core | | | 2 | 2 | ***7.4*** |
| Distal fragment | 1 | | 1 | 2 | ***7.4*** |
| Flake | | 2 | 4 | 6 | ***22.2*** |
| Medial Fragment | | | 1 | 1 | ***3.7*** |
| Proximal Fragment | 1 | | | 1 | ***3.7*** |
| Split Flake R | | | 1 | 1 | ***3.7*** |
| **Total** | **3** | **4** | **20** | **27** | |
| **%** | ***11.1*** | ***14.8*** | ***74.1*** | | |

Heat fracture damage (i.e. post depositional damage) to artefacts was present in the assemblage (Table 6). The raw material types that were heat affected included quartz (n=1), silcrete (n=3) and siliceous tuff (n=9). A total of 7 artefacts were totally affected by heat damage, including 6 siliceous tuff artefacts and 1 quartz artefact (n=7, 25%, Table 6). Six artefacts were partially impacted by heat damage (22%). Just under 50% of the artefacts were affected by heat damage (n=13). Occasional scattered charcoal fragments and baked clay were present in the deposit.

**Table 5. Phase 2 Open Area 1 Size classes**

| Size classes | Quartz | Silcrete | Siliceous Tuff | Total | % |
|---|---|---|---|---|---|
| 10-14mm | 2 | | | 2 | ***7.4*** |
| 15-19mm | 1 | 1 | 3 | 5 | ***18.5*** |
| 20-24mm | | 2 | 2 | 4 | ***14.8*** |
| 25-29mm | | | 5 | 5 | ***18.5*** |
| 30-34mm | | 1 | 4 | 5 | ***18.5*** |
| 35-39mm | | | 1 | 1 | ***3.7*** |
| 40-44mm | | | 1 | 1 | ***3.7*** |
| 45-49mm | | | 1 | 1 | ***3.7*** |
| 55-59mm | | | 1 | 1 | ***3.7*** |
| 65-69mm | | | 1 | 1 | ***3.7*** |
| <100mm | | | 1 | 1 | ***3.7*** |
| Total | 3 | 4 | 20 | **27** | |
| **%** | **11.1** | **14.8** | **74.1** | | |

**Table 6. Phase 2 Open Area 1 Cortical artefacts**

| % Cortex | Quartz | Silcrete | Siliceous Tuff | Total | % |
|---|---|---|---|---|---|
| 0% | 3 | 3 | 18 | 24 | ***88.8*** |
| 1-30% | | 1 | | 1 | ***3.7*** |
| 31-69% | | | 2 | 2 | ***7.4*** |
| **Total** | 3 | 4 | 20 | **27** | |

**Table 7. Phase 2 Open Area 1 Heat affected artefacts**

| Heat affected | Quartz | Silcrete | Siliceous Tuff | Total | % |
|---|---|---|---|---|---|
| No | 2 | 1 | 11 | 14 | ***51.8*** |
| Partially | | 3 | 3 | 6 | ***22.2*** |
| Totally | 1 | | 6 | 7 | ***25.9*** |
| **Total** | 3 | 4 | 20 | **27** | |

The assemblage from OA 1 comprised mostly angular fragments, constituting 51.8% of the assemblage (n=14) (Table 4). Diagnostic whole flakes formed a lesser proportion of the assemblage with a total of 6 artefacts of this type (22.2%). Two cores were present, both siliceous tuff. The remaining artefacts comprised various flake fragment types. In comparing the ratio of complete to broken flakes (*i.e.* flake fragments, not including angular fragments), the result is a low representation of broken flakes relative to complete ones: there is almost a one to one ratio of complete to broken flakes. Retouched artefacts were absent from the assemblage.

It is surprising that cores are present in an assemblage of this size. Artefact #2 was a unifacial core, flaked on a large cortical flake body on siliceous tuff (Plates 10 and 11). The removals are along the right lateral margin of the flake's dorsal face, with ventrally and dorsally initiated removals (Plate 10 and 11). The other core (Artefact #5) is also a siliceous tuff unifacial core, retaining 31-69% cortex (Plate 12). One edge of the core appears heavily battered as though it has been rested on an anvil, as it is used in the bipolar percussion technique.

**Plate 10. Artefact #2 Unifacial core with flake body (plan view of platform, which is also former ventral).**

**Plate 11. Artefact #2 Core with flake body (main flaking surface).**

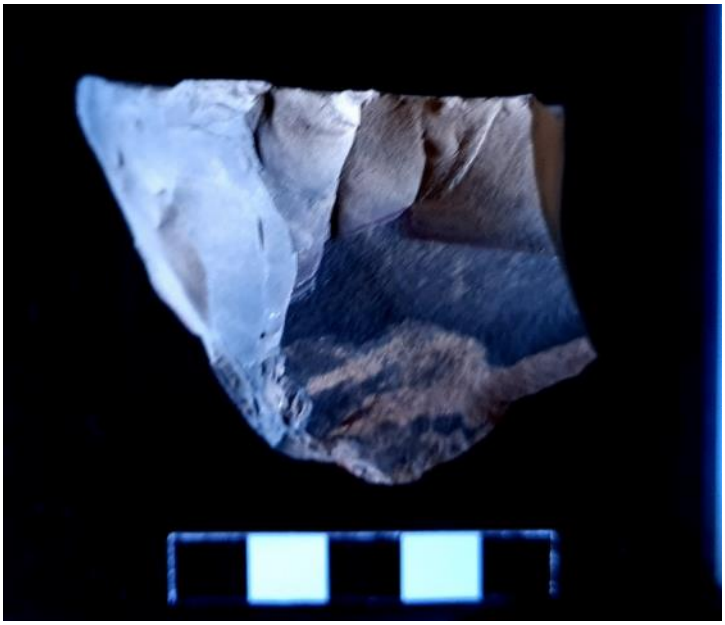


**Plate 12. Artefact #5 siliceous tuff core, unifacial flaking pattern.**

### 7.3.1 *Open Area 2 (OA 2)*

Open Area 2 was located approximately 40 metres northwest of OA1 and represented the extension of former test square TS17 (699E, 627N) on the western transect of the previous test area. OA2 is located at the lower end of the slope below the elevated flat landform, where OA1 was located. Former test unit TS 17 previously yielded three stone artefacts. A total of 16 1x1m Phase 2 squares were expanded around the original test unit. Eight of the total sixteen squares yielded artefacts.

***Soils, landform and disturbance***

Phase 2 excavation units revealed relatively uniform soil profiles across RP2J AFT 3 OA2. The deposit was excavated into basal clay in four squares to test the relationship between the presence of artefacts and their corresponding soil deposit. The majority of squares were not excavated into the basal layer as the four squares excavated to 40cm depth revealed that the artefacts occurred overwhelmingly in the top 10cm of the profile. Their presence in this upper humic layer indicates that these are artefacts occur close or near to the surface, and have likely been affected to some degree by colluvial movement down slope.

Soil profiles of OA2 typically consisted of a humic dark brown sandy loam in the upper 9cm to 15cm of the deposit. It formed a moderately compacted upper A1 horizon with ironstone and gravels (35%) and fine grass roots. A clear boundary transitioned to a lower A horizon (A2) consisting of a greyish brown silty loam, containing 15% gravels and ironstone and decreasing fine roots (2%) between 20cm and 35cm in depth. The deeper horizons excavated continued to a depth of 40cm, these demonstrated similar pale greyish brown sandy loams, however had increasing gravels between 45% to 50%. Artefacts noted within the deposit during excavation and recorded *in situ* were all located within the upper 20cm of the deposit, primarily within the greyish brown fine silty loam of the A horizon.

Expansion of the original TS 17 square, and its adjacent squares (698E, 627N and 699E, 627N) identified fragments of baked clay and fine charcoal. These corresponded with the presence of a large quantity of non-artefactual heat shattered siliceous tuff material in these squares. Many of these pieces displayed crenate fracture planes and dark-grey discolouration of the material. A total of 347 heat shatters were identified, mostly concentrated in square 698E, 627N. No cultural indicators were present on this heat shatter and they are not considered to constitute lithic artefacts.

Plates 13-16 illustrate the soil profile and conditions across Open Area 2.

**Plate 13. Typical soil profile, excavated to 20cm depth (not excavated to basal layer)**

I. 0-~10-15cm: Humic layer, loose greyish brown silty loam topsoil, grass roots, occasional Fe/Mn flecking and small gravels 1-5%, bioturbated, clear boundary to:

II. 10-cm to 20cm: Greyish brown fine silty loam, more frequent containing 15% gravels and ironstone and decreasing fine roots (2%)

**Plate 14. Typical soil profile excavated to basal layer**

I. 0-~10-15cm: Humic layer, loose greyish brown silty loam topsoil, grass roots, occasional Fe/Mn flecking and small gravels 1-5%, bioturbated, clear boundary to:

III. 10cmto 20cm: Greyish brown fine silty loam, more frequent containing 15% gravels and ironstone and decreasing fine roots (2%)

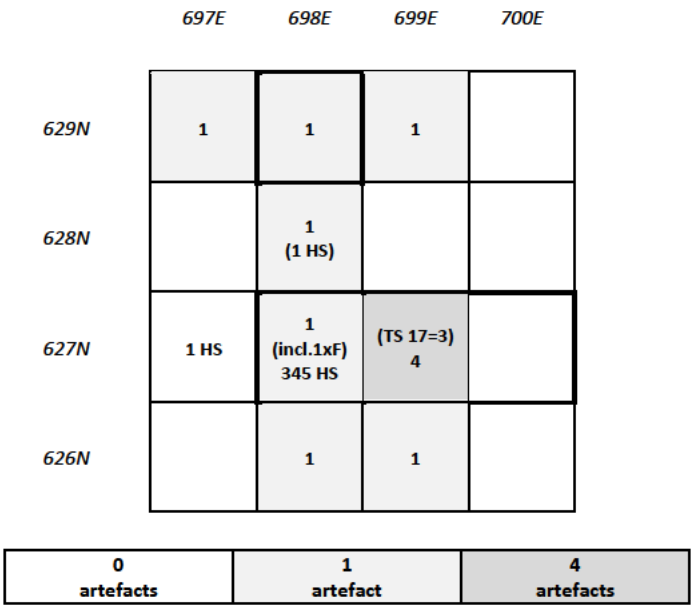
II. 30-40cm: Greyish brown fine silty loam, more frequent Fe/Mn 2-5%, moderately compact and occasional small sub-angular gravels and coarse fragments, sporadic <10%, occasional thin roots.

**Plate 15. Completed OA2 demonstrating consistency between 20cm and 40cm excavated deposit to basal layers.**

**Plate 16. Completed Open Area 2, facing west. The four squares excavated to basal layer (40cm); the remaining area is at 20cm depth.**

***Artefact Distribution***

A total of 11 artefacts were recovered from Open Area 2, from eight of the total sixteen squares (Figure 9). The spatial distribution of the artefacts was relatively focussed at a very low density. The extension of original unit TS 17 yielded 4 artefacts, and the remaining seven squares that contained artefacts formed a very low background signature (n=1 each respectively) (Table 8).




**HS = Heat shatter count. F = Flake.**

**Figure 9. Open Area 2 artefact distribution.**
Squares with thick line indicate 40cm depth excavated areas. All other areas 20cm depth.

**Table 8. Phase 2 Open Area 2 artefact density.**

| n | 0 | 1 | 4 | No. Squares | Total No. Artefacts | Mean Density |
|---|---|---|---|---|---|---|
| **RP2J AFT 3 Open Area 2** | 8 | 7 | 1 | **16** | **11** | **0.7/m²** |

***Lithics***

A total of 11 artefacts were recovered from the Open Area 2 salvage excavations. The distribution of artefacts showed one area of very low density patterning (Figure 9). The majority of artefacts were made of siliceous tuff (n= 9, 81%) in addition to one silcrete artefact and one of medium grained siliceous material, which is possibly rhyolite (Table 9). The siliceous tuff ranged in colour from pale grey to dark grey. The silcrete fragment was red in colour (Plate 17). The medium grained artefact was an unusual flake, with a dull pale grey felsitic texture. The material itself contained large (1-2mm) coarse quartz crystals, suspended in a pale grey dull matrix, with gravel sized (3mm) subrounded silicate material contained within it (Plate 17).

**Table 9. Phase 2 Open Area 2 raw material and artefact types**

| Reduction Type | MGS (medium grained siliceous) | Silcrete | Siliceous Tuff | Total | % |
|---|---|---|---|---|---|
| Angular Fragment | | 1 | 6 | 7 | ***63.6*** |
| Distal fragment | | | 1 | 1 | ***9.1*** |
| Flake | 1 | | | 1 | ***9.1*** |
| Medial Fragment | | | 2 | 2 | ***18*** |
| **Total** | **1** | **1** | **9** | **11** | |
| **%** | ***9.1*** | ***9.1*** | ***81.1*** | | |

**Plate 17. Selection of raw material: Clockwise from top left: silcrete angular fragment, medium grained siliceous (potentially rhyolite) flake, siliceous tuff distal fragment, siliceous tuff angular fragment with crenated heat fracture, siliceous tuff flake fragments.**

Artefact sizes ranged between 10mm and 39mm in maximum dimensions (Table 10). The widest range of artefact sizes was recorded for siliceous tuff artefacts, the smallest being a medial fragment weighing less than 0.1g, and the largest being an angular fragment weighing 14.7g. The lack of small debitage measuring less than 10mm indicates that this was not an active knapping location, as small shattered pieces are absent from the assemblage.

**Table 10. Phase 2 Open Area 2 raw material and size classes**

| Size Class | MGS (medium grained siliceous) | Silcrete | Siliceous Tuff | Total | % |
|---|---|---|---|---|---|
| 10-14mm | | | 1 | 1 | ***9.1*** |
| 15-19mm | | | 3 | 3 | ***27.3*** |
| 20-24mm | | 1 | 1 | 2 | ***18*** |
| 25-29mm | | | 2 | 2 | ***18*** |
| 35-39mm | 1 | | 2 | 3 | ***27.3*** |
| **Total** | **1** | **1** | **9** | **11** | |

The assemblage from OA 2 comprised 7 angular fragments (63%), with 2 medial fragments, and one distal fragment (Table 9). Only one complete flake retained cortex. This collection represents a very small and highly fragmented assemblage, likely with some colluvial disturbance (artefacts moving to the area from further up the slope). The assemblage can be characterised as displaying artefacts likely transported to the area from other locations and the site was not an active manufacturing locale.

# 8 Discussion

A total of 38 artefacts (plus 357 heat shatter pieces) were recovered during the salvage excavation program, with 55m$^2$ excavated across Phase 1 and Phase 2 salvage. Phase 1 comprised a single 1x1 metre square, with 54m$^2$ excavated across two open areas during Phase 2. OA1 was 38m$^2$ and OA2 was 16m$^2$. All of the artefacts were recovered from Phase 2.

Over one third of all excavated squares (n=22, 40%) yielded artefacts, with 33 squares (60%) yielding zero artefacts. The spatial organisation of artefact densities did not form strong patterning, with diffuse clusters present in both OA1 and OA2, with artefact frequency too low to establish a meaningful pattern. Mean artefact density was very low at both open areas, averaging 0.7 artefacts per square metre.

The lithic analysis of the RP2J AFT3 assemblage revealed a low density artefact distribution, with few diagnostic forms, and very little active knapping -there were only 7 flakes across the entire salvage assemblage. Two cores were present, indicating a highly localised signature- that is they were likely to be from the immediate area. Some transported material, (silcrete) was also present, which has no local source. Primary flaking activities are present to a limited degree. Very few flakes are present across the whole assemblage, with angular fragments dominating the stone artefact remains.

The majority of artefacts across both OA1 and OA2 were contained within the upper 20cm of the deposit. Soil profiles in the top 10cm were humic, and had begun to develop an organic A horizon. The 10 to 20cm deposit appeared pale grey, and formed a leached lower A horizon. The undulating nature of the landform indicated that there were possible microtopographic differences either in the use of the landscape based on the deposition of artefacts, or more likely a combination of this and colluvial movement from the upper elevated flat, and the lower toe of slope of the flat.

**Table 11. Artefact numbers and densities**

| Landform | Micro-topography | Open Area | Artefacts | Sample | Density |
|---|---|---|---|---|---|
| Elevated flat | Top of flat | OA1 | 27 | 38m$^2$ | 0.71/m$^2$ |
| | Base of flat | OA2 | 11 | 16 m$^2$ | 0.68/m$^2$ |
| **Total Phase 2 sample** | | | **38** | **54 m$^2$** | **0.7/ m$^2$** |

An analysis and discussion of key features of the site and artefact assemblage is presented in this section. The discussion was directed by the following research questions, as per the salvage methodology:

> **Question 1**: What cultural activities are archaeologically identifiable at site RP2J AFT 3 and how do these potentially differ from archaeological sites on other landforms in the Newcastle urban area or region?
>
> **Question 2**: What are the taphonomic features of archaeological site RP2J AFT 3? What does this indicate about site integrity and artefact survivability for sites on similar landforms especially within urban environments?

## 8.1 Site Integrity and Landform

The study area investigated during the Newcastle Inner City Bypass program lies within an inland localised elevated flat, connected by rolling hills landforms previously associated with low density sites. RP2J AFT3 is located on the elevated flat along a localised ridge spur, with local crests also nearby. The location did not offer a particular aspect, or notable views. What it does provide is a connection between the coastal resources and the inland, and an opportunity to examine Aboriginal landuse in these 'in between' spaces. This particular locale displayed lower levels of disturbance than the surrounding more developed area, and the site was considered more likely to retain information about these types of locales and their ability to provide information about transitory behaviours.

RP2J AFT 3 was an artefact scatter situated on an elevated flat overlooking the junction of two unnamed north east flowing ephemeral creeks. The environmental context of the study area has a two-fold effect on the presence of archaeological material. The topography and hydrology of the study area are likely to have affected the type of Aboriginal land use (and resulting archaeological sites) within the area whilst topography, hydrology and soil processes impacted the survivability of the archaeological material. Larger landscape features in the region include the significant stone resources available at Nobbies Beach, Glenrock Lagoon and Mereweather which provided stone for open camp sites near marine coastline, estuarine and lagoon settings. Locations in proximity to these waterways are likely to have been visited more frequently and for longer than other locations in the landscape. Aboriginal landscape use along a lower order tributary creekline such as that at RP2J AFT 3 would therefore be expected to be less intensive, reflecting intermittent transit behaviours rather than short to moderate-term camping, and specific activities witnessed in the ridge crests. Ridgelines between creeks, including the crests and upper slopes where RP2J AFT3 is located, would have sporadic archaeological remains.

The two open area locations examined the relationship between the two corresponding microtopographies of the elevated flat landform. The location at the top of the flat (OA1) and the location at the base of the slope (OA2) demonstrated good soil profile depth, averaging a maximum depth of 20cm for OA1 and 20-40cm for OA2. Both locations demonstrated modern topsoil development, which had partially 'blanketed' the artefact bearing deposit. The level of anticipated colluvial movement towards the base of the slope was relatively low (<10cm). Diagnostic artefacts tended to occur on the top of the flat, perhaps a geomorphological selection of artefacts unaffected by surface water and colluvial movement. Artefacts at the toe of slope tended to be non-diagnostic, with strong heat shatter impacting artefacts post-depositionally.

There is some evidence to suggest that the base of the slope contained colluvial material transported from the top of the flat by surface water processes. While formal artefact size sorting analysis could not be undertaken for this study due to very low artefact frequencies, this interpretation fits with other features of the assemblage including the size classes represented and the level of disturbance. Conversely, OA1 appeared to have withstood relatively little erosion of sediment, likely owing to a stable flat surface. There is some potential that in significant storm events sheet wash and surface sediment movement via water transport may have occurred, but there is little evidence from the soils or the artefactual assemblage to suggest this has caused any significant impact to the site. The analysis of soil profiles identified different soil movement processes between the two key microtopographies. Moderately low levels of these colluvial and erosional processes meant that the site retained material. The same is likely to be true of similar landforms in the region where environmental context and disturbance levels are comparable.

While it is broadly understood that Aboriginal people used these rolling hills/hinterland landscapes, the retention of subsurface archaeological remains is usually low, due to steeper gradients, more erosional soils, colluvial movement, and flood water effects. This forms an archaeological visibility and preservation bias against subsurface artefact deposits, because the majority of recorded sites in these landscapes include grinding grooves and rock engravings associated with outcrop exposures along creeklines. The microtopography of the RP2J AFT 3 landform, and its moderate soil retention despite some disturbance, have combined to retain Aboriginal objects within a subsurface deposit. The low density of objects is both a function of the type of landuse (low intensity and transitory) and the geomorphological stability of the landform. Though the site density is low, this type of information is just as important as more complex high density sites such as those known on the coast, as it provides supplementary information for the in-between and less 'formal' areas of occupation and habitation. Investigation of these smaller locales forms part of understanding the wider cultural landscape: rather than considering these low density, casual sites in isolation, they must be contextualised and understood as part of broader site patterning for the Newcastle region. Rolling hills and localised landforms of the interior, not linked to significant coastal, estuarine or lagoon resources were previously thought to lack meaningful subsurface archaeology. The salvage at RP2J AFT 3 reveals that such landscapes may have good survivability of stone artefacts, that capture locations of transit and that these connect the key resources of the landscape together.

## 8.2 Cultural activities interpreted through the lithics assemblage

While lithic densities were low, the highly localised nature of silicified tuff use depicts a local isolated capture of the resources Aboriginal people chose to bring with them, and what raw material is known to be readily available locally. The results allow for inferences about cultural activities at the site, and how it fits into the wider Aboriginal archaeological landscape of the region.

Very few reduction strategies (different methods of removing flakes from cores) could be interpreted from the assemblage. This is largely owing to the angular fragment reduction type dominating the assemblage- these are non-diagnostic elements. The two cores provide some information. Both cores were unifacial, and neither was heavily reduced. One was expediently reduced having been flaked off a larger cobble, and then 3 to 4 removals occurred, likely for a quick retooling event. No shatter associated with resharpening was identified around the cores, so it is less likely that the flakes produced formed a crucial part of the tool set and may have been *ad hoc* flake production. The cultural activity represented by the site can best be described as an isolated and expedient capture of a retooling event during a transit between the coast and hinterland.

Siliceous tuff overwhelmingly was favoured over other materials in the assemblage. Other materials were present, including silcrete, and a potential rhyolite flake. The siliceous tuff quarry could not be identified; however, it does not (on macroscopic inspection) bear any resemblance to Nobbies Beach tuff. This suggests something of the overall stone artefact resource transportation patterns between the coast and hinterland. All the identified materials are available from regional geologies and raw lithic sources are widespread, occurring as outcrops or as cobbles and pebbles distributed through the network of drainage lines, streams and rivers. The immediacy of these raw material sources in the 'in-between' zone where RP2J AFT 3 is located is likely to have influenced lithic reduction behaviours. Locally available materials would have been used as needed on an *ad hoc* basis as people moved through this landscape, consistent with the transitory usage of this zone. The fact that siliceous tuff from an immediate local source is used as cores in this transit camp, suggest that there are some functions/ practices that can be accommodated *ad hoc*. However, the presence of more distant material (though still regionally available) suggests that more reliable or particular material was selected specifically to be transported on journeys between the coast and the hinterland.

The archaeological scientific significance of this is the ability to compare the 'snapshots' at these transit camps, with the diminishing material supply at larger complex sites to indicate tasks/ practices for which material choice could not be compromised through *ad hoc* adaptation to local materials and required specific material that needed to be carried and curated.

No cultural charcoal deposits suitable for radiocarbon dating were identified however chronological sequencing for the site can be estimated based on the lithic assemblage. The presence of certain diagnostic features found in dated cultural sequences from stratified sites across south eastern Australia, would suggest occupation within the last 7,500 years. Based on the lithic analysis, the emphasis on the use of siliceous tuff, a local raw material, could suggest elements of the middle Bondaian (c. 4,000 – 1,000 years ago) period of the Eastern Regional Sequence. However, the distinct absence of retouched artefacts, in particular backed artefacts means that there is insufficient evidence to confirm the chronology.

## 8.3 Summary

The results of the salvage excavations completed at RP2J AFT 3 demonstrate the importance of the relationship between artefact density, proximity to water sources and localised landforms. They also add to our understanding of the relationship between particular landforms and archaeological survivability. In answer to research question 1, artefacts identified within the site suggest that the site was not an occupation area or work site, but rather reflects a 'snapshot' of behaviour in transit along the corridor of rolling hills and ridgelines of the hinterland of the Newcastle region. As such the site is one of transit between key locations.

The results of the salvage program demonstrate that sufficient archaeological integrity was retained at the RP2J AFT 3 to demonstrate an example of the interconnectedness between significant Aboriginal resource landmarks. In answer to research question 2, the analysis of soil profiles identified different soil movement processes between the two key microtopographies. Moderately low levels of these colluvial and erosional processes meant that the site retained material. The same is likely to be true of similar landforms in the region where environmental context and disturbance levels are comparable. Despite the lack of vertical stratigraphy, the deposit exhibited useful archaeological information. This has implications for the management of similar deposits in similar landscape positions, in particular urbanised areas of this landform in the local area and wider region. The low rate of investigation and preservation of these site types in such landforms has previously hampered our understanding of such areas, however the current program demonstrates that informative archaeological deposits do remain and can contribute to our understanding of Aboriginal landscape use. While the site is not representative of specialised activity, or even repeated occupation, it provides information about the important connections between such sites across the landscape. Its archaeological signature links together this broader cultural landscape and contributes an important part to the interconnected whole.

# 9 Conclusion

## 9.1 Archaeological salvage complete

The archaeological salvage program has been completed in accordance with the approval conditions for SSI 6888 and approved salvage methodology outlined in the CHAR.

Archaeological salvage excavation and mitigation for the impact of Newcastle Inner City Bypass – Rankin Park to Jesmond project on Aboriginal heritage has been completed in accordance with the approval. All fieldwork conditions related to Aboriginal objects within the boundary of the project area are complete and no further fieldwork mitigation is required. Salvage excavation was completed prior to any pre-construction or construction activities which may have harmed Aboriginal objects at the site locations.

Salvage excavation at RP2J AFT 3 uncovered a relatively intact archaeological deposit with a good degree of survivability and integrity. The scientific information contained within the deposit provides important data for the presence of Aboriginal sites in the local area and wider region. The data have demonstrated that material evidence of Aboriginal landscape use survives even in slightly more marginal contexts away from major landscape features. The consideration of Aboriginal archaeological heritage should continue to form an integral part of future environmental assessments, as the current program has confirmed that archaeologically valuable deposit can and does exist in on these landforms. The findings of the current program help illuminate the complexity and richness of the region's Aboriginal archaeological story.

## 9.2 Aboriginal Site Impact Recording Forms (ASIRFs)

ASIRFs have been completed for all impacted sites and submitted to the AHIMS Registrar.

## 9.3 Management of Aboriginal objects

The Aboriginal objects recovered during the salvage excavation program were moved to the following temporary storage location:

Kelleher Nightingale Consulting Pty Ltd offices
Level 10, 25 Bligh St, Sydney, NSW 2000
Objects kept in a secure storage location within a locked office

A description of the nature and types of Aboriginal objects which are now at this location is available in the salvage excavation lithics database (Appendix A).

In accordance with conditions of project approval, the management of salvaged Aboriginal objects was to be undertaken as per the management measures outlined in the CHAR and in consultation with the Registered Aboriginal Parties:

- Department of Planning and Environment (DP&E), as the approval authority, will be consulted;
- Aboriginal objects will be transferred in accordance with a Care Agreement or similar agreement to an Aboriginal community;
- In the event the Aboriginal community is unable to accept the objects, the objects will be transferred to the Australian Museum in accordance with legislative requirements, *Australian Museum Archaeological Collection Deposition Policy v1.0 January 2012*;
- In the event that neither the Australian Museum nor the Aboriginal community are able to accept the archaeological objects, KNC will work with RAPs and Transport to identify a suitable location for reburial following consultation with RAPs and DP&E.

Consultation included providing the above options to RAPs to determine an Aboriginal community preference for the long-term management of the artefacts. The initial consultation resulted in three responses:

- Awabakal LALC offered to take some of the artefacts into a Care Agreement, and would rebury some. Awabakal LALC have stated that all Aboriginal community members are free to view them as part of this arrangement.
- Awabakal Traditional Owners Aboriginal Corporation offered to enter a Care Agreement, and
- One RAP nominated a preference for the artefacts to be repatriated at the project site.

These options were redistributed to RAPs and a further two responses were received supporting Awabakal LALC entering into a Care Agreement.

A Care Agreement is currently being prepared with the Awabakal LALC.

## References

Australian Museum Business Services (AMBS), 2005. Aboriginal Heritage Study: Newcastle Local Government Area. Report prepared for Newcastle City Council.

Andrevsky, W. 1998. *Lithics: Macroscopic Approaches to Analysis.* Cambridge University Press, New York.

Baker Archaeology, 2016. *Newcastle Inner City Bypass – Rankin Park to Jesmond. Technical Paper 9 – Non-Aboriginal Heritage Assessment*. Report for Aurecon Australasia Pty Ltd on behalf of Roads and Maritime Services

Brayshaw, H., 1987. *Aborigines of the Hunter Valley: A study of Colonial Records*. Scone & Upper Hunter Historical Society.

Brayshaw and Associates, 1984. State Highway No 23 – Archaeological Investigation at Lambton Heights, Newcastle NSW. Report prepared for Cameron McNamara Pty Ltd.

Brayshaw and Kerr, 1983. Archaeological Survey at Rankin Park Hospital, Newcastle, New South Wales.

Cotterell, B. and J. Kamminga. 1987. The formation of flakes. *American Antiquity* 52:675-708.

Dean-Jones, P., 1989. Report of an Archaeological Survey at Glendale, NSW. Report prepared for Planning Workshop.

Dyall, L.K., 1971. Aboriginal Occupation of the Newcastle Coastline. Hunter Natural History, vol. 3, no. 3, pp. 154-168.

Environmental Resources Management Australia (ERM), 2002. Intersection of Lookout Road and McCaffrey Drive, New Lambton. Report prepared for Hyder Consulting.

Fawcett, J. W. "NOTES ON THE CUSTOMS AND DIALECT OF THE WONNAH-RUÁH TRIBE." *Science of man* 1.7 (1898): 152-4.

Grant, J. 1803, *The Narrative of a Voyage of Discovery, Performed in His Majesty's Vessel The Lady Nelson, of Sixty Tons Burthen, with Sliding Keels, In the Years 1800, 1801, and 1802, to New South Wales*. C. Roworth, Bell Yard, Fleet Street London

Gunson, N. (ed) 1974. Australian reminiscences & papers of L.E. Threlkeld, missionary to the Aborigines, 1824-1859. Australian Institute of Aboriginal Studies. Canberra.

Hiscock, P., 2002. Quantifying the size of artefact assemblages. *Journal of Archaeological Science 29*: 251–258.

Holdaway, S. and N. Stern, 2004. *A Record in Stone: The Study of Australia's Flaked Stone Artefacts.* Museum Victoria, Melbourne VIC.

Kamminga, J. 1982. *Over the Edge: Functional Analysis of Australian Stone Tools.* Occasional Papers in Anthropology, no. 12, Anthropology Museum, University of Queensland, St. Lucia QLD

Kelleher Nightingale Consulting (KNC), 2017, Newcastle Inner City Bypass – Rankin Park to Jesmond, Aboriginal Archaeological Survey Report - Stage 2 PACHCI. Report prepared for Roads and Maritime Services

KNC, 2018. Newcastle Inner City Bypass – Rankin Park to Jesmond: Aboriginal Cultural Heritage Assessment Report. Report prepared for Roads and Maritime Services

Maynard, J, 2015, *Callaghan, The University of Newcastle: whose traditional land?* The University of Newcastle. Newcastle.

Miller, R., 1886. No. 188 The Hunter River. The Wonnarua Tribe and Language. In Curr, E.M. *The Australian Race: Its Origin, Languages, Customs, Place of Landing in Australia, and the Routes by which it spread itself over that continent*. Melbourne, John Ferres, Government Printer, 1886-1887, Vol. 3. pp. 352 – 357

Nishiizumi, K., Lal, D., Klein, J., Middleton, R. and Arnold J.R. 1986. Production of 10Be and 26Al by cosmic rays in terrestrial quartz in situ and implications for erosion rates. *Nature 319 (6049)*: 134-136.

Nishiizumi, K. et al. 1993. Role of in situ cosmogenic nuclides 10Be and 26Al in the study of diverse geomorphic processes. *Earth Surface Processes and Landforms 18*: 407-425.

Office of Environment and Heritage (OEH), April 2011. *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW*. Office of Environment and Heritage, Department of Premier and Cabinet, Sydney.

OEH, 2010a. *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales: Part 6 National Parks and Wildlife Act 1974*. Department of Environment, Climate Change and Water NSW, Sydney

OEH, 2010b. *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010: Part 6 National Parks and Wildlife Act 1974*. Department of Environment, Climate Change and Water NSW, Sydney.

Roads and Maritime Services (RMS). November 2011. *Procedure for Aboriginal Cultural Heritage Consultation and Investigation*. Roads and Maritime Services, Sydney.

Schmidt, Patrick. (2013). What causes failure (overheating) during lithic heat treatment?. Archaeological and Anthropological Sciences. 6. 107-112. 10.1007/s12520-013-0162-3.

Umwelt (Australia) Pty Limited (Umwelt), 2002a. Management of Aboriginal Heritage Values in the Blue Gum Vista Estate, Vol 1 & 2. Report prepared for Landcom.

Umwelt, 2002b. Archaeological Survey of Revised Route for the Proposed New Access Road to John Hunter Hospital, Newcastle, NSW. Report prepared for Bovis Lend Lease.

Umwelt, 2006. Aboriginal Archaeological Survey and Assessment of the Proposed State Highway 23 Realignment form Rankin Park to Jesmond, NSW: An Examination of Four Alternative Routes. Report for NSW Roads and Traffic Authority

# Appendix A Lithics Database

RP2J AFT 3 Lithic Data

| Artefact ID | Square Location Easting | Square Location Northing | Open Area | Phase | Spit Depth | Raw Material Type | Heat Affected? | Reduction Type | Cortex % | Weight (g) | Size Range mm | Percussion L mm | Width mm | Thickness mm | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | 689 | 676 | OA1 | 2 | 1 | Siliceous Tuff | Totally | Angular Fragment | 0% | 9.5 | 55-59mm | | | | |
| **2** | 689 | 676 | OA1 | 2 | 1 | Siliceous Tuff | No | Core | 31-69% | 241.1 | <100mm | 36 | 93 | 83 | large cortical flake used as a core. Core removals are along right lateral margin (when viewed from dorsal). Removals are ventrally and dorsally initiated- a classic platform set up then ventral platform for main flaking surface |
| **3** | 690 | 675 | OA1 | 2 | 1 | Siliceous Tuff | Partially | Angular Fragment | 0% | 4.9 | 40-44mm | | | | |
| **4** | 690 | 675 | OA1 | 2 | 1 | Siliceous Tuff | Partially | Angular Fragment | 0% | 5.6 | 30-34mm | | | | |
| **5** | 690 | 674 | OA1 | 2 | 1 | Siliceous Tuff | No | Core | 31-69% | 103.6 | 65-69mm | 47 | 49 | 33 | 2 removals from main flaking surface. Butt of core has been anvil rested and crushed |
| **6** | 690 | 674 | OA1 | 2 | 1 | Siliceous Tuff | Partially | Distal fragment | 0% | 0.5 | 15-19mm | | | | |
| **7** | 691 | 676 | OA1 | 2 | 2 | Siliceous Tuff | Totally | Split Flake R | 0% | 2.2 | 25-29mm | | | | |
| **8** | 692 | 674 | OA1 | 2 | 3 | Siliceous Tuff | No | Medial Fragment | 0% | 1.5 | 25-29mm | | | | |
| **9** | 692 | 674 | OA1 | 2 | 3 | Siliceous Tuff | No | Flake | 0% | 2.8 | 30-34mm | 29 | 13 | 2 | |
| **10** | 693 | 675 | OA1 | 2 | 1 | Siliceous Tuff | No | Flake | 0% | 6.1 | 35-39mm | 26 | 31 | 2 | |
| **11** | 693 | 675 | OA1 | 2 | 1 | Silcrete | Partially | Flake | 1-30% | 4.8 | 30-34mm | 30 | 18 | 7 | |
| **12** | 694 | 674 | OA1 | 2 | 1 | Siliceous Tuff | No | Flake | 0% | 1.1 | 20-24mm | 19 | 16 | 3 | |
| **13** | 694 | 675 | OA1 | 2 | 1 | Siliceous Tuff | No | Angular Fragment | 0% | 3.1 | 25-29mm | | | | |
| **14** | 694 | 675 | OA1 | 2 | 1 | Siliceous Tuff | No | Angular Fragment | 0% | 0.8 | 20-24mm | | | | |
| **15** | 694 | 675 | OA1 | 2 | 1 | Siliceous Tuff | No | Angular Fragment | 0% | 0.8 | 25-29mm | | | | |
| **16** | 694 | 675 | OA1 | 2 | 1 | Silcrete | Partially | Angular Fragment | 0% | 1.3 | 20-24mm | | | | |
| **17** | 694 | 675 | OA1 | 2 | 1 | Siliceous Tuff | No | Angular Fragment | 0% | 1.3 | 15-19mm | | | | |
| **18** | 694 | 675 | OA1 | 2 | 1 | Quartz | No | Distal fragment | 0% | <0.1 | 10-14mm | | | | |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **19** | 694 | 676 | OA1 | 2 | 2 | Silcrete | Partially | Angular Fragment | 0% | 1.4 | 15-19mm | | | | |
| **20** | 689 | 674 | OA1 | 2 | 2 | Siliceous Tuff | Totally | Angular Fragment | 0% | 0.2 | 15-19mm | | | | |
| **21** | 689 | 677 | OA1 | 2 | 2 | Siliceous Tuff | No | Flake | 0% | 20.8 | 45-49mm | 41 | 38 | 5 | |
| **22** | 695 | 674 | OA1 | 2 | 1 | Siliceous Tuff | Totally | Angular Fragment | 0% | 3.4 | 30-34mm | | | | |
| **23** | 695 | 674 | OA1 | 2 | 1 | Quartz | No | Angular Fragment | 0% | <0.1 | 10-14mm | | | | |
| **24** | 695 | 675 | OA1 | 2 | 1 | Siliceous Tuff | Totally | Angular Fragment | 0% | 0.9 | 25-29mm | | | | |
| **25** | 695 | 675 | OA1 | 2 | 1 | Siliceous Tuff | Totally | Angular Fragment | 0% | 2.1 | 30-34mm | | | | |
| **26** | 695 | 675 | OA1 | 2 | 1 | Quartz | Totally | Proximal Fragment | 0% | 0.7 | 15-19mm | | | | |
| **27** | 695 | 676 | OA1 | 2 | 1 | Silcrete | No | Flake | 0% | 1.9 | 20-24mm | 12 | 20 | 5 | |
| **28** | 699 | 629 | OA2 | 2 | 1 | Siliceous Tuff | No | Medial Fragment | 0% | <0.1 | 10-14mm | | | | |
| **29** | 699 | 626 | OA2 | 2 | 1 | Siliceous Tuff | No | Distal Fragment | 0% | <0.1 | 15-19mm | | | | |
| **30** | 699 | 627 | OA2 | 2 | 2 | Siliceous Tuff | Totally | Angular Fragment | 0% | <0.1 | 15-19mm | | | | |
| **31** | 699 | 627 | OA2 | 2 | 3 | Siliceous Tuff | Totally | Angular Fragment | 0% | 0.8 | 25-29mm | | | | |
| **32** | 699 | 627 | OA2 | 2 | 3 | Siliceous Tuff | Totally | Angular Fragment | 0% | 0.3 | 20-24mm | | | | |
| **33** | 699 | 627 | OA2 | 2 | 1 | Siliceous Tuff | No | Angular Fragment | 0% | 2.6 | 15-19mm | | | | |
| **34** | 697 | 629 | OA2 | 2 | 2 | Siliceous Tuff | Partially | Angular Fragment | 0% | 14.7 | 35-39mm | | | | |
| **35** | 698 | 629 | OA2 | 2 | 4 | Siliceous Tuff | Totally | Angular Fragment | 0% | 9 | 35-39mm | | | | |
| **36** | 698 | 628 | OA2 | 2 | 2 | Siliceous Tuff | No | Medial Fragment | 0% | 1.2 | 25-29mm | | | | |
| **37** | 698 | 626 | OA2 | 2 | 2 | Silcrete | Partially | Angular Fragment | 0% | 1.4 | 20-24mm | | | | |
| **38** | 698 | 627 | OA2 | 2 | 1 | MGS (medium grained siliceous) | No | Flake | 0% | 9.9 | 35-39mm | 23 | 33 | 8 | looks like silcrete however there are poorly sorted clasts and pebble sized (<2mm) non quartz material is an unsilicified matrix - could be other material resembles rhyolite. |