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Appendix A: Archaeological Report
Gillieston Heights, Maitland, NSW
Residential Development

City of Maitland LGA

Prepared for Walker Gillieston Heights Pty Ltd

Prepared by Niche Environment and Heritage Pty Ltd | 13 June 2023

Document control

Project number	Client	Project manager	LGA
6617	Walker Gillieston Heights Pty Ltd	Deirdre Lewis-Cook	City of Maitland

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D1	Deirdre Lewis-Cook	Dr Morgan Disspain and Clare Anderson	Draft	8 September 2021
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Executive summary

Project outline

Niche Environment and Heritage Pty Ltd (Niche) was commissioned by Walker Gillieston Heights Pty Ltd (hereafter referred to as 'the Proponent') to prepare an Aboriginal Cultural Heritage Assessment (ACHA) to support a development application (DA) for the proposed residential subdivision development of six adjoining lots spanning 457 to 527 Cessnock Road in Gillieston Heights, a southern suburb of Maitland, NSW (hereafter referred to as 'the Subject Area'). The Subject Area comprises the following lots: Lot 2 DP 601226, Lot 1 DP 601226, Lot 1 DP 31179, Lot 1 DP 302745, Lot 2 DP 302745 and Lot 3 DP 71130.

This Archaeological Report (AR) presents the results of an Aboriginal archaeological assessment for the proposed redevelopment. The AR is an integral part of the ACHA and will be included as an Appendix in the ACHA report and has been carried out in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (Department of Environment, Climate Change and Water NSW, 2010, [DECCW 2010] 'Code of Practice').

Summary of findings

The ACHA report process and the AR assessment has included background archaeological and historical investigation, ongoing consultation with the Registered Aboriginal Parties (RAPs), an archaeological site inspection and an archaeological test excavation program.

One (1) previously recorded Aboriginal cultural heritage site (TH-IF-001; AHIMS ID#38-4-2015) is located within the Subject Area and comprises of an isolated find located close to Testers Hollow in the southern portion of the Subject Area.

A total of seven (7) new Aboriginal cultural heritage sites were located during the site inspection completed by Niche and a representative of the Mindaribba Local Aboriginal Land Council (MLALC) in compliance with the requirements of the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010a). These sites consist of three (3) isolated artefacts GH21-IF-1 (AHIMS ID#38-4-2116), GH21-IF-2 (AHIMS ID#38-4-2117), and GH21-IF-4 (AHIMS ID#38-4-2119), one isolated artefact and PAD GH21-IF-3 (AHIMS ID#38-4-2118), and three (3) PADs GH21-PAD-1 (AHIMS ID#38-4-2120), GH21-PAD-3 (AHIMS ID#38-4-2121), and GH21-PAD-4 (AHIMS ID#38-4-2122).

A test excavation program was carried out over five (5) days from 13 to 17 December 2021 resulting in the recovery of a total of four (4) sub-surface Aboriginal stone artefacts from three (3) of the PAD sites including GH21-PAD-1 (AHIMS ID#38-4-2120), GH21-PAD-3 (AHIMS ID#38-4-2121), and GH21-PAD-4 (AHIMS ID#38-4-2122). It was determined that the PAD associated with GH21-IF-3 (AHIMS ID#38-4-2118) is not associated with any sub-surface archaeological deposits despite the presence of an isolated surface artefact. An Aboriginal Site Impact Recording form (ASIRF) has been lodged for each PAD site investigated.

Overall, the results of the archaeological assessments conducted within the Subject Area are consistent with the predictive model developed for the project in that:

- The site types and features (isolated artefacts and PADs) identified within the Subject Area are common within the region.
- The presence of surface artefacts is not a predictor of sub-surface archaeological deposits and vice-versa.

- The archaeology associated with the Subject Area is indicative of general background scatter associated with sporadic and/or infrequent use of the area by past Aboriginal groups with more intensive occupation sites located elsewhere in the landscape such as in locations closer to the Hunter River.

Summary of potential impacts

This assessment has determined that the proposed development of the Subject Area has the potential to impact the following Aboriginal cultural heritage sites registered on AHIMS:

Portion of site to be impacted	AHIMS ID#	Site Name	Site Features
Whole	38-4-2118	GH21-IF-3	Isolated artefact
Whole	38-4-2120	GH21–PAD-1	PAD
Partial	38-4-2121	GH21–PAD-3	PAD
Partial	38-4-2122	GH21–PAD-4	PAD

The following Aboriginal cultural heritage sites located within the Subject Area are situated in C2 (Environmental Conservation Zone) and C3 (Environmental Management Zone) Zones and will therefore not be impacted by the proposed developed of the Subject Area.

Portion of site to be impacted	AHIMS ID#	Site Name	Site Features
None	38-4-2015	TH-IF-001	Isolated artefact and PAD
None	38-4-2116	GH21-IF-1	Isolated artefact
None	38-4-2117	GH21-IF-2	Isolated artefact
None	38-4-2119	GH21-IF-4	Isolated artefact

Conclusion and recommendations

Aboriginal objects and sites are protected under the National Parks and Wildlife Act 1974. In order to undertake the future development of the Subject Area and impact the Aboriginal cultural heritage sites listed above in the first table, an Aboriginal Heritage Impact Permit (AHIP) must be obtained prior to the activity commencing under Section 90 of the *National Parks and Wildlife Act 1974*.

The following recommendations have been made:

Recommendations	
	Aboriginal Heritage Impact Permit
1.	Walker Gillieston Heights Pty Ltd should continue to consult with the Aboriginal community in accordance with the consultation guidelines and in accordance with any future Aboriginal Heritage Impact Permit (AHIP). To ensure that the current consultation records remain valid to support any future AHIP/s for the Subject Area, the Proponent should send project updates to RAPs at a minimum of every six months for the duration of the Project. Consultation with the Aboriginal community should be undertaken to inform an Interpretation Plan, to enable Aboriginal cultural knowledge to be incorporated into the design and development of the Precinct, focusing on open/public spaces.
2.	Aboriginal cultural heritage sites TH-IF-001 (AHIMS ID#38-4-2015), GH21-IF-1 (AHIMS ID# 38-4-2116), GH21-IF-2 (AHIMS ID# 38-4-2117) and GH21-IF-4 (AHIMS ID# 38-4-2119) should be incorporated into conservation zones and protected in situ within the areas proposed for C2

Recommendations	
	(Environmental Conservation Zone) and C3 (Environmental Management Zone) Zoning and no ground disturbance should occur within the boundaries of these Aboriginal cultural heritage sites.
3.	An application for an AHIP to harm for Aboriginal cultural heritage sites GH21-IF-3 (AHIMS ID# 38-4-2118), GH21–PAD-1 (AHIMS ID# 38-4-2120), GH21–PAD-3 (AHIMS ID# 38-4-2121) and GH21–PAD-4 (AHIMS ID #38-4-2122) will be required to undertake future development within the location of these sites as it will result in harm to Aboriginal Objects.
4.	The AHIP should be conditioned to include salvage surface collection of the isolated artefact associated with Aboriginal cultural heritage site GH21-IF-3 (AHIMS ID# 38-4-2118) as a mitigation strategy for the harm to this site.
5.	Site Card information for the four AHIMS registered Aboriginal cultural heritage sites GH21-IF-3 (AHIMS ID# 38-4-2118), GH21–PAD-1 (AHIMS ID# 38-4-2120), GH21–PAD-3 (AHIMS ID# 38-4-2121) and GH21–PAD-4 (AHIMS ID #38-4-2122) should be updated in the AHIMS database with revised site descriptions following any impacts associated with any works under any future AHIP. This will involve submitting Aboriginal Site Impact Form [ASIFS] upon implementing the AHIP.
6.	A Care and Control Agreement will be required with the Registered Aboriginal Parties to determine the final storage location of any Aboriginal objects recovered during the test excavations and under any future AHIPs within the Subject Area.
7.	For any specific proposed development beyond what has been assessed in the current AR/ACHA, especially within the C2 and C3 zones, an assessment of Aboriginal heritage should be undertaken in accordance with the *National Parks & Wildlife Act 1974* (Amended 2010) and *National Parks & Wildlife Amendment Regulation 2019*. This may take the form of an Aboriginal Objects Due Diligence Assessment in the first instance.
	General
8.	All workers should be inducted into the Subject Area, so they are made aware of their obligations under the *National Parks and Wildlife Act 1974* and any conditions of any future AHIP prior and during and after construction activities.
9.	In the event that previously unknown Aboriginal object(s) and/or sites are discovered during the proposed activity, work must stop, and an appropriately qualified archaeologist be contacted to access the nature, extent, and significance of the identified sites and notification is provided to Heritage NSW. Works should not proceed without advice from Heritage NSW or an appropriately qualified archaeologist.
10.	In the unlikely event that suspected human remains are encountered during construction, all work in the area that may cause further impact, must cease immediately and: • The location, including a 20 m curtilage, should be secured using barrier fencing to avoid further harm. • The NSW Police must be contacted immediately. • No further action is to be undertaken until the NSW Police provide written notification to Walker Gillieston Heights Pty Ltd. • If the skeletal remains are identified as Aboriginal, Walker Gillieston Heights Pty Ltd or their agent must contact: ▪ Heritage NSW's Enviroline on 131 555; and representatives of the RAPs. ▪ No works are to continue until Heritage NSW provides written notification to the proponent or their Agent.

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1. Introduction

1.1 Background and need for the project

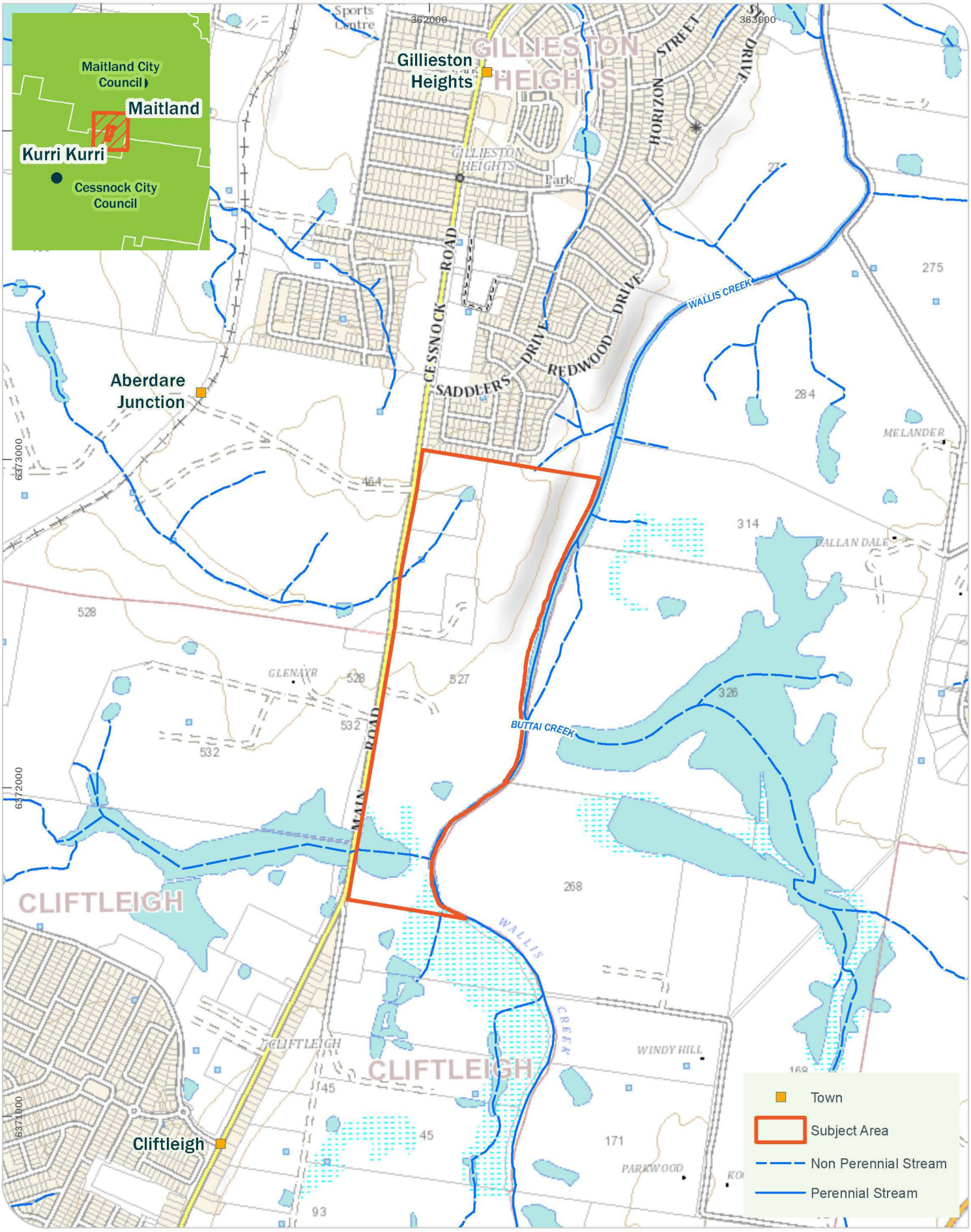
This Archaeological Report (AR) presents the results of an archaeological assessment which included a site inspection and test excavations to support the proposed residential development of six adjoining lots spanning 457 to 527 Cessnock Road in Gillieston Heights, a suburb of Maitland NSW (hereafter referred to as 'the Subject Area'; Figure 1 and Figure 2). The Subject Area is situated within the suburb of Gillieston Heights in the City of Maitland Local Government Area (LGA) and is located approximately 5 km South-West of the Hunter River within the Hunter Region of NSW. It lies within the County of Northumberland and within the Mindaribba Local Aboriginal Land Council (LALC). The Subject Area incorporates six adjoining lots comprising of Lot 2 DP 601226, Lot 1 DP 601226, Lot 1 DP 31179, Lot 1 DP 302745, Lot 2 DP 302745 and Lot 3 DP 71130.

Niche Environment and Heritage Pty Ltd (Niche) were commissioned by Walker Gillieston Heights Pty Ltd (hereafter referred to as 'the Proponent') to prepare an ACHA and AR for the Project.

Niche has prepared this AR in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW, 2010a).

As per the Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales (DECCW 2010b), the objectives of the archaeological assessment undertaken to inform the ACHA were:

- Describe the aims of the project and the rationale for the archaeological assessment.
- Present a feasible and appropriate methodology for the archaeological survey and other investigations.
- Undertake field surveys in accordance with Section 2.2 of the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales 2010*
- Present the findings and interpretation of the results within a wider context of archaeological knowledge and Aboriginal history.
- Ensure that the findings and interpretation of the results support the assessment of the archaeological significance of the Subject Area.



niche Environment and Heritage

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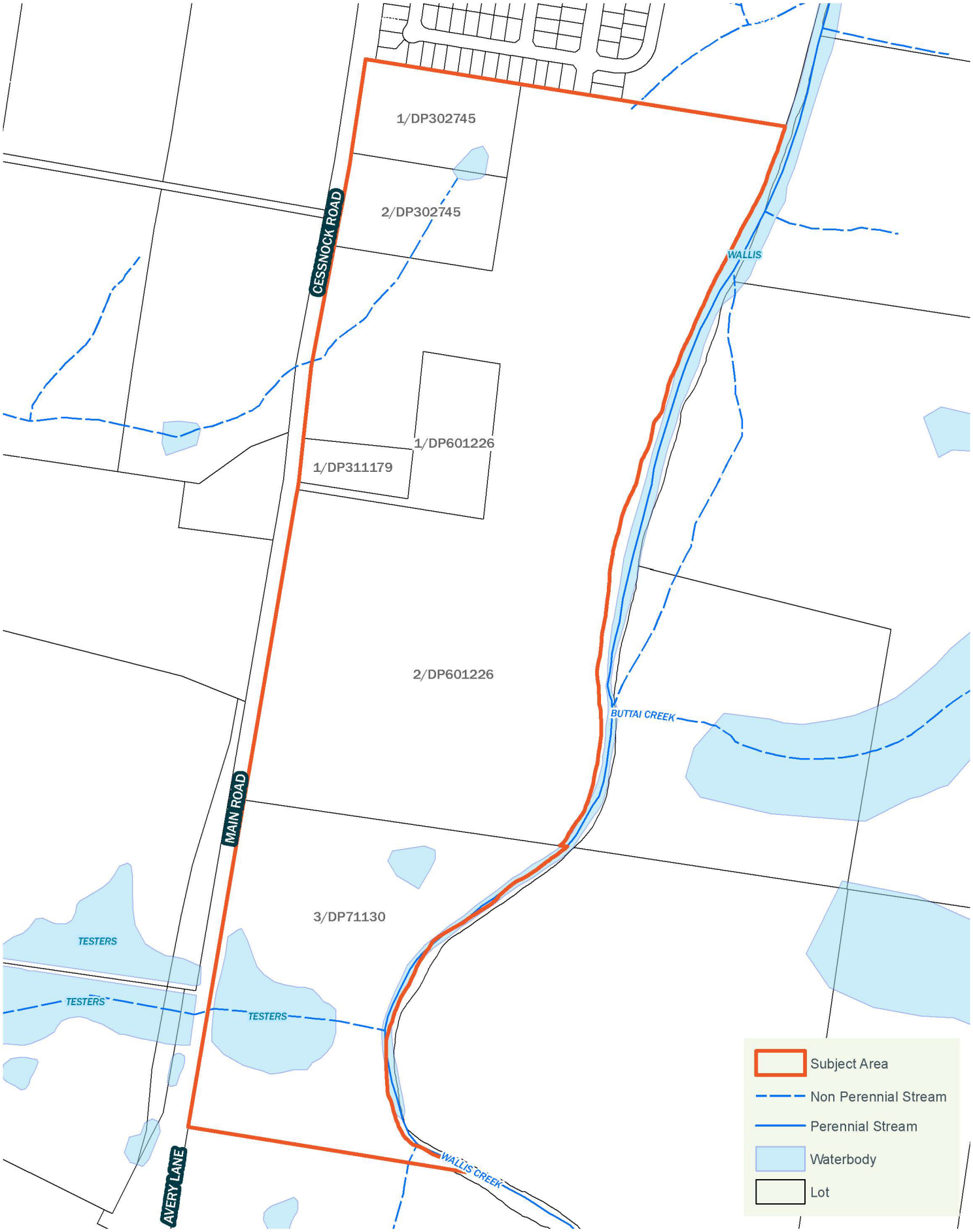
m
GDA 1994 MGA Zone 56

Niche PM: Deirdre Lewis-Cook
Niche Proj. #: 6617
Client: Walker Corporation Pty Ltd

Location Map
Gillieston Heights Land Rezoning

Figure 1



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GDA 1994 MGA Zone 56

Niche PM: Deirdre Lewis-Cook
Niche Proj. #: 6617
Client: Walker Corporation Pty Ltd

Location of the Subject Area
Gillieston Heights Land Rezoning

Figure 2

2. Investigator and contributors

The contributors to this AR and their project roles are listed in Table 1 below.

Table 1: Contributors, affiliations and contributions

Contributor	Affiliation	Contribution	Qualification
Dr Morgan Disspain	Niche	Project Manager, Aboriginal Community Consultation, Quality Control	BA (Hons), PhD
Clare Anderson	Niche	Quality Control and Internal Reviews	BA (Hons)
Deirdre Lewis-Cook	Niche	Project Manager, Aboriginal Community Consultation, Primary Author	BA, MA (Hons)
Kosta Contos	Niche	Aboriginal Community Consultation	BA
Marika Low	Niche	Secondary Author	BA (Hons), PhD
James McGuiness	Niche	Field Survey	BA
Neil Berry	Niche	GIS, Mapping	BSc (Hons1)
Ben Slack	Niche	Test Excavation	BA
Riley Finnerty	Niche	Test Excavation, Artefact Analysis	BA (Hons)
Carly Todhunter	Niche	Aboriginal Community Consultation	BA, BSc (Hons)
Nicole Topple	Walker Gillieston Heights Pty Ltd	Client Contact, Client Review	NA
Registered Aboriginal Parties (RAPS)			
Contact Person	**Organisation**	**Contribution**	
Christine Paul	Aboriginal Native Title Consultants	Registered Aboriginal Party, test excavation and document review	
Blain Archbold	Aboriginal Native Title Consultants	Test excavation	
Aliera French	Aliera French Trading	Registered Aboriginal Party	
Adam and Gregory Sampson	AGA Services	Registered Aboriginal Party	
Ashley Sampson	AGA Services	Registered Aboriginal Party, test excavation	
Tracey Howie	Awabakal and Guringai Pty Ltd	Registered Aboriginal Party	
Peter Leven	Awabakal Descendants Traditional Owners	Registered Aboriginal Party	
Kerrie Brauer	Awabakal Traditional Owners Aboriginal Corporation	Registered Aboriginal Party and document review	
George and Donne Sampson	Cacatua Culture Consultants	Registered Aboriginal Party	

Contributor	Affiliation	Contribution	Qualification
Tannika Sampson	Cacatua Culture Consultants	Test excavation	
[redacted]	[redacted]	Registered Aboriginal Party and document review	
B. Sagona	Corroboree Aboriginal Corporation	Test excavation	
Tracey Skene	Culturally Aware	Registered Aboriginal Party	
Paul and Lilly Carroll	DNC	Registered Aboriginal Party	
Steve Talbott	Gameroi Naomi	Registered Aboriginal Party	
Paulette Ryan	Hunter Traditional Owner	Registered Aboriginal Party	
CEO	Mindaribba Local Aboriginal Land Council	Registered Aboriginal Party	
Darleen and Ryan Johnson	Murra Bidgee Mullangari Aboriginal Corporation	Registered Aboriginal Party and document review	
Scott and Danny Franks	Tocomwall	Registered Aboriginal Party and document review.	
Steven Hickey	Widescope Indigenous Group	Registered Aboriginal Party, test excavation and document review	
Maree Waugh	Wallangan Cultural Services	Registered Aboriginal Party	
Laurie Perry	Wonnarua Nation Aboriginal Corporation	Registered Aboriginal Party and document review	
[redacted]	[redacted]	Registered Aboriginal Party and document review	
Adam King	Woka Aboriginal Corporation	Test excavation	
Kathleen Steward Kinchela	Yinarr Cultural Services	Registered Aboriginal Party	
Steve Talbot	Gameroi Naomi	Registered Aboriginal Party	

3. Description of development proposal

3.1 Project location

The Subject Area is situated within the suburb of Gillieston Heights in the City of Maitland LGA and is located approximately 5 km southwest of the Hunter River within the Hunter Region of NSW. It lies within the Mindaribba Local Aboriginal Land Council (MLALC) and within the County of Northumberland. The Subject Area encompasses six lots: Lot 2 DP 601226, Lot 1 DP 601226, Lot 1 DP 31179, Lot 1 DP 302745 Lot 2 DP 302745, and Lot 3 DP 71130 and is made up of dense pastureland located immediately to the south of an existing low-density residential development. The Subject Area is bound by Cessnock Road to the west, Wallis Creek to the east, and Testers Hollow to the south.

3.2 Proposed development description

The Subject Area is proposed for a residential subdivision comprising 323 residential allotments. The South Gillieston Heights (Eastern Precinct) comprises approximately 323 residential allotments, drainage reserves, open space reserves and residue lots. The residential development would include the construction of new roads, bulk earthworks, vegetation removal, demolition of existing residences and remediation works. Figure 4 shows the draft precinct plan that has been provided which may be subject to change. This draft precinct plan has been used to frame the management recommendations in this report. A draft concept plan layout (Figure 5) has also been prepared based on the precinct plan.

3.3 Potential for harm

The results of an Aboriginal Heritage Information Management System (AHIMS) search (Table 3), desktop assessment, and archaeological field inspection, undertaken as part of this report, determined that one (1) previously recorded Aboriginal cultural heritage site TH-IF-001 (AHIMS ID# 38-4-2015) registered on AHIMS and seven (7) newly recorded Aboriginal cultural heritage sites (GH21-IF-1, GH21-IF-2, GH21-IF-3, GH21-IF-4, GH21–PAD-1, GH21-PAD-3, and GH21-PAD-4) are located within the Subject Area. Four (4) of these sites, GH21-IF-3, GH21-PAD-1, GH21-PAD-3, and GH21-PAD-4 will be impacted by the proposed works. A detailed impact assessment is provided in Section 13 of this AR.

Table 2: Details of the Aboriginal objects identified by this AR

Portion of site to be impacted	AHIMS ID#	Site Name	Site Features	Easting (GDA 94, Zone 56)	Northing (GDA 94, Zone 56)
None- there is no potential for the site to be harmed by the proposed development in the Subject Area	38-4-2015	TH-IF-001	Isolated artefact and PAD	[redacted]	[redacted]
None- there is no potential for the site to be harmed by the proposed development in the Subject Area	38-4-2116	GH21-IF-1	Isolated artefact	[redacted]	[redacted]
None- there is no potential for the site to be harmed by the proposed development in the Subject Area	38-4-2117	GH21-IF-2	Isolated artefact	[redacted]	[redacted]

Portion of site to be impacted	AHIMS ID#	Site Name	Site Features	Easting (GDA 94, Zone 56)	Northing (GDA 94, Zone 56)
Whole- the entire site has the potential to be harmed by the proposed development in the Subject Area	38-4-2118	GH21-IF-3	Isolated artefact and PAD	[redacted]	[redacted]
None- there is no potential for the site to be harmed by the proposed development in the Subject Area	38-4-2119	GH21-IF-4	Isolated artefact	[redacted]	[redacted]
Whole- the entire site has the potential to be harmed by the proposed development in the Subject Area	38-4-2120	GH21–PAD-1	PAD	[redacted]	[redacted]
Partial- a portion of the site has the potential to be harmed by the proposed development in the Subject Area	38-4-2121	GH21–PAD-3	PAD	[redacted]	[redacted]
Partial- a portion of the site has the potential to be harmed by the proposed development in the Subject Area	38-4-2122	GH21–PAD-4	PAD	[redacted]	[redacted]

Figure 3: Proposed land zone map (Source: Walker Gillieston Heights)

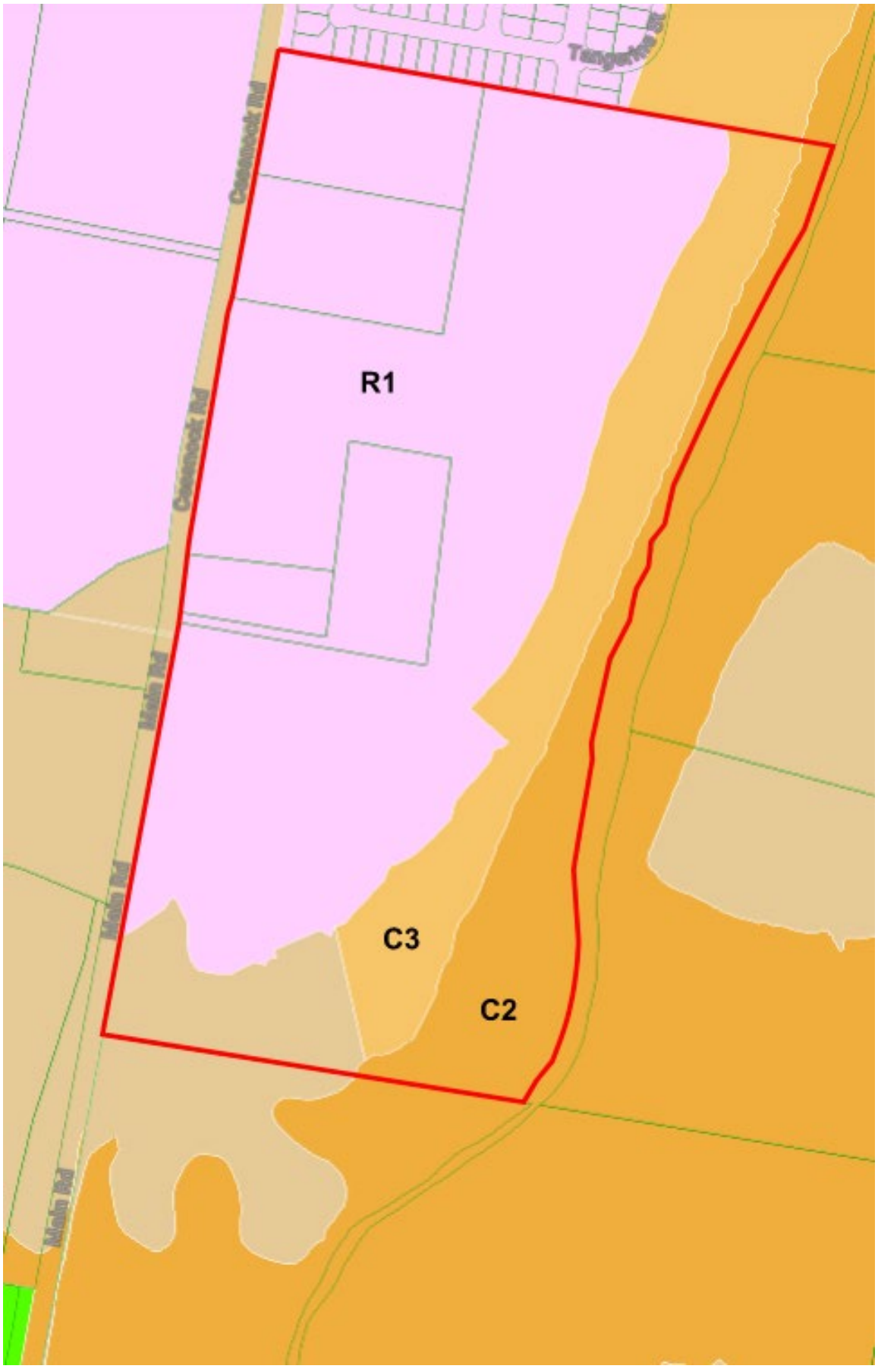


Figure 4: Draft East Precinct Plan (Source: Walker Gillieston Heights)

[MAITLAND DEVELOPMENT CONTROL PLAN]

December 2011

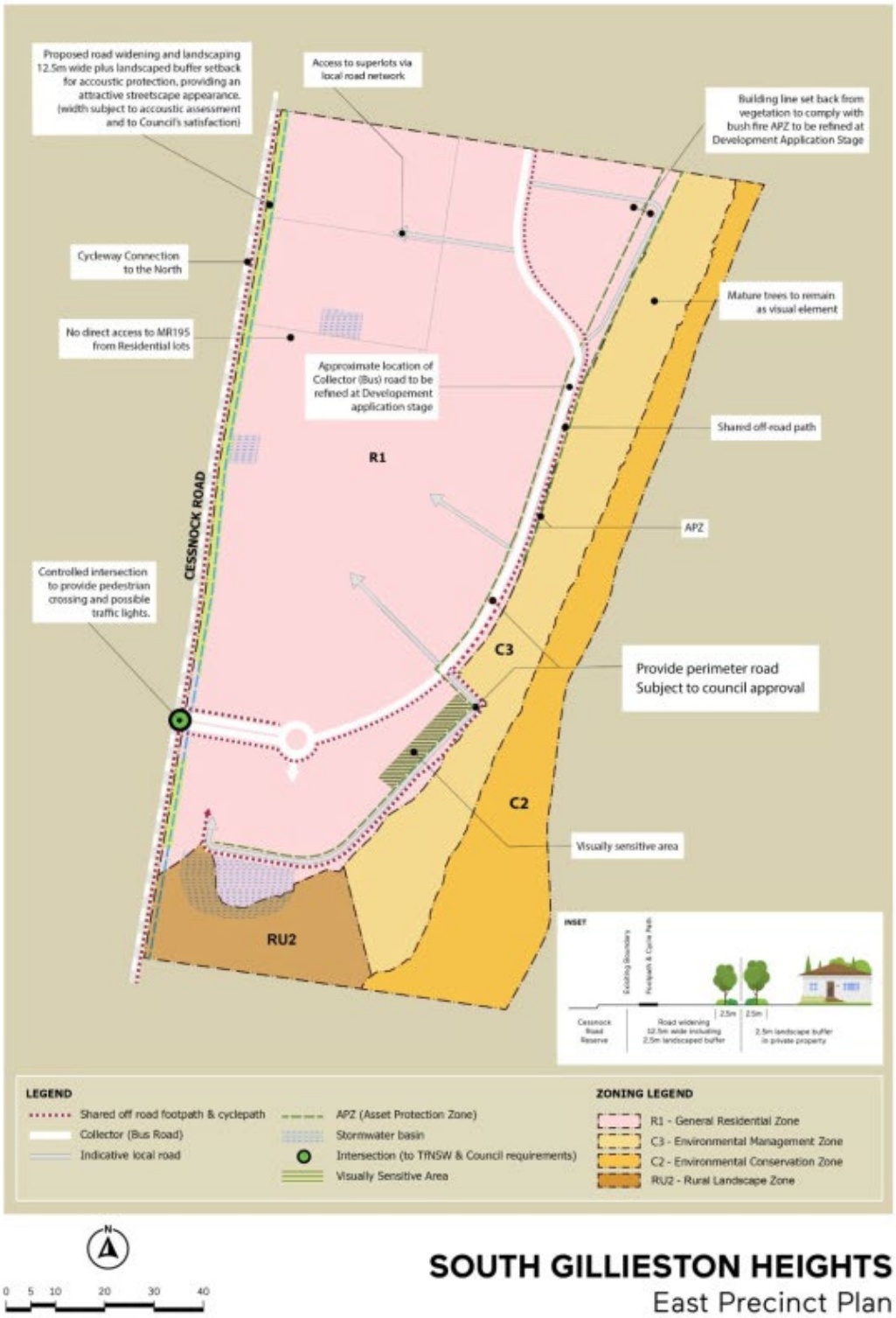
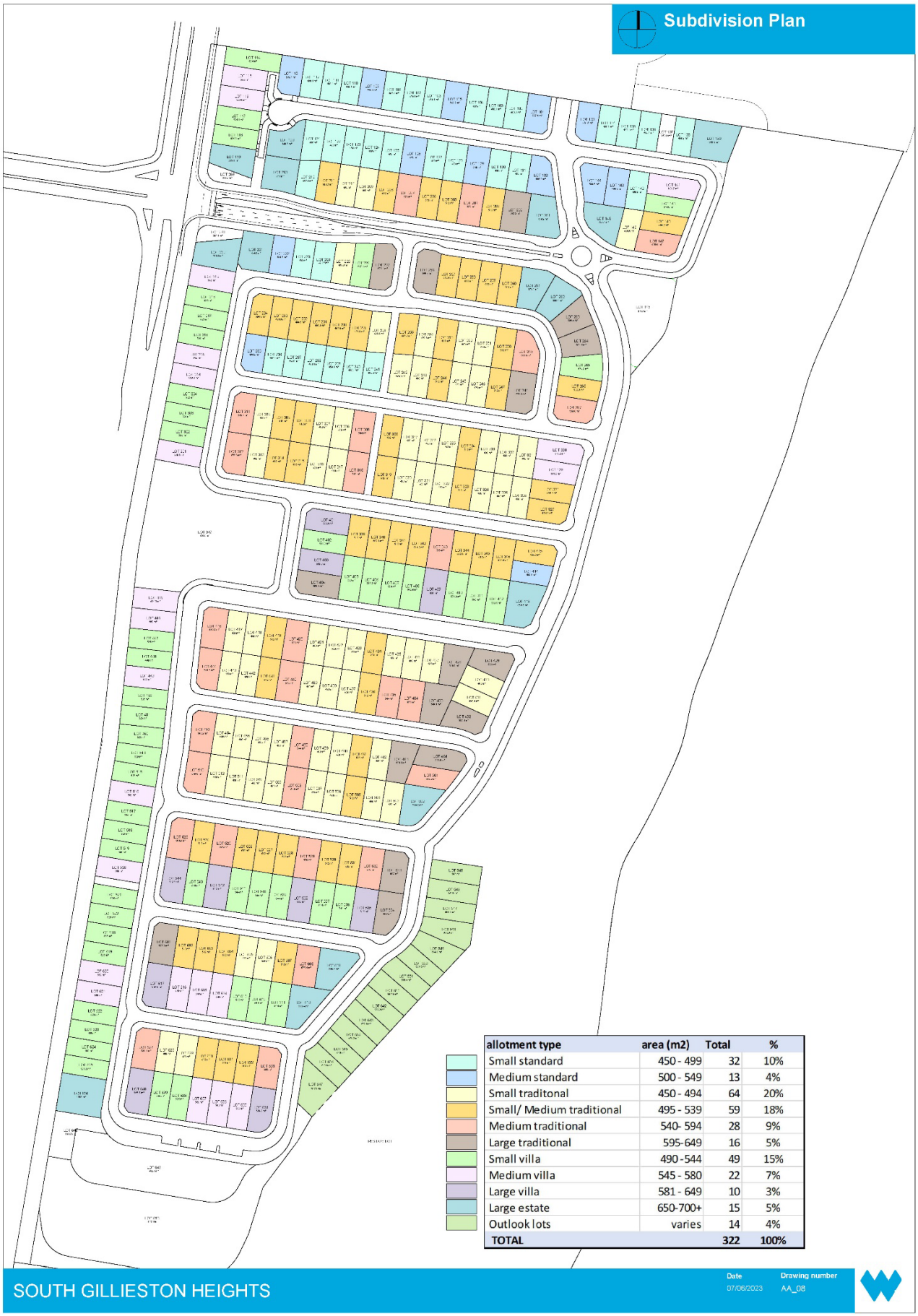


Figure 22: South Gillieston Heights - East Precinct Plan

Figure 5: Draft concept layout plan



allotment type	area (m2)	Total	%
Small standard	450 - 499	32	10%
Medium standard	500 - 549	13	4%
Small traditonal	450 - 494	64	20%
Small/ Medium traditional	495 - 539	59	18%
Medium traditional	540- 594	28	9%
Large traditional	595-649	16	5%
Small villa	490 -544	49	15%
Medium villa	545 - 580	22	7%
Large villa	581 - 649	10	3%
Large estate	650-700+	15	5%
Outlook lots	varies	14	4%
TOTAL		**322**	**100%**

4. Previous archaeological work

4.1 Heritage registers

4.1.1 Aboriginal Heritage Information Management System (AHIMS)

An extensive search of the AHIMS was carried out on the 12 May 2021 (AHIMS Client ID #590399; Annex 1) for the Subject Area with a Buffer of 1,000 m. A total of eight (8) Aboriginal cultural heritage sites were recorded within the search area and include Potential Archaeological Deposits (PAD) (n=3), Isolated Artefacts (n=3) and Artefacts and PAD (n=2) (summarised in Table 3 and Figure 6).

Table 3: Summary of AHIMS site features within the wider region of the AHIMS search

Site features	Total
Potential Archaeological Deposit (PAD)	3
Isolated Artefact	3
Isolated Artefact and PAD	2
Total	**8**

Table 4 below provides a summary of recorded sites registered on AHIMS and their proximity to the Subject Area.

Table 4: Summary of Aboriginal sites registered on AHIMS within AHIMS search area

Site name	AHIMS ID#	Site Context	Approximate distance from current Subject Area	Site Features	Reference
Cliftleigh 1	38-4-0898	Open Site	[redacted]	Isolated Artefact	MCH 2011, Umwelt 2011
GHS IF1	38-4-1036	Open Site	[redacted]	Isolated Artefact	MCH 2011
GHS PAD 1	38-4-1037	Open Site	[redacted]	PAD	MCH 2011
GHS PAD 2	38-4-1038	Open Site	[redacted]	PAD	MCH 2011
PAD GH1	38-4-1839	Open Site	[redacted]	PAD - After subsurface testing was determined "Not a Site"	RPS 2020
TH-PAD-002	38-4-1997	Open Site	[redacted]	PAD	Jacobs (RMS) 2019
TH-AS-001	38-4-1998	Open Site	[redacted]	PAD and Artefact Scatter	Jacobs (RMS) 2019
TH-IF-001	38-4-2015	Open Site	[redacted]	Isolated Artefact	Jacobs (RMS) 2019

Three (3) Aboriginal cultural heritage sites are located within 300 m of the Subject Area including:

- TH-IF-001 (AHIMS ID# 38-4-2015), an Isolated Artefact and PAD, is located within the Subject Area along the boundary. The Aboriginal cultural heritage site was recorded by Kayandel Archaeological

Services (KAS) in 2018 and described as a hammerstone with PAD (Jacobs 2019) (see Site card provided in Annex 2).

- TH-AS-001 (AHIMS ID# 38-4-1998) is a previously recorded Aboriginal cultural heritage site located within 100 m southwest of the Subject Area. The site consists of one artefact and one potential archaeological deposit (PAD) and is situated on the western side of Cessnock Road, near the southwestern corner of the Subject Area.
- TH-PAD-002 (AHIMS ID# 38-4-1997) is a previously recorded Aboriginal cultural heritage site located within 100 m southwest of the Subject Area. TH-PAD-002 is recorded as a PAD and is situated on the western side of Cessnock Road, near the southwestern corner of the Subject Area.

The boundary of Aboriginal cultural heritage sites TH-AS-001 (AHIMS # 38-4-1998) and TH-PAD-002 (AHIMS ID# 38-4-1997) do not overlap with the Subject Area. However, these sites contain similar landforms and exposure to that within the current Subject Area, providing an indication of its archaeological potential.

The five (5) remaining sites listed on AHIMS are located more than 300 m away from the Subject Area.

4.1.1.1 Assessment of robustness AHIMS data

It must be noted that care should be taken when using the AHIMS database to reach conclusions about site prevalence or distribution. The distribution of registered sites does not reflect patterns of occupation, but rather is often indicative of survey coverage and conditions.

The Hunter Valley is one of the most intensively studied regions in NSW. Archaeological studies over the last few decades within and around Gillieston Heights has been initiated as a requirement of planning proposals for residential development and rezoning projects. To date, the main research questions addressed by these studies include the presence, absence, and distribution of sites, and broad characterisation of where the sites occur within the landscape and their association with certain environmental features (e.g. distance from water).

4.1.2 Other registers

Searches of the Australian World Heritage Database, the Commonwealth Heritage List, National Heritage List, State Heritage Register, State Heritage Inventory, the Maitland Local Environmental Plan (LEP) (2011), Section 170 Heritage and Conservation Registers and the Register of the National Estate (non-statutory archive) were conducted on 20 May 2021. No listed heritage items or places are present within the Subject Area (Table 5).

Table 5: Listed heritage items in proximity to the Subject Area

Heritage Register	Items in the Subject Area	Items nearby to the Subject Area
Australian World Heritage Database	None located within the Subject Area	None located within close proximity to the Subject Area
Commonwealth Heritage List	None located within the Subject Area	None located within close proximity to the Subject Area
National Heritage List	None located within the Subject Area	None located within close proximity to the Subject Area
State Heritage Register	None located within the Subject Area	None located within close proximity to the Subject Area
State Heritage Inventory	None located within the Subject Area	None located within close proximity to the Subject Area

Heritage Register	Items in the Subject Area	Items nearby to the Subject Area
Schedule 5 of the LEP	None located within the Subject Area	None located within close proximity to the Subject Area
Register of the National Estate	None located within the Subject Area	None located within close proximity to the Subject Area

4.2 Previous heritage assessments of the Subject Area

Four (4) archaeological assessments have previously been undertaken whereby the current Subject Area has been assessed in part or as a whole. A summary of these is provided in Table 6 below.

Table 6: Aboriginal heritage assessments within the Subject Area

Author and year	Title and description
Roberts, 2003	**Gillieston Heights Investigation Area, Gillieston Heights. Report to Hunter Development Brokerage, Maitland, NSW.** This report was summarised in MCH 2011 and states that Roberts (2003) completed an assessment of various lots at Gillieston Heights as part of a rezoning application for housing subdivisions. The current Subject area overlaps with the southern portion of Roberts' assessment. The assessment identified no sites or PADs. Civil construction began on the site in February; however, all works ceased within 24 days as several stone artefacts were identified by MLALC. Subsequently Umwelt (2008) were engaged to complete monitoring and salvage works. The Roberts (2003) report was unable to be located. The portion excavated by Umwelt is located at least 800 m north of the current subject area.
RPS Group, 2017	**Aboriginal Due Diligence Heritage Assessment, Gillieston Heights, NSW. A report to Graham Warby CL/- Pulver Cooper and Blackley.** This report presents the results of an Aboriginal Objects Due Diligence Assessment for a portion of the current Subject Area; Lot 2 DP601226. The assessment was conducted to support a Planning Proposal for the rezoning of land at Gillieston Heights, NSW. The project area was inspected on 18 August 2017. No Aboriginal objects or places were identified in the project area.
Kayandel Archaeological Services (KAS), 2018	**Stage 2 PACHI Aboriginal Archaeological Survey Report, Unpublished Report prepared for Roads and Maritime on behalf of Jacobs for report: Jacobs, 2019. Cessnock Road Upgrade at Testers Hollow: Draft Aboriginal Cultural Heritage Assessment Report. A report to RMS.** KAS were engaged to complete a PACHCI Stage 1 and 2 field survey as part of the Cessnock Road upgrade at Testers Hollow (Jacobs 2019) which is located along Cessnock Road bordering the western boundary of the Subject Area. The site inspection identified an isolated artefact and PAD, TH-IF-001 (AHIMS ID#38-4-2015), which is located within the current Subject Area.
RPS Group, 2020	**RPS Group, 2020. Aboriginal Heritage Due Diligence Assessment, Cessnock Road, Gillieston Heights. A report to Rotor Sand Unit Trust.** This report presents the results of an Aboriginal Objects Due Diligence Assessment for a portion of the current Subject Area; Lot 1 DP 302745 and Lot 2 DP 302745. The assessment was conducted to support a Planning Proposal for the rezoning of land at Gillieston Heights, NSW. The project area was inspected on 14 October 2020. No Aboriginal objects or places were identified in the project area.

4.3 Previous heritage assessments of the wider region

Several heritage assessments have been undertaken within the vicinity of the Subject Area. While these reports mostly focus on the presence and absence of Aboriginal objects within a limited area of works, they provide an insight into the nature of the broader archaeological landscape and are useful in the development of a predictive model for the region. A summary of the most relevant heritage assessments undertaken in the surrounding region, as identified based on the search of the AHIMS report register and other archaeological reports, is provided in Table 7 below.

Table 7: Regional heritage assessments considered

Author and year	Title and relevance to the Subject Area
Kuskie and Kamminga, 2000	**Salvage of Aboriginal archaeological sites in Relation to the F3 Freeway near Lenaghans Drive, Black Hill, New South Wales. Volumes 1-3. Unpublished report to NSW Roads and Traffic Authority (Major Projects, Newcastle).** Kuskie and Kamminga (2000) established a general model of occupation strategies based primarily upon ethnographic research. The model discusses short-term or extended long-term occupation as well as likely locations of different foraging and settlement activities. The model can be applied to the current Subject Area in consideration of a lack of artefacts which would suggest low occupation compared to the presence of larger isolated finds such as a core (GH21-IF-2 and GH21-IF-4) and hammerstones (TH-IF-001 and GH21-IF-1) as indicators or low mobility and extended occupation. However, Kuskie and Kamminga (2000) state that where group mobility was high and campsites frequently shifted throughout the landscape, artefact assemblages are not expected to contain elements such as grindstones, heat-treatment pits, ovens and the diversity of implements frequently discarded at places of extended residential occupation. It may also have been the case that the location of particular activities could not be predicted by tool users, adding to the increased low-density scattering of artefacts over the landscape. Also, if individuals were opting to carry a number of stone tools during hunting and gathering activities and maintaining these tools rather than manufacturing new tools at each task location, the ratio of used tools to unworn flakes in these assemblages should be high.
ERM, 2002	**Waterford Estate: Stage 2 and 3. Aboriginal Archaeological Excavation. Report to Waterford Pty Ltd.** ERM (2002) undertook the test excavation of two PADs identified as part of an initial archaeological assessment at Waterford Stage 4 study area (ERM 2001) located approximately 2.2 km east of the current Subject Area. No artefacts were present within PAD2 whilst only five of the 21 test pits excavated in PAD1 contained artefacts. The excavated PADs are located on similar landforms (slopes ad crests) and exposure to that within the current Subject Area, which provides an indication of its archaeological potential.
MCH, 2004	**Singleton Golf Course Indigenous Cultural Heritage Assessment. Unpublished report to Overdean Group Pty Ltd.** MCH (2004) undertook an archaeological assessment for a proposed land rezoning of various lots off Maitland – Kurri Kurri Road (Main Road 195) in Cliftleigh. The assessment area was approximately 600 m south-west of the current Subject area. One isolated artefact was identified. The results of this cultural heritage assessment contribute to our understanding of the archaeological potential of the Subject Area.
Clarke and Kuskie, 2006	**Aboriginal Heritage and Cultural Mapping Project: Lower Shoalhaven River Valley – Stage 4A: Archaeological Predictive Modelling and Aboriginal Community Consultation. Unpublished report to DEC (NSW) National Parks and Wildlife Service, South Coast Region.**

Author and year	Title and relevance to the Subject Area
	Clarke and Kuskie (2006) undertook a study of 1650 hectares of conservation reserves within a 228 square kilometre area of the Lower Shoalhaven, around Nowra and Bomaderry. Although located within the Shoalhaven, their identification of two main resource zones have been applied to the current assessment. • The primary resource zones were identified as areas in which various of activities were likely to take place ranging from congregations of large groups of people through to transitory movement. • Within the secondary resource zones there was an identified high probability of what Clarke and Kuskie refer to as "nuclear/extended family base camps, camping by small hunting and/or gathering parties" (Clarke and Kuskie 2006: ii) as well as the associated hunting, gathering and transitory movement.
Dallas, 2007	**Aboriginal Archaeological Survey and Assessment Report Lost 114 in DP 703265 Cessnock Road Gillieston Heights, NSW. Report to Stockland Developments Pty Ltd.** Dallas (2007) assessed 30 ha of land in Gillieston Heights immediately north of the current Subject Area. The study area is bounded by Cessnock Road toward the west and Wallis Creek along the eastern side. The land comprises gently undulating terrain overlooking the broad alluvial flood plains of Wallis Creek. One isolated artefact (GHS-IF1) and two PADs were recorded during the assessment. The results of this cultural heritage assessment contribute to our understanding of the archaeological potential of the Subject Area due to the similarity of landforms and proximity to Wallis Creek.
MCH, 2008	**Proposed Land Rezoning at Louth Park. Indigenous Archaeological Assessment. Report to ADW Johnson.** MCH (2008) undertook an assessment of land at Louth Park approximately 1 km to the east of the current Subject Area. The study aimed to determine if the study area was suitable for future development as part of future rezoning for a draft Maitland Local Environmental Plan (2011). One artefact scatter and one isolated find were identified. The results of this cultural heritage assessment contribute to our understanding of the archaeological potential and predictive modelling of the Subject Area.
Umwelt, 2008	**Salvage Report – DECC s90#2714, Gillieston Heights, NSW. A report to the Department of Environment and Climate Change on behalf of Mirvac Homes Pty Ltd.** Umwelt conducted an excavation program for an estate development in Gillieston Heights approximately 800 m north of the current Subject Area. The project began as a monitoring and salvage; however, further variations for the methodology were approved based on the concentration of artefacts. In total, 548 artefacts were recovered. A total of 194 artefacts were recovered from a monitoring program during topsoil removal while a further 354 artefacts were recovered from the subsurface salvage program. Of the artefacts recovered silcrete was the most dominant form of raw material, making up more than 80% of all artefacts. Other raw materials recovered include mudstone, tuff, chert, hornfels, quartzite and basalt. The most dominant artefact type recovered was broken flakes with smaller occurrences of flakes, cores, retouched flakes, an axe blank and a manuport (Umwelt 2011:6). The monitoring area was located on a knoll with associated saddle and spur crest landforms in an area of simple slope. The soil profile of the test pits indicated that the entire area had been subject to a high level of historic disturbance and none of the artefacts recovered were assessed as being *in situ* (Umwelt 2011:6).
MCH, 2011	**Farley Investigation Area: Indigenous Archaeological Due Diligence Assessment. Report to ADW Johnson Pty Ltd.** This report presents the outcomes of an Aboriginal due diligence assessment. The assessment area was located approximately 5 m north-west of the current Subject Area. The survey undertaken as part of this assessment resulted in the identification of 4 new

Author and year	Title and relevance to the Subject Area
	Aboriginal cultural heritage sites (including one artefact scatter, two isolated artefacts, and a PAD). The study concluded that the availably and occurrence of water most influenced the location of sites stating that the "most common site locations are along reliable watercourses, gentle slopes and hilltops and ridges. Artefact density is greatest within 50 metres of watercourses and appears to be comparatively high on elevated landforms over 100 metres from water." (MCH 2011: 45).
Umwelt, 2011	**Section 87/90 AHIP Salvage of Artefacts from the Stage 4 to 11 Areas, Saddlers Ridge Estate, Gillieston Heights, NSW. A report to Mirvac Homes Pty Ltd.** This report presents the results of a program of monitoring of ground disturbance works conducted within the Stage 4 to 11 area of the Saddlers Ridge housing subdivision at Gillieston Heights. The works took place approximately 900 m to the northwest of the current Subject Area. The monitoring area consisted of a knoll with associated saddle and spur crest landforms and an area of simple slope. Drainage lines within the broader development area flow into Wallis Creek to the east. A total of four artefacts were recovered because of the monitoring work. This report is of relevance as it contributes to the archaeological record of the region and assists in establishing a predictive model for the nature and distribution of Aboriginal sites for the Subject Area.
Dallas, 2013	**Aboriginal Heritage Due Diligence Assessment for a Proposed Housing Development of Three Lots at 369 & 427 Cessnock Road, Gillieston Heights NSW.** Dallas (2013) undertook an assessment for a proposed development of Lot A DP 377804, Lot 1 DP 381940 and Lot 1 DP 663703 (known as 391 and 405 Cessnock Road), Gillieston Heights, approximately 300 m north of the current study area. The assessment was for an extension of the proposed housing development. The area was determined to be highly disturbed; no evidence of past Aboriginal use was identified, and the area was determined to be devoid of archaeological potential. It was considered and recommended that no further archaeological investigations or actions are required in relation to the proposed development.
Lucas, 2013	**Hunter Estates: A Comparative Heritage Study of pre 1850s Homestead Complexes in the Hunter Region. Volume 1: Historical Context and Survey of Sites. State of NSW and the NSW Office of Environment and Heritage. Online at http://www.environment.nsw.gov.au/resources/heritagebranch/heritage/media/13235huntesvol1.pdfMaitland LEP, 2011. Maitland Local Environmental Plan 2018 under the Environmental Planning and Assessment Act 1979. New South Wales.** This study is an independent and comprehensive comparative heritage study of pre 1850s homestead complexes located throughout the Hunter Region. In order to achieve this outcome, this study first aims to contextualise the homestead complexes found in the area and provides an overview of the historic and cultural phenomenon of the Hunter Estate. The study was useful in understanding some of the impacts of European settlement, not only on the environment and landscape, but also on the Wonnarua people.
Hughes et.al., 2014	**The Central Lowlands of the Hunter Valley, NSW: Why so few early sites have been found in this archaeologically rich landscape. Australian Archaeology (79):34-44.** This study looked at the geomorphology of the region. Their study states that while the Central Lowlands are abundant in Holocene-aged open stone artefact concentrations, very few traces of Pleistocene occupation have been recorded. They argue that most archaeological material older than 10,000 years has either been completely removed or widely dispersed due to bioturbation. This analysis is useful for the current analysis as it discusses the formation processes of the landform units within the Subject Area and expected deposits.

Author and year	Title and relevance to the Subject Area
RPS, 2015	**Aboriginal Due Diligence Assessment, Lot A DP377804 – 391 & Lot 1 DP663703 – 405 Cessnock Road, Gillieston Heights. A report to Maitland Property No. 1 Pty Ltd and Gillieston Heights Investments Pty Ltd.** RPS was engaged to prepare an Aboriginal Heritage Due Diligence Assessment for two parcels of land at 405 Cessnock Road. A visual inspection was conducted in October 2015 whereby no artefacts were identified during the visual inspection and the area was considered to have low archaeological potential due to the high level of disturbance including clearing, landform modification and dam construction and grazing.
RPS, 2017	**Aboriginal Due Diligence Heritage Assessment, Gillieston Heights, NSW. A report to Graham Warby CL/- Pulver Cooper and Blackley.** RPS (2017) conducted test excavations for a proposed subdivision at Gillieston Heights within Lot 229 DP1223484 which impacted upon a registered Potential Archaeological Deposit (PAD) (AHIMS# 38-4-1839). No surface artefacts were noted. Test excavations deemed the previously recorded PAD as "not a site". This report is of relevance as it contributes to establishing a predictive model for the nature and distribution of Aboriginal cultural heritage sites for the Subject Area.
Jacobs (RMS) 2019	**Cessnock Road Upgrade at Testers Hollow: Draft Aboriginal Cultural Heritage Assessment Report. A report to RMS.** The site inspection identified an artefact scatter with PAD, TH-AS-001 (AHIMS ID#38-4-1998), and a PAD, TH-PAD-002 (AHIMS ID#38-4-1997). Archaeological test excavation of TH-PAD-001 confirmed its archaeological sensitivity. Archaeological test excavations of TH-PAD-002 (AHIMS ID#38-4-1997) was confirmed to be of high archaeological sensitivity.

The immediate area surrounding the Subject Area has been the focus of numerous archaeological assessments over the past thirty (30) years. Assessments within the Subject Area have been undertaken in association with residential rezoning requirements. Syntheses of the earlier work in and around Gillieston Heights by archaeologists have set the groundwork for the characterisation of the region. Such studies highlight the inherent limitations of previous assessments with issues relating largely to the nature of past assessments which comprised of small study areas.

Archaeological assessments undertaken previously show that the most common site types to occur within the immediate surrounds of the Subject Area include isolated artefacts and PADs. The scientific significance of identified Aboriginal cultural heritage sites have been revised during the process and patterns of site distribution and impact of historical land use investigated during these assessments have been reviewed. Overall, the results of the field inspection, background research and literature reviews suggest that existing predictive models for the region can be applied to the Subject Area.

4.4 Existing predictive models for the Central Lowlands of the Hunter Region

A number of predictive models concerning Aboriginal occupation and settlement of the Hunter Region and Central Lowlands have been formulated and refined based on archaeological assessments undertaken in the region, as presented above (e.g. Dallas 2004, 2013; ERM 2001, 2001, 2009; MCH 2004, 2008, 2010; Roberts 2003; RPS Group 2017, 2020 and Umwelt 2008, 2009). According to RPS Group (2020: 9) the availability and occurrence of water primarily influenced the location of Aboriginal cultural heritage sites within the region stating that "sites will most commonly be found along permanent creeks and within and around swamp margins. Creek flats and banks are the topographical features most likely to contain sites". RPS's predictive modelling is in line with that provided by MCH (2011:44) for the Gillieston Heights region. Both of these models consider previous regional models from Kuskie and Kamminga (2000) and Clarke and Kuskie (2006) and can be applied to the current Subject Area:

- Artefact scatters, isolated artefacts and axe grinding grooves are the most likely site types to be encountered within the Subject Area.
- It is expected that archaeological cultural heritage sites will be found along watercourses, gentle slopes, hilltops and ridges.
- Artefact density is likely to be greater within 50 m distance from a watercourse while lower density sites are expected within 100 m from watercourses.
- Given the water sources available to the Subject Area, there is high potential for sites to occur, particularly low to medium density artefact scatters within 50 m of these watercourses.
- Higher density scatters may be present along high order streams and swamp margins.
- Any artefacts located are likely to be from the mid to late Holocene period.
- The dominant raw material for artefacts is likely to be mudstone or silcrete, with small amounts of quartz, chert, petrified woods and other raw materials.
- Sites are likely to be disturbed.

Figure 6: Location of AHIMS sites and Heritage items (Source: Niche)

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5. Landscape context

5.1 Preamble

Understanding the past and present environmental contexts of a Subject Area is requisite in any Aboriginal archaeological and cultural heritage investigation (DECCW 2010a). The landscape context may provide insight as to areas of land that may have been more intensively used by Aboriginal people in the past due to the presence of resources such as water, stone, plants and animals and other raw materials or landscape features associated with sustenance, shelter, tool manufacture and cultural activities. Furthermore, the landscape provides the context within which the material remains of past Aboriginal occupation may be preserved and detectable due to the movement of soil through geomorphic processes such as erosion or its removal from the landscape through past land use and disturbance (DECCW 2010a: 8). By considering these factors, an Aboriginal cultural heritage investigation may develop a sampling strategy for identifying any tangible Aboriginal heritage values within the Subject Area. It allows for an understanding of what activities would likely have taken place across the Subject Area in the past and the likelihood that any trace of these would have survived below the surface. The following section provides details of the environmental characteristics of the Subject Area.

5.2 Topography, landforms and hydrology

The Subject Area is in the Central Lowlands of the Hunter Region, a biogeographic region extending from approximately 120 km to 310 km north of Sydney. The surrounding landscape is made up of undulating floodplains and is characterised by low rolling to steeply sloping hills. The Subject Area consists of various landscape units including sandstone scarp; steep slopes and gullies; low hills; hill crests; and wetlands and alluvial floodplains. Localised rock outcrops, water erosion hazards and seasonal waterlogging are also present. In the north-western section of the Subject Area there is a first order tributary of Swamp Creek and various drainage gullies exist throughout. Along the eastern boundary is Wallis Creek, and its tributaries. Buttai Creek is also located to the south-east of the Subject Area. The southern-most portion of the Subject Area falls over part of Testers Hollow which is prone to seasonal waterlogging.

5.3 Geology and soils

The geological unit of the Study Area is Quaternary alluvium derived from Triassic sandstone. The underlying geology is predominantly Braxton Formation with smaller areas of Muree Sandstone, Greta Coal Measures, the Farley Formation and the Dalwood Group. The area consists of sandstone, siltstone, conglomerate, erratics, shale, coal seams and mudstone. Closer to the creek line the underlying geology consists of sand and minor clay deposits of the Sugarloaf, Broken Back and Myall Ranges. The Subject Area consists of Bolwarra Heights (GH) soil landscape, Middlehope (MI) soil landscape, and Wallis Creek (WC) soil landscape (Figure 7).

RPS (2013:17) surmise that various terrestrial and alluvial sources of silcrete have been identified, including at Bengalla, Saltwater Creek, Bulga, Lemington, Jerrys Plains, Singleton, and terraces along the Hunter River. The primary source of silcrete is thought to come from the alluvial and terrace gravels of the Hunter River while cobbles are sourced from creek banks. Volcanic tuffs occur in widespread seams throughout the Hunter Valley and are occasionally exposed in drainage lines or in cliff faces (primary sources), secondary sources of tuff may occur as river cobbles and can be a readily available source of the material. Sandstone outcrops were noted within the Subject Area during the site inspection; however, no grinding grooves were recorded.

Bolwarra Heights (BH) Soil Landscape

This soil landscape generally consists of approximately ≤25 cm of brownish black gravelly loam topsoil (A^1 Horizon) followed by 15-20 cm of gravelly fine sandy clay loam (A^2 Horizon) which overlies 75-103 cm of yellowish-brown pedal clay (B^2 Horizon). The yellowish-brown pedal mottled clay is rarely seen and usually occurs at a level of >185 cm. Some landscape limitations include localised steep slopes where the loamy topsoil is rare. Mass movement hazards, seasonal waterlogging, water erosion hazard, shallow soils, foundation hazards, and rock outcrops are other limitations which occur in the Bolwarra Heights landscape.

Middlehope (MI) Soil Landscape

This soil landscape generally consists of gravelly brown loam (A^1 Horizon), bleached dull brown clayey sand (A^2 Horizon), and mottled dull yellowish-brown clay (B horizon). Commonly the landscape consists of 10-25 cm of gravelly brown loam directly overlying bedrock with topsoil depth expected to be <25 cm deep. The landscape has limitations which include steep slopes, high run-on, water erosion hazard, shallow soils, foundation hazards, rock outcrops, and rock fall hazards.

Wallis Creek (WC) Soil Landscape

This soil landscape is made up of brownish black greasy clay loam (A^1 Horizon), brown loose loamy sand (A^1 Horizon), and pale loose clayey sand (A^2 Horizon). Within the Subject Area one can expect approximately 10-55 cm brown loose loamy sand overlying pale loose clayey sand to greater, varying, depths.

The typical soil profile observed across the Subject Area during the test excavation program is summarised below, while Plate 1 and Plate 2 provide a photo and section drawing of an example of the typical stratigraphy as observed in test pit 1.

- Context 001 = Dark brown topsoil. Sandy loam with high inclusions of gravel and roots
- Context 002 = Transition to lighter brown sandy loam with some root inclusions
- Context 003 = Dark brown sandy loam with some root inclusions
- Context 004 = Mottled brown-orange sandy clay with orange mottling and some root inclusions

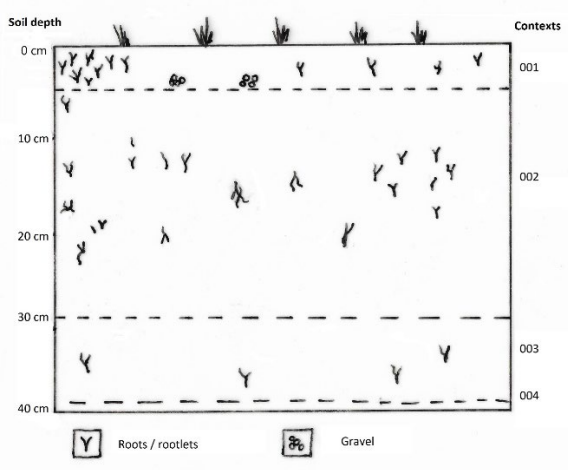


Plate 1: Section drawing of typical soil profile as observed in TP 1 Northern Wall

Plate 2: Photo of typical soil profile as observed in TP 2 Northern Wall

Soil profiles were relatively consistent across the Subject Area despite differences in soil landscape units. The test pits were associated with relatively consistent depths of between 20 cm and 40 cm where the mottled brown-orange sandy clay was reached.

5.4 Vegetation

The Subject Area, once consisting of tall open-forest vegetation, is now situated within a landscape that is made up of cleared land where the occasional forest red gum (*Eucalyptus tereticornis*) occurs on the floodplains and prickly-leaved paperbark (*melaleuca styphelioides*) in the backswamps while wattle (*Accacia irrorate*) and swamp oak (*casuarina glauca*) are observable along drainage lines. Other species of vegetation include spotted gum (*Eucalyptus maculata*), broad-leaved ironbark (*E. fibrosa*), arrowleaved ironbark (*E. crebra*), and grey gum (*E. punctata*), paperbark (*Melaleuca linearifolia*), rough-barked apple (*Angophora floribunda*), and forest oak (*Allocasurina torulosa*). The subject area consists of dense ground vegetation, limiting ground surface exposure and visibility.

5.5 Past land use and disturbance

Gillieston Heights is a suburb of the City of Maitland Local Government Area. The suburb was originally established as a coal mining village for the purpose of housing coal miners employed in the local mines. Local infrastructure such as the roads, low-density residential, and railway lines have been implemented to support the local miners. Changes to the environment and surrounding landscape were brought about by extensive European land use. Some of the more prominent disturbances to the landscape within the Hunter Valley have been described by Lucas (2013:9) and can be applied to the Gillieston Region:

- The rapid drainage and subsequent use for agricultural purposes of the large swamps and wetlands that were once dominant features of areas such as in the Paterson Valley that can be hardly traced as landscape features today.
- The rapid removal of the original rich and diverse riparian riverbank vegetation along all of the river systems right up to their headwaters in places and its replacement over time by regrowth trees and introduced species such as willows, the creation of extensive tracts of both improved pasture and lands modified for monoculture agriculture and expanding suburbia around the first township sites.
- Extensive creek and river gullying, erosion, and channel flow changes that have occurred from early over-clearing, animal grazing and dam construction.

Some of the archaeological assessments within the vicinity of the Subject Area have noted the lack of stratigraphic integrity of soil deposits and disturbances (RPS 2008, MCH 2011, Umwelt 2011, Jacobs 2019). Archaeological test excavations (e.g., Umwelt 2011) have confirmed that artefacts salvaged from test pits are rarely *in situ*. Mr Scott Franks from Tocomwall has stated that the Subject Area has had fill deposited over original ground surface. Stratigraphically he expects that the soils of the area would be alluvium then artificial clay capping followed by the original ground surface. Mr Scott Franks informed Niche that the area was once a market garden. Floods in 1955 saw the removal of large amounts of sediment / mud in low lying areas.

Geotechnical testing completed in 2017 by Qualtest Laboratory and borehole testing completed in 2020 by Practical Environmental Solutions indicates that elevated areas, such as crests, consist of at least 0.25 m of topsoil and 0.65 m of residual soil while the lower slopes consist of at least 0.10 m of topsoil followed by 0.10 m of slope wash and 0.65 m of residual soil. Fill deposits were noted as minor filling along the driveway to the existing dwelling on Lot 2 DP601226. There were no other fill deposits observed. Land disturbance and soil contamination was greatest around dwellings and associated building structures.

Historical aerial photos can provide further information about previous land use and impact on the ground surface. Details of the available historical aerial photos are summarised in Table 8 and Figure 8. The overall landscape context of the Subject Area provides a picture of a landscape that has seemingly remained undeveloped; however, the local area has been greatly disturbed since European settlement through actions associated with land clearing and usage.

Table 8: Historical mapping and aerial photos

Year	Description
1954	A historical aerial image of the Subject Area from this time show that by this period the landscape was still distinctly rural. The areas surrounding the Subject Area are also largely cleared. The rural buildings within the Subject Area already exist as do rural features such as dams and tracks.
1977	The image taken in 1977 shows that the landscape remains largely unchanged. Changes to some of the buildings immediately surrounding the dwellings has changed slightly.
2001	Modern aerial imagery of the Subject Area shows that the landscape remains largely unchanged. Changes to the rural buildings has occurred with much of what existed in the 1954 map being altered. New buildings and access track has been added to Lot 1 DP601226. Some trees have also been removed from around the Subject Area.

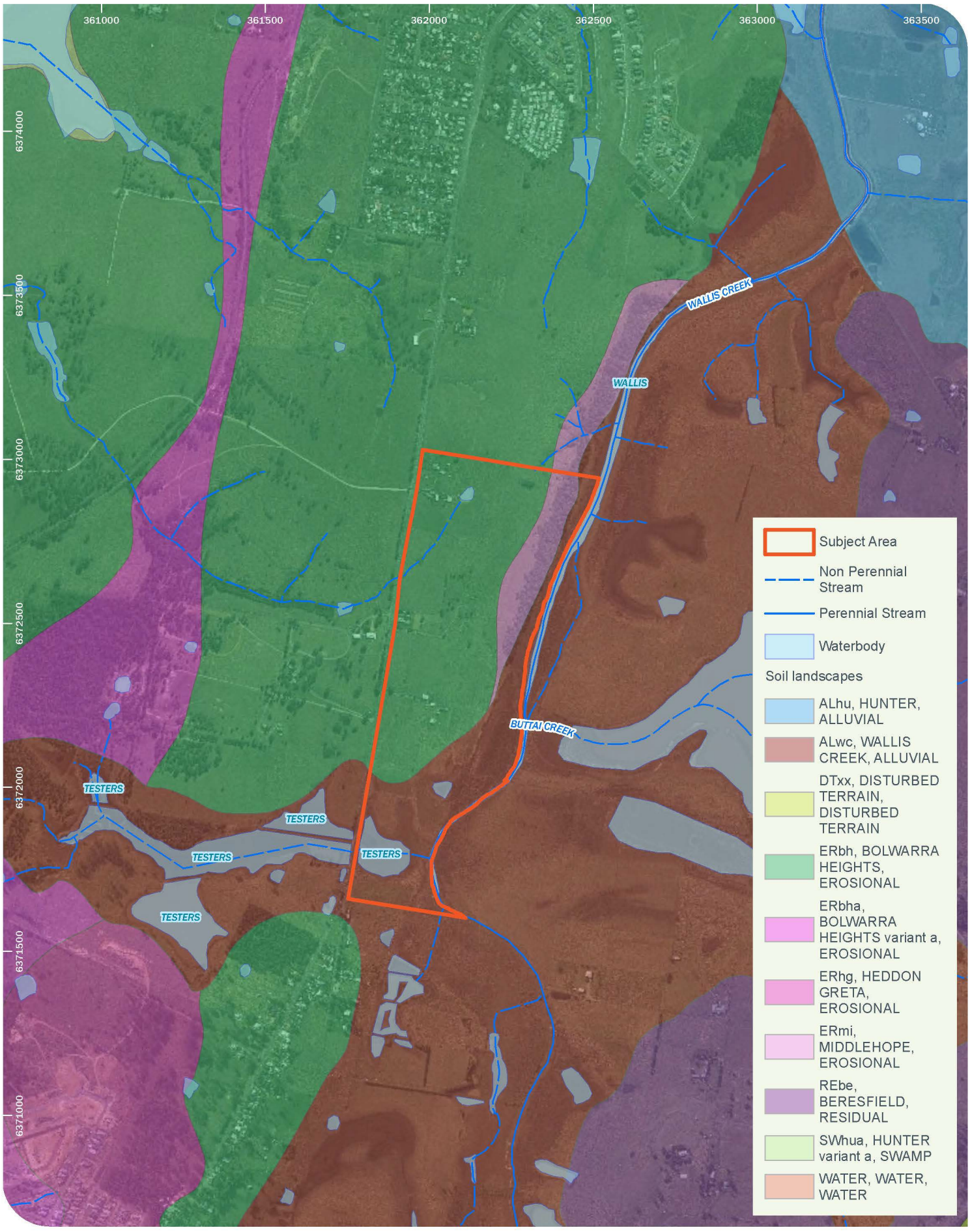
5.6 Synthesis

Water is one of the most important resources to human occupation in a landscape and is considered the primary factor for the prediction of Aboriginal sites potential presence in a landscape. Across NSW, there is a strong correlation to the presence, frequency and density of Aboriginal objects with the abundance and permanency of water sources. Areas within 200 m of water are identified by the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales (*DECCW 2010c*)* as landscape features likely to indicate the presence of Aboriginal objects.

The Subject Area is located along Wallis Creek, approximately 2 km from Swamp Creek, and 5 km south-west of the Hunter River and thus considered to be located within primary and secondary resource zones described by Kuskie and Kamminga (2000) for the region. The landscape of the Subject Area is comprised sandstone scarps; steep slopes and gullies; low hills; hill crests; and wetlands and alluvial floodplains surrounded by several fresh water sources including Testers Hollow, Swamp Creek, Wallis Creek and Buttai Creek and their tributaries. Combined, these sources of water would have offered access to fresh drinking water. Occupation in this area would have involved hunting and gathering activities by small to possibly large groups of people. The Subject Area's close proximity to Swamp Creek (<2 km) and Wallis Creek (immediately to the east of the Subject Area), both permanent water sources, would have been culturally significant as an area offering abundant resources and elevated areas ideal for the gathering of people and camping. The elevation of the Subject Area overlooking Wallis Creek and Testers Hollow as well as landmarks in the distance would have been a primary factor in site occupation.

Excavations less than 200 m outside of the Subject Area (Jacobs 2019) to the southwest show artefact rich deposits extending up to 50-60 cm in silty loams below the current ground surface. Dating suggests deposits are likely to be at least mid-Holocene in age. In their interpretation of the results, Jacobs (2019) suggests that the excavated site is likely to be an intermittent campsite linked to others known for the Wentworth Swamp Wallis Creek cultural landscape focusing on the margins of wetlands during the mid to late Holocene. Jacobs (2019) concluded that the low density (<1 artefact/m^2) of surface artefacts does not appear to be an indicator of subsurface potential within the region. This can also be seen within the Subject

Area itself where Roberts (2003) had initially recorded no archaeological cultural heritage sites prior to artefacts being found during construction.



niche Environment and Heritage

0 300
m
GDA 1994 MGA Zone 56

Soil landscapes and hydrology in the local area

Gillieston Heights Land Rezoning

Niche PM: Deirdre Lewis-Cook
Niche Proj. #: 6617
Client: Walker Corporation Pty Ltd

Figure 7

Figure 8: Historical aerial photographs (Source: Niche)

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6. Regional character

6.1 Regional archaeological context

It is now proposed that Aboriginal occupation of Australia dates back at least 65,000 years based on results from Madjedbebe, a rockshelter located in northern Australia (Clarkson et al. 2017). Occupation of the Central Lowlands, where the Subject Area is located, has been dated to at least 20,000 years, possibly longer (Lucas 2013:11). Work in the Central Lowlands has aimed to understand the nature of Aboriginal occupation and determine the nature of land use. This theme often seeks to identify and explain archaeological patterning in site type, content and distribution. General theories have been developed outlining the relationship between land use patterns and the resulting archaeological evidence. Over 98% of Aboriginal archaeological sites recorded within the Hunter Valley to date are stone artefact scatters and isolated artefacts. Less common site types include painted and stencilled art in rock shelters, rock engravings and axe grinding grooves, rock shelters with occupation evidence, open shell middens on the coast, burials, scarred and carved trees, stone arrangements, stone quarries, and ceremonial sites (Lucas 2013:12).

The extent of archaeological research within the Hunter Valley, where the Central Lowlands are located, has revealed more than 3,500 sites (ERM 2004), and has helped to establish likely patterns of occupation and movement throughout the landscape. Reports mentioned in Section 4.3 show results which supports the archaeological models for the area. MCH (2011) states that, while a number of models have been developed for the Hunter Valley, the model developed by Kuskie and Kamminga (2000) is thus far the most widely accepted model. Kuskie and Kamminga (2000) explore short-term or extended long-term occupation, discuss the theme of occupational fluidity through time, and make some predictions about the likely location of different foraging and settlement activities and assemblage patterns. According to MCH (2011:48-50) the more transitory a group is within the environment the lower the expected complexity of a site. Table 9 has been taken from MCH (2011) and is an adaptation of Kuskie and Kamminga (2000) with additional information in relation to sites and distance from water.

Table 9: Site descriptions (after Kuskie and Kamminga 2000 in MCH 2011:66)

Occupation Pattern	Activity Location	Proximity to Water	Proximity to Food	Archaeological expectations
Transitory movement	All landscape zones	Not important	Not important	• Assemblages of low density and diversity • Evidence of took maintenance & repair • Evidence for stone knapping
Hunting &/or gathering without camping	All Landscapes	Not important	Near food resources	• Assemblages of low density and diversity • Evidence of took maintenance & repair • Evidence for stone knapping • High frequency of used tools
Camping by small groups	Associated with permanent & temporary water	Near (within 100 m)	Near food resources	• Assemblages of moderate density and diversity • Evidence of took maintenance & repair • Evidence of stone knapping & hearths

Occupation Pattern	Activity Location	Proximity to Water	Proximity to Food	Archaeological expectations
Nuclear family base camp	Level or gently undulating ground	Near reliable source (within 50 m)	Near food resources	• Assemblages of high density and diversity • Evidence of took maintenance & repair & casual knapping • Evidence for stone knapping • Heat treatment pits, stone lined ovens • grindstones
Community based camp	Level or gently undulating ground	Near reliable source (within 50 m)	Near food resources	• Assemblages of high density and diversity • Evidence of tool maintenance & repair & causal knapping • Evidence for stone knapping • Heat treatment pits, stone lined ovens • Grindstones & ochre • Large area >100 sqm with isolated camp sites

6.2 Post-1788 ethnology and history

According to Tindale's catalogue of Australian Aboriginal (1974) groups, the current Subject Area falls within the boundaries occupied by the Wonnarua tribal group. The Wonnarua tribal group is also known as Wonnuaruah, Wannerawa, Wonarua, Wonnah Kuah.

The boundaries of the Wonnarua extends from the Upper Hunter River from a few kilometres above Maitland west to the Dividing Ranges. The traditional territory of the Wonnarua was bounded to the north by the Geawegal people, to the north-east by the Worimi people, to the southeast by the Awabakal people and to the south by the Darkinjang (Tindale 1974:201). Family groups belonged to clans who were united by language and cultural affinities with ties to specific areas of land. Oral tradition of the Wonnarua people tell of a creation spirit called Baiami (Biame, Baayami, Baayama or Byamee), also known as Koin. Baiami, who was the creator of all things and the keeper of the valley. The creation spirit appears in the oral tradition of several Aboriginal peoples including the Wonnarua, Kamilaroi, Eora, Darkinjung, and Wiradjuri people. The Dreaming story tells of how Baiame, the sky father, came down from the sky to the land and created the rivers, mountains and forests. He then gave the people their laws, traditions, songs and culture. Baiami is said to have also created the Bora for male initiation rights (Leaman and Hamacher 2019).

According to Miller (1886:353) the Wonnarua tribe numbered around 500 in 1841. Due to European settlement and restrictions placed on traditional practices and ways of life, their numbers greatly diminished in the years that followed. The Wonnarua people were semi-nomadic hunter gatherers. They dressed in opossum-skin cloaks and fabric spun from opossum fur and in their possession, they carried spears, wommera, shields, and war-boomerangs.as well as bags made from platted swamp grass, koolaman, stone tomahawks and flint knives. Food resources included terrestrial animals and plants, hunting for kangaroo and emu as well as other animals and reptiles and foraging for a variety of roots which were roasted or baked. Fish were caught with nets and three-pronged spears from canoes made of sheets of bark cut from suitable trees (Miller 1886:353).

The arrival of European prospectors to the area of Gillieston Heights in 1888 and the establishment of their mining colony that followed had pervasive and devastating effects on the local Aboriginal people. Foreign disease killed many of Wonnarua people as well as illness such as bronchitis and rheumatic fever resulting from the disruption of traditional practices and ways of living (Miller 1886:352). Late in the nineteenth

century, European prospectors and miners began taking up land in what is now Gillieston Heights, leading to competition for resources and the alienation of Aboriginal people. Access to both specialised and everyday resources (such as water) and the clearing of the land greatly impacted traditional practices and ways of living, causing significant social disruption between Aboriginal groups, and pressure between Aboriginal people and the ever-increasing European population. Those who survived the impacts of disease, alienation from food sources and country and relocation to designated missions continued to live a semi-traditional life on the peripheries of European settlements. Lucas et.al. (2013:23) suggests that local Aboriginal people may have used pockets of "discrete" land that was of no interest to early farmers. This land would have been the only land available for occupation and travel after settlement. Potential landscapes include elevated hills, or the margins of lower swamps and wetlands situated away from the first homesteads, convict accommodations, and workstations.

Various Wonnarua groups throughout the Hunter Valley has been working hard to increase cultural visibility within the community. This has included promoting the history and culture of the Wonnarua people, supporting the health and education standards of the community, and seeking out opportunities for sustainable development. Private land ownership has perhaps prevented local Wonnarua from accessing the lands within the Subject Area. Despite no previous cultural significance being expressed through Aboriginal consultation as part of previous archaeological assessments, the current site inspection with Carl McDonald (MLALC) highlighted some PADs of cultural significance owing to elevated areas in close proximity to water as well as the views of the watercourses and landscape from elevated areas.

6.3 Synthesis of local and regional character of Aboriginal land use and its material traces

The Subject Area is located in the Central Lowlands, a physiographic region of Maitland characterised by its open undulating hilly landscape with alluvium rich soil underlain by the sedimentary geology. While occupation of the Australian continent has been dated to around 65,000 years, occupation for the Central Lowlands is dated to around 20,000 years. Hughes et.al. (2014) state that while the Central Lowlands is abundant in Holocene-aged Aboriginal cultural heritage sites, very few traces of Pleistocene occupation have been recorded. They argue that most archaeological material older than 10,000 years has either been completely removed or widely dispersed due to events of bioturbation (2014:34).

Past Aboriginal land use indicated by the results of previous archaeological work in the region (reviewed in Section 4 of this report) suggests that artefact scatters and isolated artefacts are by far the most common archaeological cultural heritage site type occurring in the region, with these site types usually located within close proximity to water. The number of sites as well as artefact volume decrease with distance from water. Aboriginal sites are usually found on landforms such as creek lines, crests/ridges, and slopes. According to MCH (2011:32) there also appears to be a secondary peak in site numbers and artefact volumes at distances over 100 m from water. Jacobs (2019) discussed the Wentworth Swamp Wallis Creek cultural landscape and suggest that occupation was focused along the margins of wetlands during the mid to late Holocene.

The Subject Area is potentially reminiscent of an occupation site linked to other known sites within the landscape (see AHIMS search results for the closest known sites). Previous assessments confirm that the low density (<1 artefact/m^2) of surface artefacts does not appear to be an indicator of subsurface potential within the region.

7. Predictions

The predictive model for the Subject Area has been developed based on a review of landscape and archaeological data from previous assessments within the region. As such, the following criterion have been used to determine the archaeological potential (both surface and subsurface) for the Subject Area:

- Patterns of Aboriginal land use and occupation of the region, to identify those landscape areas where material was likely to have been deposited.
- Distribution of known sites within the Subject Area and broader Central Lowlands, to identify the landforms known to contain archaeological materials (and patterning of those materials).
- Geomorphic evolution, including soil characteristics, of the Subject Area, to identify those natural processes that may have affected the archaeological resource.
- Likely detection of archaeological materials within the Subject Area, considering the nature of the resource (surface/ sub-surface materials) and ground surface visibility constraints.
- The nature of past land use within the Subject Area to consider the likely level of integrity of any Aboriginal objects found.

Based on these criteria, the following predictions concerning the presence or absence of Aboriginal cultural heritage site types have been formulated specific to the Subject Area:

- Artefact scatters and isolated artefacts are the most likely Aboriginal site types to occur on very gently to moderately inclined slopes in close proximity to Wallis Creek and Testers Hollow.
- Potential Archaeological Deposits (PADs) are likely to occur where soil profiles remain intact and close to the Swamp Creek tributary, Wallis Creek and Testers Hollow, low hills, and hill crests.
- The occurrence of sub-surface material is not predicated on finding Aboriginal objects upon the surface and vice versa.
- Culturally modified trees (scarred or carved) are unlikely to occur within the Subject Area due to historic clearing of vegetation and the absence of remnant woodland areas.
- The sandstone scarp present within the Subject Area has the potential to contain axe grinding grooves.
- Aboriginal burials, though rare, may occur within the Subject Area due to the presence of suitable soils landscapes (deep, soft sediments, such as Aeolian or alluvial deposits). Burials would only be visible as surface expressions if they had been exposed by erosion or as the result of animal or human activities.
- Aboriginal places are places of cultural significance to Aboriginal people. No Aboriginal Places have been declared within the Subject Area or listed on AHIMS (https://www.heritage.nsw.gov.au/about-our-heritage/aboriginal-cultural-heritage/).

Although the Subject Area has seemingly remained undeveloped, the clearing of vegetation and agricultural land use within the area has been extensive and may have impacted the integrity of the soil profile and consequently the likelihood of finding *in-situ* artefacts in some areas. The likelihood of finding Aboriginal objects in the Subject Area is currently unknown due to a lack of surface visibility; however, there is potential for archaeologically rich subsurface deposits within the Subject Area. Section 4.5 provides information on land use and disturbance relating to land use and geotechnical testing. Land disturbance and soil contamination was greatest around dwellings and associated building structures.

Caution must be taken when using predictive models as archaeological investigations continue to reveal patterns and information that challenge current understandings. As such, these models must continue to be assessed, tested and refined based the results from present and future investigations. The following section of this report looks at the sampling strategy and field methods used in the Aboriginal archaeological assessment of the Subject Area.

8. Sampling strategy

8.1 Archaeological survey

The Subject Area is made up of five (5) discrete landform units: sandstone scarps; steep slopes and gullies; low hills; hill crests; and wetlands and alluvial floodplains. Due to the extent of the impact footprint, the varying landform units within, and the dense ground coverage, the survey objective was to sample all landforms within the Subject Area and target areas of higher ground exposure and visibility. The survey strategy for the current archaeological assessment was to relocate the previously recorded Aboriginal cultural heritage site and to sample all landform units.

8.2 Test Excavation Sampling Strategy

The test excavation methodology and sampling strategy was informed by the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales (DECCW 2010)*. The sampling strategy for the testing program is outlined below and includes stratigraphic archaeological excavation trenches.

The areas to be sampled have been determined by the proposed projects' impact areas. Some sections of the Subject Area have not been selected for sampling, namely portions of PAD that are not located within areas of proposed impact.

8.2.1 Stratigraphic trenches

The test excavations targeted the location of the following Aboriginal cultural heritage sites: GH21-PAD-1 (AHIMS ID# 38-4-2120), GH21-IF-3 (AHIMS ID# 38-4-2118), GH21-PAD-3 (AHIMS ID# 38-4-2121), and GH21-PAD-4 (AHIMS ID# 38-4-2122). These locations were targeted as they would be directly impacted by the proposed development and are areas assessed as consisting of PADs. The test excavation program aimed to determine whether the PADs were associated with sub-surface archaeological deposits, and if so, to identify the nature and extent of these archaeological deposits.

Between one (1) and 15 stratigraphic trenches measuring 50 cm x 50 cm would be excavated by hand within each of the areas identified as PAD (Table 10). Only the portions of PAD located within impact areas will be tested.

The purpose of the test pits will be to:

- Establish the stratigraphy of potential subsurface deposits.
- Identify the presence or absence of Aboriginal objects.
- Collect samples for radiocarbon dating.
- Collect soil samples.
- Assist in the identification of archaeologically sterile unit should that occur within the impact footprint.
- Determine the extent of the subsurface deposit through the placement of test pits outside the recorded boundaries of the Aboriginal cultural heritage sites.

It is anticipated that a maximum of 7.75 m² would be excavated during the test excavations. This is approximately 0.001 % of the total area of the Subject Area, being 570,000 m².

Details of test pits for each site are presented in Table 6.

Table 10: Details of test pits for each PAD

Site name	Site area (m²)	Estimated Maximum number of excavation squares*	Excavation area (m²)	% Of total area
GH21-PAD-1	14,830	15	3.75	0.03
GH21-IF-3	13,435	12	3.0	0.02
GH21-PAD-3	635	1	0.25	0.04
GH21-PAD-4	3,132	3	0.75	0.02

*Test pit numbers represent estimates made during the development of the project methodology and therefore may vary from the final number of test pits actually excavated during the test excavation program.

9. Methods

9.1 Assessment methodology

An assessment methodology was developed and is outlined below and presented in Appendix B of, the ACHA (Niche 2021).

The following methods were used to identify archaeological resources, heritage values and significant cultural themes for the Subject Area:

- Aboriginal community input – this was sought throughout the project via the consultation process, participation in archaeological fieldwork and other correspondence.
- Archaeological research – this included landscape characterisation, analysis of previous archaeological works in the region and field survey.

9.2 Sensitive cultural information – Management protocol

During the consultation process the proponent and Niche provided the opportunity for the RAPs to provide cultural information, including a statement of the value of identified sites and other matters. The input points were listed within the survey methodology that has been included in Appendix B, information will be accepted at any point during the project prior to the finalisation of the ACHA and AR.

RAPs were made aware that proponent and Niche staff would seek cultural information and supporting evidence in regard to matters of cultural value.

In the event that a stakeholder had sensitive or restricted public access information it was proposed that the proponent and Niche would manage this information (if provided by the Aboriginal community) in accordance with a sensitive cultural information management protocol. It is anticipated that the protocol will include making note of and managing the material in accordance with the following key limitations as advised by Aboriginal people at the time of the information being provided:

- Any restrictions on access to the material.
- Any restrictions on communication of the material (confidentiality).
- Any restrictions on the location/storage of the material.
- Any cultural recommendations on handling the material.
- Any names and contact details of persons authorised within the relevant Aboriginal stakeholder to make decisions concerning the Aboriginal material and the degree of authorisation.
- Any details of any consent given in accordance with customary law.
- Any access and use by the registered Aboriginal stakeholders of the cultural information in the material.

No sensitive or restrictive material provided by the representative of MLALC to Niche during the site inspection to be included within the ACHA or archaeological report.

9.3 Archaeological and cultural heritage survey field methods

A comprehensive site survey was competed by James McGuinness (Niche) and Carl McDonald (MLALC) over three days from 18 to 21 August 2021. The survey targeted the five different landform units as well as the area in which the AHIMS registered site was previously recorded. Opportunistic inspection of exposures and a systematic survey across the Subject Area was undertaken during the survey.

The survey methodology is outlined below:

- A hand-held non-differential GPS unit was used to record all tracks and appropriate site data for the survey with spatial data recorded in terms of Datum and grid co-ordinates (i.e. Zone, Easting, Northing) as per Requirement 8b of The Code.
- Representative photographs were taken of survey units, different visibility levels, exposures and disturbed areas.
- All Aboriginal sites, artefacts and/or features identified during the survey were flagged and their location recorded using a hand-held non-differential GPS unit. The context of flagged sites, artefacts and/or features were additionally photographed, and the following details recorded on recording forms: description, photographic recording, context of the recorded site sketched, and the boundary/extent recorded using a hand-held non-differential GPS unit.
- Different types and levels of exposure were recorded. Exposure was defined as an estimate of the area which has a likelihood of revealing buried artefacts and/or deposits. Exposure is represented as a percentage of land for which erosion and exposure was sufficient to reveal archaeological evidence on the surface of the ground. As Burke and Smith (2004: 78-80) phrase it: exposure refers to what reveals. Exposure types are based on the results of erosional processes (e.g. sheet wash, gullying, blow-outs, animal tracks or pads, vehicle or walking tracks etc).
- Archaeological visibility was recorded, defined as the amount of bare ground on the exposures which might reveal artefacts or other archaeological materials. As Burke and Smith (2004: 78-80) phrase it: visibility refers to what conceals. Visibility is affected by vegetation, leaf litter, stone ground, introduced material etc.
- Effective survey coverage area was also recorded (the area of the survey unit multiplied by the visibility percentage and exposure percentage and given in either square meters or hectares) as per Requirement 9 of The Code.

9.4 Test Excavations

The test excavation was carried out over five days from 13 to 17 December 2021 by personnel listed in Table 1. The test excavation methodology was prepared in accordance with Requirements 16 and 17 of the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW 2010b). The approach for the testing program is outlined below and includes:

- Test excavation pits were excavated in 50 cm x 50 cm pits and were placed to target areas designated for impact by the proposed works (See Section 2). The locations selected for testing within the PADs was guided by on-the-ground observations of best placement at the time of the test excavation program. The exact locations were determined by the Excavation Director, based on the advice of the field team and RAPs.
- Test excavation pits were placed 40 m apart on a systematic grid appropriate to the scale of the areas being investigated.
- The excavation pits were hand excavated.
- Excavation was carried out using 5 cm spits for the first test pit within each transect, and then 10 cm spits for each test pit thereafter, until one of the following was reached:
    - the base of artefact bearing layers;
    - a viable B horizon indicating a base of artefact layer;
    - rock, should this occur in the absence of B horizon or base of artefact layer;
    - groundwater, where present;
    - where it would be considered that digging any deeper would be unsafe; or
    - where sufficient information has been recovered to understand the extent, nature and significance of the archaeological deposits.
- All excavated material was weighed prior to sieving to allow for the provision of proportional weights for analysis of archaeological material where identified.
- All excavated material was dry sieved through nested 5 mm and 3 mm mesh.

- Sediment was retained for backfilling of test pits.
- All excavation units (spits, contexts, stratigraphic units etc.) were assigned a unique identifier.
- Photographic recording of each pit was taken.
- Scaled drawings of one section of each test pit was completed.
- GPS readings were taken at each test pit location.

9.4.1 Rehabilitation of Excavation Locations

Test pits were back filled by Niche as soon as practicable after excavation. Backfilling utilised original soil where possible. Where imported fill was required for backfill, Walker Gillieston Heights Pty Ltd sourced clean fill from a location which has been identified as not having the potential for Aboriginal objects to be present.

9.4.2 Sample Collection

All material recovered from the test pits was dry sieved using, at a minimum, a 3 mm mesh size.

All cultural material or environmental samples recovered were carefully bagged and labelled with a unique identifier and stored in a suitable container for short storage.

A full record and catalogue of the artefacts was prepared post-excavation in accordance with Requirement 19 and 20 of the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW 2010b).

Artefact analysis and the preparation of a catalogue was conducted by Niche.

9.4.3 Short- and long-term storage of artefacts

Artefacts recovered during excavation were temporarily held at the Niche Parramatta Office in a locked cabinet. Such objects were stored in a secure location and returned to Gillieston Heights as soon as practical after analysis and recording was completed.

The long-term disposition of artefacts will require placing artefacts back on site at completion of works unless the RAPs agree to a Care Agreement. Niche will explore the potential of returning artefacts to the designated C2 Environmental Conservation Zone (Figure 4) in consultation with the RAPs. If re-buried on site, artefacts will be double bagged in sealed zip-lock plastic bags labelled with unique identification numbers and placed in a suitable impervious and permanent container. This container will be buried onsite in an area away from the works zone to avoid disturbance during construction operations. A GPS location for the reburial location will be recorded, and the reburial location will be registered as a site on AHIMS.

9.4.4 Stone artefact attribute recording and analysis

A comparison of artefact assemblages was carried out. Variables noted include provenance information, raw material type, presence of cortex, artefact type, maximum size, oriented size measures for complete and modified artefacts, weight, flake shape, flake platform, core type and core flaking pattern.

An archaeologist with skills in stone artefact identification prepared the artefacts catalogue post-excavation.

10. Results

10.1 Archaeological and cultural heritage survey

The Subject Area is currently characterised by dense grass cover and regrowth vegetation with scattered areas of exposure. Visibility and exposure levels were low within the Subject Area as outlined in Table 11. The survey covered all landform units within the Subject Area (Table 12). Plate 3 through to Plate 36 presents aspects of the Subject Area.

Table 11: Survey coverage

Survey unit	Landform	Survey unit area (m²)	Visibility (%)	Exposure (%)	Effective coverage (m²)	Effective coverage (%)
1	Sandstone Scarp	63,000	15%	10%	945	1.5%
2	Steep Slopes and Gullies	16,000	<5%	<3%	24	0.15%
3	Low Hills	150,000	<5%	<3%	225	0.15%
4	Hill Crest	42,000	<5%	<3%	63	0.15%
5	Wetlands and Alluvial Floodplain	280,000	<10%	<5%	1,400	0.5%

Table 12: Landform summary – sampled areas

Landform	Landform area (m²)	Area effectively surveyed (m²)	Landform effectively surveyed (m²)	Number of sites	Number of artefacts or features
Sandstone Scarp	63,000	945	1.5%	2	2
Steep Slopes and Gullies	16,000	24	0.15%	2	1
Low Hills	150,000	225	0.15%	0	0
Hill Crest	42,000	63	0.15%	1	0
Wetlands and Alluvial Floodplain	280,000	1,400	0.5%	2	2

Plate 3: Survey Unit 1 – view from upper slope descending to sandstone scarp, facing north

Plate 4: Survey Unit 1- View from upper slope above centre of scarp, facing north-east.

Plate 5: Survey Unit 1- Silty exposure below vegetation on upper slope above outcrop, facing north.

Plate 6: Survey Unit 1- Silty exposure just above scarp, facing east.

Plate 7: Survey Unit 1- View upslope, facing west.

Plate 8: Survey Unit 1- Base of sandstone ledges and boulders in south of survey unit, facing north-east.

Plate 9: Survey Unit 1- view from alluvial flat towards site GH21-IF-2, facing south-west.

Plate 10: Survey Unit 1- sandstone scarp, showing rainforest tree species, facing north.

Plate 11: Survey Unit 2- View over developing gully on northward slopes, facing west.

Plate 12: Survey Unit 2- degree of slope, facing north-east.

Plate 13: Survey Unit 2- gully between parallel spurs, facing south-west.

Plate 14: Survey Unit 2- exposed soil profile of GH21-IF-3, facing north-west.

Plate 15: Survey Unit 3- View over rear of property 457 Cessnock Rd, facing south towards Mount Sugarloaf.

Plate 16: Survey Unit 3- View over dam between properties 457 Cessnock Rd and 463 Cessnock Rd, facing south-east.

Plate 17: Survey Unit 3- Dam exposure showing soil disturbance, facing north.

Plate 18: Survey Unit 3- Fence line through silty exposure between properties 457 Cessnock Rd and 463 Cessnock Rd, facing south-east.

Plate 19: Survey Unit 3- View over lower hills towards crest, facing east.

Plate 20: Survey Unit 3- Property 527 Cessnock Rd, agricultural ruins and debris, facing west.

Plate 21: Survey Unit 3- sandstone bedrock exposure north of property 527 Cessnock Rd, facing south-west.

Plate 22: Survey Unit 3- view over property 527 Cessnock Rd, facing south-east.

Plate 23: Survey Unit 4- view form high ground overlooking property 457 Cessnock Rd, facing west.

Plate 24: Survey Unit 4- view form high ground overlooking central area of Subject Area, facing south-east.

Plate 25: Survey Unit 4- non-cultural scarring on gum tree, facing north east.

Plate 26: Survey Unit 4- view from crest looking towards Survey Unit 1, facing east.

Plate 27: Survey Unit 4- view from site GH21-PAD 2, facing south-east towards Wallis Creek.

Plate 28: Survey Unit 4- view from site GH21-PAD 1, facing south-east.

Plate 29: Survey Unit 5- view of Wallis Creek from near site GH21-IF-2, facing north.

Plate 30: Survey Unit 5- PAD of THI-F 001, facing west.

Plate 31: Survey Unit 5- general shot of survey unit, facing south.

Plate 32: Survey Unit 5- general shot of survey unit, facing south.

Plate 33: Survey Unit 5- dam on alluvial ground, facing south-east.

Plate 34: Survey Unit 5- disturbance to site, facing south-east.

Plate 35: Survey Unit 5- view across GH21-PAD-4, facing south.

Plate 36: Survey Unit 5- view of Wallis Creek and GH21-PAD-3, facing north-east.

10.2 Archaeological cultural heritage sites

One previously recorded Aboriginal cultural heritage site, TH-IF-001 (AHIMS ID#38-4-2015), was relocated during the site inspection. Seven new Aboriginal cultural heritage sites including GH21-IF-1 (AHIMS ID#38-4-2116), GH21-IF-2 (AHIMS ID#38-4-2117); GH21-IF-3 (AHIMS ID#38-4-2118), GH21-IF-4 (AHIMS ID#38-4-2119), GH21-PAD-1 (AHIMS ID#38-4-2120), GH21-PAD-3 (AHIMS ID#38-4-2121), and GH21-PAD-4 (AHIMS ID#38-4-2122), were recorded during the site inspection. Figure 9 shows the survey coverage and site location results as a result of the site inspection. A description of the seven new Aboriginal cultural heritage sites is provided below.

10.2.1 TH-IF-001 (AHIMS ID#38-4-2015)

This previously recorded site consists of an isolated artefact and PAD located on within wetlands and alluvial floodplains landform. The site recording details a hammerstone associated with a PAD and is situated [redacted] of the Subject Area. This site was relocated during the current field survey, no additional stone artefacts were identified; however, the hammerstone was recorded in a different location (toward the northwest of the AHIMS location). The current site inspection observed a crest with gentle inclined slopes toward Testers Hollow. An overview of site TH-IF-001 is provided in Table 13 below while Plate 37 presents the hammerstone associated with the site and Plate 38 presents the general location of the site. Expected deposits are likely to be similar to GH21-PAD-4 with slope wash deposits from higher up building along the lower slopes with possible alluvial deposits from the seasonal waterlogging of Testers Hollow. The landform (approximately 230 m x 180 m) is bound by water along the north and east, Cessnock Road to the west and rural dwellings/land to the south.

Table 13: Site details for TH-IF-001 (AHIMS ID#38-4-2015)

Overview					
Site type	Isolated Artefact	Corrected MGAE	[redacted]	Corrected MGAN	[redacted]
Previous Recording	Meggan Walker of Kayandel Archaeological Services	Date of original recording	5 October 2018	Date of Updated Recording	18 August 2021
Location Description					
Landform	Wetlands and Alluvial Floodplain	Land use/ disturbance	Pastoral/Grazing	Impacts	Cattle, damming, flooding
Landscape type	Aggrading/Eroding	Visibility	10%	Exposure	5%
Proximity to water	39 m to Testers Hollow				
Site Details – Artefact Descriptions					
Distal flake	Quartzite core/Hammerstone, 51-75% cortex, unidirectional scarring, 1 scar, Max Dimension (MD) = 88mm				

Plate 37: Hammerstone associated with TH-IF-001 (AHIMS ID#38-4-2015)

Plate 38: location of TH-IF-001 (AHIMS ID#38-4-2015) looking north

10.2.2 GH21-IF-1 (AHIMS ID#38-4-2116)

GH21-IF-1 is a newly recorded site comprising of an isolated quartzite hammerstone. The stone artefact was located on disturbed pastoral/grazing lands on a scarp/upper slope approximately [redacted] from Wallis Creek. An overview of GH21-IF-1 is provided in Table 14 below presents the general location of the site. Plate provides an example of the hammerstone associated with the site.

Table 14: Site details for GH21-IF-1 (AHIMS ID#38-4-2116)

Overview					
Site type	Isolated Artefact	Corrected MGAE	[redacted]	Corrected MGAN	[redacted]
Previous Recording	New Recording	Date of original recording	18 August 2021	Date of Updated Recording	N/A
Location Description					
Landform	Scarp/Upper Slope	Land use/ disturbance	Disturbed terrain- Pastoral/ grazing	Impacts	Cattle
Landscape type	Eroding	Visibility	25%	Exposure	20%
Proximity to water	70 m to Wallis Creek				
Site Details – Artefact Descriptions					
Core	Quartzite Hammerstone, cobble cortex, 50% - 70% cortex, MD=11 mm, L=107 mm, W=68 mm, Th=62 mm (see Plate 39 and Plate 42)				

Plate 39: Location of GH21-IF-1 (AHIMS ID#38-4-2116) looking northeast. Note elevated views

Plate 40: Hammerstone associated with site GH21-IF-1 (AHIMS ID#38-4-2116).

10.2.3 GH21-IF-2 (AHIMS ID#38-4-2117)

Site GH21-IF-2 is a newly recorded site comprising of an isolated quartz core, located on disturbed pastoral/grazing lands on an alluvial flat. An overview of GH21-IF-2 is provided in Table 15 below while Plate 41 and Plate 42 provides an example of the quartz core and the site location.

Table 15: Site details for GH21-IF-2 (AHIMS ID#38-4-2117)

Overview					
Site type	Isolated Artefact	Corrected MGAE	[redacted]	Corrected MGAN	[redacted]
Previous Recording	New Recording	Date of original recording	18 August 2021	Date of Updated Recording	N/A
Location Description					
Landform	Alluvial Flat	Land use/ disturbance	Disturbed terrain- Pastoral/ grazing	Impacts	Flooding
Landscape type	Stable	Visibility	5%	Exposure	3%
Proximity to water	Approximately 20 m east of Wallis Creek				
Site Details – Artefact Descriptions					
Core	Quartzite core, 6 scars, multidirectional, 3 platforms, MD=121 mm, L=118 mm, TH = 44 mm (see Plate 41 and Plate 42).				

Plate 41: Quartzite core associated with site GH21-IF-2 (AHIMS ID#38-4-2117)

Plate 42: View of GH21-IF-2 (AHIMS ID#38-4-2117) towards west from alluvial flat

10.2.4 GH21-IF-3 and PAD (AHIMS ID#38-4-2118)

Site GH21-IF-3 is a newly recorded Aboriginal cultural heritage site comprising of an isolated silcrete non diagnostic angular flake and PAD (approx. 250 m x 94 m). The PAD is located on a crest and gently inclined to moderately inclined slope. Subsurface potential is predicted to be moderate with low to very low surface potential. The site is located on disturbed pastoral/grazing lands on the steep slope of a gully. An overview of this site is provided in Table 16 below while Plate 43 and Plate 44 provides an example of the quartz core and the site location. Carl McDonald (MLALC) involved in the fieldwork noted the views linked to song lines.

Table 16: Site details for GH21-IF-3 (AHIMS ID#38-4-2118)

Overview					
Site type	Isolated Artefact	Corrected MGAE	[redacted]	Corrected MGAN	[redacted]
Previous Recording	New Recording	Date of original recording	18 August 2021	Date of Updated Recording	N/A
Location Description					
Landform	Steep slope/gully	Land use/ disturbance	Disturbed terrain- Pastoral/ grazing	Impacts	Dam, waste dump
Landscape type	Stable	Visibility	5%	Exposure	3%
Proximity to water	Approximately 130 m east to Wallis Creek				
Site Details – Artefact Descriptions					
Core	Silcrete non-diagnostic angular flake, with plane platform, MD=16 mm, L = 14 mm, W = 13 mm, Th=7 mm (see Plate 43 and Plate 44). PAD is approximately 94 m x 250 m.				

Plate 43: non-diagnostic silcrete flake recorded at GH21-IF-3 (AHIMS ID#38-4-2118)

Plate 44: View of associated PAD at GH21-IF-3 (AHIMS ID#38-4-2118) looking southeast toward Wallis Creek. Note elevated views above permanent watercourse

10.2.5 GH21-IF-4 (AHIMS ID#38-4-2119)

Site GH21-IF-4 is a newly recorded Aboriginal cultural heritage site comprising of an isolated silcrete core, located on an alluvial flat approximately [redacted] from Testers Hollow. The area has been disturbed by pastoral/grazing activities. An overview of this site is provided in Table 17 below while Plate 45 and Plate 46 provides an example of the quartzite core and the site location. GH21-IF-4 may be associated with the previously recorded site AHIMS#38-4-1997 as it is located approximately 30 m to the east.

Table 17: Site details for GH21-IF-4 (AHIMS ID#38-4-2119)

Overview					
Site type	Isolated Artefact	Corrected MGAE	[redacted]	Corrected MGAN	[redacted]
Previous Recording	New Recording	Date of original recording	18 August 2021	Date of Updated Recording	N/A
Location Description					
Landform	Alluvial flat	Land use/ disturbance	Disturbed terrain- Pastoral/ grazing	Impacts	Roads
Landscape type	Stable	Visibility	5%	Exposure	3%
Proximity to water	100 m south to Testers				
Site Details – Artefact Descriptions					
Core	Silcrete Core, block formed, 9 multidirectional scars, 5 platforms, MD=241 mm, L=224 mm, W=218 mm, Th=93 mm (see Plate 45 and Plate 46).				

Plate 45: Silcrete core at GH21-IF-4 (AHIMS ID#38-4-2119)

Plate 46: View of GH21-IF-4 (AHIMS ID#38-4-2119) towards west (Cessnock Road) from alluvial flat

10.2.6 GH21-PAD-1 (AHIMS ID#38-4-2120)

Site GH21-PAD-1 is a newly recorded Aboriginal cultural heritage site comprising of a PAD located along a hill slope approximately [redacted] from Wallis Creek. The site has a prominent vantage point and deposits with moderate subsurface potential. An overview of this site is provided in Table 18 below while Plate 47 and Plate 48 presents the site location. Carl McDonald (MLALC), during the field inspection, identified the area as having cultural values due to the elevated landscape, views, and access to water. Borehole testing to the west of this PAD suggests that deposits could consist of 0.25 m of topsoils and 0.65 m of residual soils.

Table 18: Site details for GH21-PAD-1 (AHIMS ID#38-4-2120)

Overview					
Site type	Potential Archaeological Deposit (PAD)	Corrected MGAE	[redacted]	Corrected MGAN	[redacted]
Previous Recording	New Recording	Date of original recording	18 August 2021	Date of Updated Recording	N/A
Location Description					
Landform	Slope	Land use/ disturbance	Disturbed terrain- Pastoral/ grazing	Impacts	Roads
Landscape type	Stable	Visibility	5%	Exposure	3%
Proximity to water	70 m east to Wallis Creek				
Site Details – Artefact Descriptions					
Core	Approx. 250 m x 140 m (see Plate 47 and Plate 48).				

Plate 47: GH21-PAD-1 (AHIMS ID#38-4-2120) from the northern end. Note elevated views

Plate 48: GH21-PAD-1(AHIMS ID#38-4-2120) from the southern end

10.2.7 GH21-PAD-3 (AHIMS ID#38-4-2121)

Site GH21-PAD-3 is a newly recorded Aboriginal cultural heritage site comprising of a PAD located on a slope approximately [redacted] from Wallis Creek. An overview of GH21-PAD-3 is provided in Table 19 below while Plate 49 presents the site location. Carl McDonald (MLALC) involved in the fieldwork considered the PAD to have high cultural value due elevated landforms, views, and access to water. The PAD is located along the slight rises along the margins of the wetlands. It is predicted that this site has low to moderate subsurface potential. Deposits may have been removed by flooding events. Borehole testing to the west of this PAD suggests that deposits could consist of at least 0.15 m of topsoils, 0.10 m of slope wash, and 0.65 m of residual soils.

Table 19: Site details for GH21-PAD-3 (AHIMS ID#38-4-2121)

Overview					
Site type	Potential Archaeological Deposit (PAD)	Corrected MGAE	[redacted]	Corrected MGAN	[redacted]
Previous Recording	New Recording	Date of original recording	18 August 2021	Date of Updated Recording	N/A
Location Description					
Landform	Slope	Land use/ disturbance	Disturbed terrain- Pastoral/ grazing	Impacts	Roads
Landscape type	Stable	Visibility	5%	Exposure	3%
Proximity to water	80 m east to Wallis Creek				
Site Details – Artefact Descriptions					
Core	Approx. 230 m x 80 m (see Plate 49).				

Plate 49: GH21-PAD-3 (AHIMS ID#38-4-2121) looking southeast. Note elevated land overlooking Wallis Creek and Mount Sugarloaf in distance

10.2.8 GH21-PAD-4 (AHIMS ID#38-4-2122)

Site GH21-PAD-4 is a newly recorded Aboriginal cultural heritage site comprising of a PAD located on a slope approximately [redacted] from Wallis Creek. An overview of GH21-PAD-4 is provided in Table 20 below while Plate 50 and Plate 51 presents the site and landscape. Carl McDonald from MLALC has expressed that the sites proximity to wetlands makes it a significant site. Deposits here along the lower slopes is expected to be greater due to the build-up of sheetwash. Borehole testing in the drainage lines to the north of this PAD suggests that deposits could consist of 0.15 m of topsoils, 0.10 m of slope wash, and 0.65 m of residual soils.

Table 20: Site details for GH21-PAD-4 (AHIMS ID#38-4-2122)

Overview					
Site type	Potential Archaeological Deposit (PAD)	Corrected MGAE	[redacted]	Corrected MGAN	[redacted]
Previous Recording	New Recording	Date of original recording	18 August 2021	Date of Updated Recording	N/A
Location Description					
Landform	Slope	Land use/ disturbance	Disturbed terrain- Pastoral/ grazing	Impacts	Roads
Landscape type	Stable	Visibility	5%	Exposure	3%
Proximity to water	140 m east to Wallis Creek and 60 m south to Testers Hollow				
Site Details – Artefact Descriptions					
Core	Approx. 210 m x 100 m (see Plate 50 and Plate 51).				

Plate 50: GH21-PAD-4 (AHIMS ID#38-4-2122) looking south/southwest

Plate 51: GH21-PAD-4 (AHIMS ID#38-4-2122) looking south/southwest

Figure 9: Site inspection results (Source: Niche)

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10.3 Test excavation results

10.3.1 Excavation coverage

The test excavation was carried out over five days from 13 to 17 December 2021 by personnel listed in Table 1. A total of twenty-six (26) test pits measuring 50 cm x 50 cm, were excavated (Figure 10). A summary of the excavated test pits is provided in Table 21. Details of the individual test pits, wall sections and photos are provided in Annex 3 and the analysis and discussion of all results is provided in Section 11 of this report. Figure 10 shows the location of test pits excavated during the test excavation program.

Table 21: Summary of test pits, locations, depth and finds/inclusions

Area	Test Pit ID	Datum	Zone	Northing	Easting	Final depth (cm)	Finds/inclusions
GH21-PAD4	TP1	GDA	56	[redacted]	[redacted]	40	One red silcrete flake from spit 3.
GH21-PAD4	TP2	GDA	56	[redacted]	[redacted]	20	No inclusion and/or finds.
GH21-PAD4	TP3	GDA	56	[redacted]	[redacted]	30	One red silcrete distal flake piece from spit 1.
GH21-PAD4	TP4	GDA	56	[redacted]	[redacted]	20	No inclusion and/or finds.
GH21-PAD3	TP5	GDA	56	[redacted]	[redacted]	30	One red/orange chert proximal flake piece from spit 2.
GH21-PAD3	TP6	GDA	56	[redacted]	[redacted]	20	No inclusion and/or finds.
GH21-PAD3	TP7	GDA	56	[redacted]	[redacted]	20	No inclusion and/or finds.
GH21-PAD3	TP8	GDA	56	[redacted]	[redacted]	30	No inclusion and/or finds.
GH21-IF-3	TP9	GDA	56	[redacted]	[redacted]	30	No inclusion and/or finds.
GH21-IF-3	TP10	GDA	56	[redacted]	[redacted]	30	No inclusion and/or finds.
GH21-IF-3	TP11	GDA	56	[redacted]	[redacted]	NA	Not Excavated
GH21-IF-3	TP12	GDA	56	[redacted]	[redacted]	30	No inclusion and/or finds.
GH21-IF-3	TP13	GDA	56	[redacted]	[redacted]	40	No inclusion and/or finds.
GH21-IF-3	TP14	GDA	56	[redacted]	[redacted]	20	No inclusion and/or finds.
GH21-IF-3	TP15	GDA	56	[redacted]	[redacted]	20	No inclusion and/or finds.
GH21-IF-3	TP16	GDA	56	[redacted]	[redacted]	40	No inclusion and/or finds.
GH21-PAD3	TP17	GDA	56	[redacted]	[redacted]	20	No inclusion and/or finds.
GH21-PAD3	TP18	GDA	56	[redacted]	[redacted]	30	No inclusion and/or finds.
GH21-PAD3	TP19	GDA	56	[redacted]	[redacted]	15	No inclusion and/or finds.
GH21-PAD3	TP20	GDA	56	[redacted]	[redacted]	30	No inclusion and/or finds.
GH21-PAD3	TP21	GDA	56	[redacted]	[redacted]	30	No inclusion and/or finds.
GH21-PAD3	TP22	GDA	56	[redacted]	[redacted]	30	No inclusion and/or finds.
GH21-PAD3	TP23	GDA	56	[redacted]	[redacted]	20	No inclusion and/or finds.
GH21-PAD3	TP24	GDA	56	[redacted]	[redacted]	30	One red silcrete flake from spit 2.
GH21-PAD3	TP25	GDA	56	[redacted]	[redacted]	20	No inclusion and/or finds.
GH21-PAD3	TP26	GDA	56	[redacted]	[redacted]	39	No inclusion and/or finds.

Area	Test Pit ID	Datum	Zone	Northing	Easting	Final depth (cm)	Finds/inclusions
GH21-PAD3	TP27	GDA	56	[redacted]	[redacted]	50	No inclusion and/or finds.

10.3.2 Soil profiles

The typical soil profile observed across the Subject Area during the test excavation program is summarised below, while Plate 52 and Plate 53 provide a photo and section drawing of an example of the typical stratigraphy as observed in test pit 1.

- Context 001 = Dark brown topsoil. Sandy loam with high inclusions of gravel and roots
- Context 002 = Transition to lighter brown sandy loam with some root inclusions
- Context 003 = Dark brown sandy loam with some root inclusions
- Context 004 = Mottled brown-orange sandy clay with orange mottling and some root inclusions

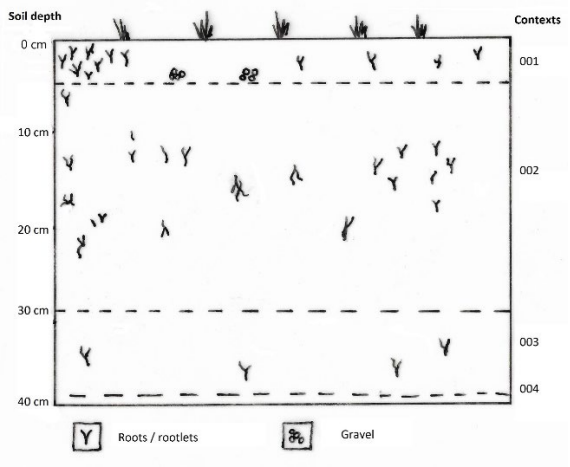

Plate 52: Section drawing of typical soil profile as observed in TP 1 Northern Wall

Plate 53: Photo of typical soil profile as observed in TP 2 Northern Wall

Soil profiles were relatively consistent across the Subject Area despite differences in soil landscape units. The test pits were associated with relatively consistent depths of between 20 cm and 40 cm where the mottled brown-orange sandy clay was reached.

10.3.3 Disturbance and inclusions

The results of the test excavations demonstrate that the Subject Area is associated with a moderate level of sub-surface disturbance. Evidence for historical disturbance and ploughing, for example, was common while evidence for bioturbation was noted in most test pits. This disturbance relates to the past land-use practices that have occurred within the Subject Area most notably relating to its ongoing use as a pastoral / agricultural land.

Most test pits were associated with a range of natural inclusions including plant and grass roots/rootlets, flecks of charcoal/carbon, and variable amounts of gravels ~1-10 mm in size (<5-25%). Evidence of bioturbation/ insect activity was also noted including, for example, ant activity within TP8 (~10-20 cm depth), TP10 (~0-20 cm depth), TP18 (~0-20 cm depth) and TP27 (~10-20 cm depth).

10.3.4 Stone artefact assemblage

Four (4) Aboriginal objects were recovered during the test excavations from three of the PAD sites (GH21–PAD-1, GH21-PAD-3, and GH21-PAD-4). The stone artefact assemblage was analysed by Riley Finnerty (Niche Heritage Consultant). The artefact catalogue is provided in Table 22 and Plate 54 to Plate 57.

Due to the small number of the recovered artefacts it is not possible to identify temporal changes in technology and behaviour between spits. As such the excavated assemblage will be analysed as a whole for the Subject Area to gain a general impression of the palimpsest of activities that resulted in the accumulation of these Aboriginal objects within the Subject Area.

All stone artefacts are flakes with plain platforms and feather terminations. Most are manufactured from red silcrete (n=3) with a single distal flake manufactured from red/orange chert. No evidence of retouch or use was observed. Artefacts were recovered from spits 1 to 4 associated with a depth of between 0-40 cm.

The frequency and distribution of Aboriginal objects within the Subject Area are representative of predominant Hunter Region assemblages in their dominance of silcrete and support the predictive model of transient land-use resulting from low-density occupation.

Table 22: Stone artefact catalogue

ID#	Site	Context	Class	Raw material	Colour	Platform type	Termination type	Max dimension (mm)	Length (mm)	Width (mm)	Thickness (mm)
AFT#1	GH21-PAD-4	TP1, Spit 3	Complete flake	Silcrete	Red	Plain	Feather	23.2	21.8	16.5	5.0
AFT#2	GH21-PAD-4	TP3, Spit 1	Distal flake	Silcrete	Red	NA	Feather	34.9	31.0	34.2	7.5
AFT#3	GH21-PAD-3	TP 5, Spit 2	Proximal flake	Chert	Red/ orange	Plain	Feather	17.4	9.5	17.4	4.3
AFT#4	GH21-PAD-1	TP24, Spit 2	Split flake	Silcrete	Red	Plan	Feather	12.8	12.8	7.3	1.6

Plate 54: AFT#1 complete flake from TP1, spit 3

Plate 55: AFT#2 distal flake from TP3, spit 1

Plate 56: AFT#3 proximal flake from TP5, spit 2

Plate 57: AFT#4 split flake from TP24, spit 2

Figure 10: Test excavation results - Location of test pits (Niche)

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11. Analysis and discussion

11.1 Analysis and discussion of results

While the region is characterised by a rich Aboriginal archaeological record, the reconstruction of past land use of Aboriginal people in the Central Lowlands is an extremely difficult task often relying on historical documents and archaeological evidence resulting from environmental impact assessments rather than research-driven projects. Despite these inherent limitations, archaeologists have built up a picture of Aboriginal settlement patterns for the region, establishing a foundation for the testing of predictive models and the inclusion of ethnographic accounts, and the invaluable knowledge and contributions of the Aboriginal communities of the Hunter Region.

The visibility and exposure within the Subject Area has made the site inspection difficult. All landforms within the Subject Area were targeted for survey and were assessed for subsurface potential. The extent of disturbance within the Subject Area is not known but has been noted by other archaeologists who have completed assessments nearby. The past Aboriginal land use indicated by the results of previous archaeological work in the region (reviewed in Section 4 of this report) suggests that the Aboriginal objects identified during the field survey are best considered representative of occupation within a secondary resource zone (Clarke and Kuskie 2006). This is reflective of the Subject Area location on elevated ground overlooking a permanent watercourse (Wallis Creek) and near Testers Hollow, Swamp Creek (<2 km) and the Hunter River (<5 km). Carl McDonald from MLALC conveyed that he believed the area contained cultural significance due to landform elevations, proximity to water, and views.

The location of the Subject Area would have offered elevated ground within the resource rich Central Lowlands which offered various types of food, medicine and wood resources. The presence of cobble cores and hammerstones (TH-IF-001, GH21-IF-1, GH21-IF-2, and GH-IF-4 for example) suggest that lithic material may be readily available nearby and the size of these artefacts suggests that the area potentially was used for more than just transitory movement. Many confirmed lithic sources are between 40 and 80 km to the northeast of the Subject Area; however, terraces along the Hunter River north of the Subject Area would have offered silcrete resources (RPS 2013:17). Nearby excavations which yielded a large quantity of artefacts supports the idea that the area was used by small groups of people for low levels of Aboriginal occupation (Umwelt 2011:1). It is predicted that the Subject Area is linked to other nearby sites within the landscape converging along wetlands during the mid to late Holocene.

11.2 Results summary

- Field survey within the Subject Area identified seven (7) previously unrecorded Aboriginal cultural heritage sites consisting of isolated artefacts and PADs.
- Silcrete and quartz represented the lithic raw material type recorded for surface artefacts and is representative of nearby lithic material from Wallis Creek and the Hunter River.
- Surface artefacts are of low density.
- Subsurface potential has been identified by RAPs present during survey due to elevated ground, access to fresh permanent water and views of the surrounding landscape.
- The whole Subject Area is considered to be of low to moderate archaeological potential based on the occurrence of Aboriginal cultural heritage sites and the fact that the entire area falls within an archaeologically sensitive landscape (i.e. within 200 m from water).
- Test excavations within the Subject Area resulted in the recovery of four (4) Aboriginal stone artefacts from three of the PAD sites (GH21–PAD-1, GH21-PAD-3, and GH21-PAD-4).
- The investigations concluded that the PAD associated with GH21-IF-3 contained no sub-surface archaeological deposits.

- Despite the low low-density of sub-surface archaeological deposits, the Subject Area remains significant due to the intangible values associated with the song lines and surrounding landscape such as in locations closer to the Hunter River.
- Overall, the results of the assessments conducted as part of this ACHA / AR support the predictive model developed for the Project in that:
    - The site types and features (isolated artefacts and PADs) identified within the Subject Area are common within the region.
    - The presence of surface artefacts is not a predictor of sub-surface archaeological deposits and vice-versa.
    - The archaeology associated with the Subject Area is indicative of general background scatter associated with sporadic and/or infrequent use of the area by past Aboriginal groups with more intensive occupation sites located elsewhere in the landscape such as in locations closer to the Hunter River.

The table below presents a list of Aboriginal cultural heritage sites that were identified over the course of this investigation within the Subject Area and summarises the potential impacts for each site.

Table 23: Aboriginal cultural heritage sites identified within the Subject Area

Portion of site to be impacted	AHIMS ID#	Site Name	Site Features
None- there is no potential for the site to be harmed by the proposed development in the Subject Area	38-4-2015	TH-IF-001	Isolated artefact and PAD
None- there is no potential for the site to be harmed by the proposed development in the Subject Area	38-4-2116	GH21-IF-1	Isolated artefact
None- there is no potential for the site to be harmed by the proposed development in the Subject Area	38-4-2117	GH21-IF-2	Isolated artefact
Whole- the entire site has the potential to be harmed by the proposed development in the Subject Area	38-4-2118	GH21-IF-3	Isolated artefact
None- there is no potential for the site to be harmed by the proposed development in the Subject Area	38-4-2119	GH21-IF-4	Isolated artefact
Whole- the entire site has the potential to be harmed by the proposed development in the Subject Area	38-4-2120	GH21–PAD-1	PAD
Partial- a portion of the site has the potential to be harmed by the proposed development in the Subject Area	38-4-2121	GH21–PAD-3	PAD
Partial- a portion of the site has the potential to be harmed by the proposed development in the Subject Area	38-4-2122	GH21–PAD-4	PAD

12. Scientific values and significance assessment

12.1 Assessment framework

The Burra Charter (Australia ICOMOS 2013) defines the basic principles and procedures to be observed in the conservation of important places. It provides the primary framework within which decisions about the management of heritage sites in Australia should be made. The Burra Charter defines cultural significance as being derived from the following values summarised in Table 24 below.

Table 24: Scientific values as outlined by the Burra Charter

Value type	Description
Aesthetic Value	Aesthetic value includes aspects of sensory perception for which criteria can and should be stated. Such criteria may include consideration of the form, scale, colour, texture and material of the fabric; the smells and sounds associated with the place and its use.
Historic Value	Aesthetic value includes aspects of sensory perception for which criteria can and should be stated. Such criteria may include consideration of the form, scale, colour, texture and material of the fabric; the smells and sounds associated with the place and its use.
Scientific Value	The scientific or research value of a place will depend upon the importance of the data involved, on its rarity, quality or representativeness, and on the degree to which the place may contribute further substantial information.
Social Value	Social value embraces the qualities for which a place has become a focus of spiritual, political, national or other cultural sentiment to a majority or minority group.

12.2 Other approaches

The categorisation into aesthetic, historic, scientific and social values is one approach to understanding the concept of cultural significance. However, more precise categories may be developed as understanding of a particular place increases.

The NSW DECCW guidelines for the significance assessment of Aboriginal archaeological sites are contained within the Aboriginal Cultural Heritage Standards and Guidelines Kit (National Parks and Wildlife Service 1997). The Kit identifies with two main streams in the overall significance assessment process: the assessment of cultural/social significance to Aboriginal people and the assessment of scientific significance to archaeologists.

This approach encapsulates those aspects of the Burra Charter that are relevant to Aboriginal archaeological sites. The guidelines specify the following criteria for archaeological significance, as paraphrased in Table 25.

Table 25: Criteria specified for archaeological significance

Criteria	Description
Research potential	It is the potential to elucidate past behaviour which gives significance under this criterion rather than the potential to yield collections of artefacts. Matters considered under this criterion include – the intactness of a site, the potential for the site to build a chronology and the connectedness of the site to other sites in the archaeological landscape.
Representativeness	As a criterion, representativeness is only meaningful in relation to a conservation objective. Presumably all sites are representative of those in their class or they would not be in that

Criteria	Description
	class. What is at issue is the extent to which a class of sites is conserved and whether the particular site being assessed should be conserved in order to ensure that we retain a representative sample of the archaeological record as a whole. The conservation objective which underwrites the 'representativeness' criteria is that such a sample should be conserved.
Rarity	This criterion cannot easily be separated from that of representativeness. If a site is 'distinctive' then it will, by definition, be part of the variability which a representative sample would represent. The criteria might best be approached as one which exists within the criteria of representativeness, giving a particular weighting to certain classes of site. The main requirement for being able to assess rarity will be to know what is common and what is unusual in the site record but also the way that archaeology confers prestige on certain sites because of their ability to provide certain information. The criterion of rarity may be assessed at a range of levels: local, regional, state, national, and global.
Educational Potential	Heritage sites and areas should be conserved and managed in relation to their value to people. It is assumed that archaeologists have the ability to speak of the value of sites to members of their own profession. Where archaeologists or others carrying out assessments are speaking for the educational value of sites to the public, the onus is on them to go to the public for an assessment of this value, or to reputable studies which have canvassed public demand for education. The danger, otherwise, is that archaeologists would be projecting their values onto a public which is itself given no voice on the matter.
Aesthetics	Archaeologists are not expected to include an assessment of aesthetic significance along with their assessment of scientific significance. In relation to heritage places, aesthetic significance is generally taken to mean the visual beauty of the place. Aesthetic value is not inherent in a place but arises in the sensory response people have to it. Although the guidelines provide no expectation for archaeologists to consider aesthetic values it is often the case that a site's or a landscape's aesthetic is a significant contributory value to significance. Examples of archaeological sites that may have high aesthetic values would be rock art sites, or sites located in environments that evoke strong sensory responses. For this reason, we consider it appropriate to include aesthetic values as part of the significance assessments for the sites identified during this assessment.

12.3 Assessment of archaeological significance

The overall archaeological value of the Aboriginal cultural heritage sites within the Subject Area is considered to be low. Isolated artefacts and low-density sub-surface deposits represent common site features found within the Hunter Valley. Due to the low density of stone artefacts and their disturbed contexts, the Aboriginal cultural heritage sites within the Subject Area have limited potential to contribute to our understanding of the local past.

Assessment of each of the criteria for archaeological (scientific) value and significance is presented in the Table 26 below.

Table 26: Significance Assessment – individual sites

AHIMS ID	Site Name	Features	Impact Area	Representativeness/ conservation value	Rarity	Educational Potential	Aesthetic Value	Scientific Value / Research Potential
38-4-2015	TH-IF-001	Isolated artefact and PAD	None	Low – The site is representative of one of the most frequent Aboriginal cultural heritage site types (i.e. burial) in the region. As the site, does not present any differing or additional representative values of its material or site class type, it's value in terms of representativeness is considered low.	Low – The site type and features are common in the local region.	Low – The site is of limited educational potential due to in nature as an isolated artefact in a disturbed context.	Moderate – AHIMS site TH-IF-001 has moderate aesthetic significance at the local level as it is on a Wetlands and Alluvial Floodplain approximately 39 m north of Testers Hollow.	Low-Moderate– The location of the site suggests moderate scientific values which will need to be confirmed by archaeological test excavations. There is the possibility that subsurface archaeological material will be present, including dateable material. The site however was not subject to test excavations as it is not located in ana rea proposed for impact.
38-4-2116	GH21-IF-1	Isolated artefact	None	Low – The site is representative of one of the most frequent Aboriginal cultural heritage site types (i.e. burial) in the region. As the site, does not present any differing or additional representative values of its material or site class type, it's value in terms of representativeness is considered low.	Low – The site type and features are common in the local region.	Low – The site is of limited educational potential due to in nature as an isolated artefact in a disturbed context.	Low – AHIMS site GH21-IF-1 has low aesthetic significance at the local level as it is on a sandstone scarp approximately 80 m west of Wallis Creek.	Low – GH21-IF-1 is one of the most common Aboriginal cultural heritage site types within the Central Lowlands and shows no unique features which could provide significant additions to the current body of knowledge.
38-4-2117	GH21-IF-2	Isolated artefact	None	Low – The site is representative of one of the most frequent Aboriginal cultural heritage site types (i.e. burial) in the region. As the site, does not present any differing or additional representative values of its material or site class type, it's value in terms of	Low – The site type and features are common in the local region.	Low – The site is of limited educational potential due to in nature as an isolated artefact in a disturbed context.	Low – AHIMS site GH21-IF-2 has Low aesthetic significance at the local level as it is on a sandstone scarp approximately 40 m West of Wallis creek.	Low – GH21-IF-2 is one of the most common Aboriginal cultural heritage site types within the Central Lowlands and shows no unique features which could provide significant additions to the current body of knowledge.

AHIMS ID	Site Name	Features	Impact Area	Representativeness/ conservation value	Rarity	Educational Potential	Aesthetic Value	Scientific Value / Research Potential
				representativeness is considered low.				
38-4-2118	GH21-IF-3	Isolated artefact	Whole	Low – The site is representative of one of the most frequent Aboriginal cultural heritage site types (i.e. burial) in the region. As the site, does not present any differing or additional representative values of its material or site class type, it's value in terms of representativeness is considered low.	Low – The site type and features are common in the local region.	Low – The site is of limited educational potential due to in nature as an isolated artefact in a disturbed context.	Moderate – AHIMS site GH21-IF-3 has moderate aesthetic significance at the local level as it is on the slope of a crest overlooking Wallis Creek. This PAD is located on an elevated landscape in close proximity to permanent water and natural resources and may have subsurface potential.	Low – GH21-IF-3 is one of the most common Aboriginal cultural heritage site types within the Central Lowlands and shows no unique features which could provide significant additions to the current body of knowledge. Furthermore, the results of test excavations indicate that the site is not associated with sub-surface archaeological deposits.
38-4-2119	GH21-IF-4	Isolated artefact	None	Low – The site is representative of one of the most frequent Aboriginal cultural heritage site types (i.e. burial) in the region. As the site, does not present any differing or additional representative values of its material or site class type, it's value in terms of representativeness is considered low.	Low – The site type and features are common in the local region.	Low – The site is of limited educational potential due to in nature as an isolated artefact in a disturbed context.	Low – AHIMS site GH21-IF-4 has low aesthetic significance at the local level as it is on a Wetlands and Alluvial Floodplain approximately 100 m north of Testers Hollow.	Low – GH21-IF-4 is one of the most common Aboriginal cultural heritage site types within the Central Lowlands and shows no unique features which could provide significant additions to the current body of knowledge.
38-4-2120	GH21-PAD-1	PAD	Whole	Low – The site is representative of one of the most frequent Aboriginal cultural heritage site types (i.e. burial) in the region. As the site, does not present any differing or additional representative values of its material or site class type, it's value in terms of	Low – The site type and features are common in the local region.	Low – The site is of limited educational potential due to in nature as an isolated artefact in a disturbed context.	Moderate – This PAD is located on an elevated landscape in close proximity to permanent water and natural resources. This PAD was identified by RAPs present during the survey due to the views of the	Low – Test excavations demonstrate that the site is associated with sub-surface isolated artefact. The site is one of the most common Aboriginal cultural heritage site types within the Central Lowlands and shows no unique features which could provide significant

AHIMS ID	Site Name	Features	Impact Area	Representativeness/ conservation value	Rarity	Educational Potential	Aesthetic Value	Scientific Value / Research Potential
				representativeness is considered low.			surrounding area and proximity to water.	additions to the current body of knowledge.
38-4-2121	GH21-PAD-3	PAD	Partial	Low – The site is representative of one of the most frequent Aboriginal cultural heritage site types (i.e. burial) in the region. As the site, does not present any differing or additional representative values of its material or site class type, it's value in terms of representativeness is considered low.	Low – The site type and features are common in the local region.	Low – The site is of limited educational potential due to in nature as an isolated artefact in a disturbed context.	Moderate – This PAD is located on an elevated landscape in close proximity to permanent water and natural resources. This PAD was identified by RAPs present during the survey due to the views of the surrounding area and proximity to water.	Low – Test excavations demonstrate that the site is associated with sub-surface isolated artefact. The site is one of the most common Aboriginal cultural heritage site types within the Central Lowlands and shows no unique features which could provide significant additions to the current body of knowledge.
38-4-2122	GH21-PAD-4	PAD	None	Low – The site is representative of one of the most frequent Aboriginal cultural heritage site types (i.e. burial) in the region. As the site, does not present any differing or additional representative values of its material or site class type, it's value in terms of representativeness is considered low.	Low – The site type and features are common in the local region.	Low – The site is of limited educational potential due to in nature as a very low density (n=2) sub-surface assemblage in a disturbed context.	Moderate – This PAD is located on an elevated landscape in close proximity to permanent water and natural resources. This PAD was identified by RAPs present during the survey due to the views of the surrounding area and proximity to water.	Low – Test excavations demonstrate that the site is associated with a very low-density sub-surface assemblage (n=2). The site is one of the most common Aboriginal cultural heritage site types within the Central Lowlands and shows no unique features which could provide significant additions to the current body of knowledge. There is the possibility that subsurface archaeological material will be present, including dateable material.

12.4 Statement of Significance

Statements of significance for the Subject Area are presented in the following sub sections. These statements of significance have been prepared in consideration of comments received from the RAPs during the consultation process, including those comments relating to the cultural significance of all sites and the interrelationships between the cultural and spiritual values with the natural landscape.

12.4.1 Social Value

The Subject Area, including the Aboriginal cultural heritage sites TH-IF-001 (AHIMS ID#38-4-2015), GH21-IF-1 (AHIMS ID#38-4-2116), GH21-IF-2 (AHIMS ID#38-4-2117), GH21-IF-3 (AHIMS ID#38-4-2118), GH21-IF-4 (AHIMS ID#38-4-2119), GH21–PAD-1 (AHIMS ID#38-4-2120), GH21-PAD-3 (AHIMS ID#38-4-2121), and GH21-PAD-4 (AHIMS ID#38-4-2122), holds cultural significance to the local Aboriginal community. Mr Carl McDonald of MLALC involved in the fieldwork, for instance, considered the Subject Area to have high cultural value due elevated landforms, “exceptional” views, and access to water. The Aboriginal cultural heritage sites mentioned above are valued for providing a tangible link to the past.

Information provided by Carl McDonald from MLALC is outlined below:

Cultural knowledge was limited to second-hand information Carl had been given by Tara Preswich from Mindaribba LALC and other elders of the local area. The information was associated with journeying song lines through the floodplain, primarily from SW to NE from the area of Yengo National Park through the routes of Congewoi Creek, Bellbird Creek, Swamp Creek and Testers Hollow/Wallis Creek.

Testers Hollow was described by Carl as a key focal point along this route. He thought the floodplain surrounding it was referred to in the past as 'Lake Lachlan' when in flood/prior to agricultural modification of the floodplain drainage systems. He believed this location was a source for the hunting/trading of waterbirds, particularly black swans, a feature of the cultural landscape that may form a part of past trade connections between the Hunter and other regions of NSW and beyond. This activity may have formed part of gatherings that also involved broader hunting and gathering activity and social activity, such as historically remembered bark canoe races that apparently took place here, according to Carl.

Carl considered it important that every effort be made to collect information about the cultural values of the landscape within the Subject Area.

This assessment of cultural significance is consistent with the contemporary view held by Aboriginal people that all Aboriginal objects and sites are important within the region due to their interconnectivity with the natural landscape and past occupation of the region.

A statement of cultural significance will be provided in Section 5.6 of the ACHA associated with this report once the ACHA has been reviewed by RAPS.

12.4.2 Aesthetic Value

The Subject Area has aesthetic values as portions are located on high ground overlooking various bodies of water such as Testers Hollow and Wallis Creek. There are also views to the far distance where Mount Sugarloaf can be seen to the south of the Subject Area.

12.4.3 Historic Value

The Subject Area is of low historical value as there are no known historical references for this location.

12.4.4 Scientific (Archaeological) Value

The Subject Area contains eight (8) identified Aboriginal cultural heritage sites, consisting of PADs and isolated artefacts. These sites type are the most common Aboriginal cultural heritage site types within the Central Lowlands of the Hunter Region. The results of the test excavations demonstrates that the low-density surface and sub-surface archaeological deposits are associated with low scientific (archaeological) value with limited potential to contribute significant information to current understandings of past Aboriginal land use in the region. The archaeological fieldwork for this Project shows no unique features which could provide significant additions to the current body of knowledge.

13. Impact assessment

13.1 Proposed activity

The Subject Area is proposed for an approximately 323 residential allotment subdivision.

The following outlines the proposed impacts associated with the different zones proposed for the Subject Area:

- R1 General Residential Zone: impacts to this zone are proposed to consist of shared off road footpaths and cycleways, roads, fire trails; stormwater basins, the widening of Cessnock Road, and residential housing.
- C3 Environmental Management Zone: impacts to this zone are proposed to consist of the placement of stormwater basins.
- C2 Environmental Conservation Zone: No impacts are proposed to occur within this zone.

Table 27 below provides an overview of the Aboriginal cultural heritage sites within the Subject Area.

Table 27: Current zoning associated with Aboriginal cultural heritage sites

Site name	AHIMS ID#	Current zoning
TH-IF-001	38-4-2015	NA
GH21-IF-1	38-4-2116	C3 – Environmental Management Zone
GH21-IF-2	38-4-2117	C2 – Environmental Conservation Zone
GH21-IF-3	38-4-2118	R1 – General Residential Zone
GH21-IF-4	38-4-2119	NA
GH21-PAD-1	38-4-2120	R1 – General Residential Zone
GH21-PAD-3	38-4-2121	C3 – Environmental Management Zone / R1 – General Residential Zone
GH21–PAD-4	38-4-2122	C3 – Environmental Management Zone

13.2 Potential for harm

The *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (OEH 2011) requires that both direct and indirect harm to Aboriginal objects and Aboriginal places be considered. Generally direct harm refers to occasions where an activity physically impacts a site or objects and therefore affects the heritage values possessed by the site or objects. Indirect harm is usually taken to mean harm stemming from secondary consequences of the activity and may affect sites or objects as an indirect consequence of the activity. Examples of such indirect harm are increased visitors to a site, or increased erosion in an area as a result of an activity.

It is anticipated that the proposed rezoning and subsequent future development of the Subject Area may result in the harm (whole or Partial) of the following Aboriginal cultural heritage sites:

- GH21-IF-3 (AHIMS ID#38-4-2118)
- GH21-PAD-1 (AHIMS ID#38-4-2120)
- GH21-PAD-3 (AHIMS ID#38-4-2121)
- GH21–PAD-4 (AHIMS ID #38-4-2122)

Table 28 below presents a list of Aboriginal cultural heritage sites that were identified over the course of this investigation within the Subject Area and an impact assessment for these sites.

Table 28: Impact assessment summary

AHIMS ID#	Site name	Type of harm (Direct/Indirect/ None)	Degree of harm (Total/Partial/ None)	Consequence of harm
38-4-2015	TH-IF-001	None	None	No loss of value. TH-IF-001 is located outside of the precinct planning area.
38-4-2116	GH21-IF-1	None	None	No loss of value. Site is located within Zone C3 where there are no planned impacts.
38-4-2117	GH21-IF-2	None	None	No loss of value. Site is located within Zone C2 conservation area.
38-4-2118	GH21-IF-3	Direct	Total	Total loss of value. GH21-IF-3 is located wholly within the R1 general residential area and will be impacted by the development.
38-4-2119	GH21-IF-4	None	None	No loss of value. The site is located outside of the precinct planning area.
38-4-2120	GH21-PAD-1	Direct	Total	Total loss of value. This site is located almost wholly within the R1 general residential area and will be impacted by the development.
38-4-2121	GH21-PAD-3	Direct	Partial	Partial loss of value. This PAD is located within the R1 general residential zone and C3 environmental management zone. While no works are currently proposed within this portion of the C3 zone a portion of the PAD will be impacted by the residential development within the R1 zone.
38-4-2122	GH21-PAD-4	Direct	Partial	Partial loss of value. This PAD is located within the C3 environmental management and C2 conservation zones. A water basin is proposed within this section of the C3 zone which may impact a portion of the PAD.

Figure 11: Site locations within proposed precinct (Source: Niche)

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14. Management and mitigation measures

14.1 Conservation Principles and Management Framework

The two founding principles behind the *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* (OEH 2011:12) are ecologically sustainable development and intergenerational equity. These principles hold that "the present generation should make every effort to ensure the health, diversity and productivity of the environment – which includes cultural heritage – is available for the benefit of future generations".

The strong emphasis, as in the Burra Charter, is to quantify and understand the heritage values of a place, a site, or an object and exhaust avenues of avoiding harm to those values. If harm cannot be avoided, then there must be consideration and implementation of strategies to minimise harm (OEH 2011:13).

It follows that the hierarchy for consideration in terms of the management strategies available for surface stone artefacts and subsurface stone artefacts and areas of archaeological potential, fall into four general categories, in order of preference from a conservation perspective:

- avoidance and in-situ conservation;
- partial avoidance and partial in-situ conservation (includes partial harm);
- harm caused with mitigating circumstances such as collection or salvage; and
- unmitigated harm.

The four general categories (described above) have been considered in the following subsections with regard to both direct impacts (e.g. surface disturbance) and indirect impacts (e.g. monitoring activities).

The management and mitigation measures have been prepared in consideration of comments received from the RAPs during the consultation process. These comments include those related to cultural considerations surrounding salvage works and the handling of artefactual materials, as well as the cultural significance of all sites. All comments received from the RAPs are considered in Section 3.4 of the ACHA.

In its current layout, the proposed development of the Subject Area would cause total harm the following Aboriginal cultural heritage sites:

- GH21-IF-3 (AHIMS ID#38-4-2118)
- GH21-PAD-1 (AHIMS ID#38-4-2120)

In its current layout, the proposed development of the Subject Area would cause partial harm the following Aboriginal cultural heritage sites:

- GH21-PAD-3 (AHIMS ID#38-4-2121)
- GH21-PAD-4 (AHIMS ID#38-4-2122)

In its current layout, the proposed development of the Subject Area no harm would be caused to the following Aboriginal sites:

- GH21-IF-1 (AHIMS ID#38-4-2116)
- GH21-IF-2 (AHIMS ID#38-4-2117)
- GH21-IF-4 (AHIMS ID#38-4-2119)
- TH-IF-001 (AHIMS ID #38-4-2015)

Where harm to Aboriginal sites and objects cannot be avoided, an Aboriginal Heritage Impact Permit (AHIP) will be required.

Management measures are warranted to mitigate the loss of value to the Aboriginal sites that would result from the proposed subdivision and development activities. Management and mitigation measures are required to ensure continued compliance with the *National Parks and Wildlife Act 1974*.

Consideration and discussion of management and mitigation options are provided in Table 29.

Given the low conservation and research value of the identified Aboriginal cultural heritage sites, the application for an AHIP to consent to destroy the Aboriginal sites with surface salvage collection of Aboriginal objects associated GH21-IF-3 (AHIMS ID# 38-4-2118) is considered to be appropriate, and the completion of this ACHA and the test excavation program undertaken as part of this, are considered to be sufficient mitigation in this case.

Table 29: Consideration of management and mitigation strategies

Management Risk / Impacted Value	Strategies considered	Response
Management Risk – impacts to cultural values and stakeholder values	Continued consultation with the RAPs	• Walker Gillieston Heights Pty Ltd should continue to consult with RAPs in accordance with the consultation guidelines and in accordance with any future AHIP)/s. • To ensure that the current consultation records remain valid to support any future AHIP/s for the Subject Area, the Proponent should send project updates to RAPs at a minimum of every six months for the duration of the Project.
	Further community consultation, Interpretation Plan and Cultural Values Assessment	• An Interpretation Plan should be developed with the RAPs, to enable Aboriginal cultural knowledge to be incorporated into the design and development of the Precinct, focusing on open/public spaces. The interpretation plan or strategy may include elements such as: ▪ Identifying and incorporating Wonnarua names and words into the naming of elements in the precinct (for example, parks, streets, community buildings). ▪ Inclusion of local Wonnarua art and design in the development of public spaces. ▪ Signage and contributing to resources which place value in and increase public awareness of Wonnarua history and values. • If further views confirming the cultural significance of the landscape are expressed, then consideration should also be given to a Cultural Values Assessment (CVA) regarding the intangible values expressed during consultation with the RAPs. • The above-mentioned strategies are dependent on council approvals and may not be feasible. In this instance, Walker Gillieston Heights Pty Ltd, in the draft precinct plan, proposes to deliver public access to views and areas identified as having cultural significance via a new perimeter road along the eastern boundary of the R1 zone.
	Avoidance and *in-situ* conservation	• Aboriginal cultural heritage sites TH-IF-001 (AHIMS ID#38-4-2015), GH21-IF-1 (AHIMS ID# 38-4-2116), GH21-IF-2 (AHIMS ID# 38-4-2117) and GH21-IF-4 (AHIMS ID# 38-4-2119) should be incorporated into conservation zones and protected in situ within the C2 (Environmental Conservation Zone) and C3 (Environmental Management Zone) Zoning and no ground disturbance should occur within the boundaries of these Aboriginal cultural heritage sites.
	Incorporation of values into Precinct Plan	• The Gillieston Heights draft precinct plan recognises the significance of certain views / vantage points within the Subject Area and have responded by incorporating areas of visual sensitivity within their designs. Design elements have been incorporated into the precinct, for instance, to retain views through the outer placement of road corridors to the east and west, and the placement of a green space which may assist in conserving and promoting elements identified by the RAPs as having cultural values associated with sites and the landscapes visible from the Subject Area. These views will be accessible to the public via proposed perimeter roads.

Management Risk / Impacted Value	Strategies considered	Response
Management risk – Compliance	AHIMS Site card updates	• Site cards for sites GH21-IF-1, GH21-IF-2, GH21-IF-3. GH21-IF-4, GH21–PAD-1, GH21-PAD-3, and GH21-PAD-4 must be submitted to AHIMS based on the results of the assessments including test excavations undertaken as part of this ACHA / AR.
	Aboriginal Heritage Impact Permit	• An application for an AHIP to harm for Aboriginal cultural heritage sites GH21-IF-3 (AHIMS ID# 38-4-2118), GH21–PAD-1 (AHIMS ID# 38-4-2120), GH21–PAD-3 (AHIMS ID# 38-4-2121) and GH21–PAD-4 (AHIMS ID #38-4-2122) will be required to undertake future development within the location of these sites as it will result in harm to Aboriginal Objects.
	Mitigating harm through salvage surface collection	• A salvage surface collection of the isolated artefact associated with Aboriginal cultural heritage site GH21-IF-3 (AHIMS ID# 38-4-2118) should be undertaken to mitigate harm to Aboriginal objects in accordance with an AHIP.
	Entering into a Care Agreement with the Registered Aboriginal Parties to determine the keeping place of Aboriginal objects collected during any test excavation undertaken as part of the ACHA or AHIP	• Long term storage and care of Aboriginal Objects recovered during any test excavation and any AHIP conditions is required under S.89 of the *National Parks and Wildlife Act* through a Care Agreement. • Provision should be made to return Aboriginal objects to RAPs entitled to, and willing to accept possession, custody or control of the Aboriginal object in accordance with Aboriginal tradition.
	Completion of Aboriginal Site Impact Recording Forms	• Site Card information for the four AHIMS registered Aboriginal cultural heritage sites GH21-IF-3 (AHIMS ID# 38-4-2118), GH21–PAD-1 (AHIMS ID# 38-4-2120), GH21–PAD-3 (AHIMS ID# 38-4-2121) and GH21–PAD-4 (AHIMS ID #38-4-2122) should be updated in the AHIMS database with revised site descriptions following any impacts associated with any works under any future AHIP. This will involve submitting Aboriginal Site Impact Form [ASIFS] upon implementing the AHIP.
Management Risk – Compliance and Unexpected Finds (excluding human remains)	Communication to employees, site visitors, contractors and landowners	• All workers should be inducted into the Subject Area, so they are made aware of their obligations under the *National Parks and Wildlife Act 1974* and any conditions of any future AHIP prior and during and after construction activities.
Management Risk – Unexpected Finds – human remains	Stop work and follow procedure for discovery of suspected human remains	• All workers should be inducted into the Subject Area, so they are made aware of their obligations under the *National Parks and Wildlife Act 1974* and any conditions of any future AHIP prior and during and after construction activities. • In the unlikely event that suspected human remains are encountered during construction, all work in the area that may cause further impact, must cease immediately. • The location, including a 20 m curtilage, should be secured using barrier fencing to avoid further harm.

Management Risk / Impacted Value	Strategies considered	Response

		• The NSW Police must be contacted immediately.
		• No further action is to be undertaken until the NSW Police provide written notification to Walker Gillieston Heights Pty Ltd.
		• If the skeletal remains are identified as Aboriginal, Walker Gillieston Heights Pty Ltd or their agent must contact:
		  ▪ the Heritage NSW's Enviroline on 131 555; and
		  ▪ Representatives of the RAPs.
		• No works are to continue until Heritage NSW provides written notification to the proponent or their Agent.

15. Recommendations

Part 6 of the *National Parks and Wildlife Act* (1974) provides protection for all Aboriginal objects and declared Aboriginal places from harm. Harm is defined as destroying, defacing, damaging or moving an object from the land. An Aboriginal Heritage Impact Permit (AHIP) is a legal document that grants you permission to harm Aboriginal objects or declared Aboriginal places and sets out any conditions you must comply with. An AHIP is required to disturb any Aboriginal objects or places.

Niche has prepared an ACHA. This Archaeological Report (AR) presents the results of an Aboriginal cultural heritage site inspection and sub-surface test excavation program completed by Niche and representatives of the RAPs in compliance with the requirements of the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010a).

Based on the community consultation with the Aboriginal stakeholders and archaeological investigations undertaken for the Project by Niche, the following recommendations have been made:

Recommendations	
	Aboriginal Heritage Impact Permit
1.	Walker Gillieston Heights Pty Ltd should continue to consult with the Aboriginal community in accordance with the consultation guidelines and in accordance with any future Aboriginal Heritage Impact Permit (AHIP). To ensure that the current consultation records remain valid to support any future AHIP/s for the Subject Area, the Proponent should send project updates to RAPs at a minimum of every six months for the duration of the Project. Consultation with the Aboriginal community should be undertaken to inform an Interpretation Plan, to enable Aboriginal cultural knowledge to be incorporated into the design and development of the Precinct, focusing on open/public spaces.
2.	Aboriginal cultural heritage sites TH-IF-001 (AHIMS ID#38-4-2015), GH21-IF-1 (AHIMS ID# 38-4-2116), GH21-IF-2 (AHIMS ID# 38-4-2117) and GH21-IF-4 (AHIMS ID# 38-4-2119) should be incorporated into conservation zones and protected in situ within the areas proposed for C2 (Environmental Conservation Zone) and C3 (Environmental Management Zone) Zoning and no ground disturbance should occur within the boundaries of these Aboriginal cultural heritage sites.
3.	An application for an AHIP to harm for Aboriginal cultural heritage sites GH21-IF-3 (AHIMS ID# 38-4-2118), GH21–PAD-1 (AHIMS ID# 38-4-2120), GH21–PAD-3 (AHIMS ID# 38-4-2121) and GH21–PAD-4 (AHIMS ID #38-4-2122) will be required to undertake future development within the location of these sites as it will result in harm to Aboriginal Objects.
4.	The AHIP should be conditioned to include salvage surface collection of the isolated artefact associated with Aboriginal cultural heritage site GH21-IF-3 (AHIMS ID# 38-4-2118) as a mitigation strategy for the harm to this site.
5.	Site Card information for the four AHIMS registered Aboriginal cultural heritage sites GH21-IF-3 (AHIMS ID# 38-4-2118), GH21–PAD-1 (AHIMS ID# 38-4-2120), GH21–PAD-3 (AHIMS ID# 38-4-2121) and GH21–PAD-4 (AHIMS ID #38-4-2122) should be updated in the AHIMS database with revised site descriptions following any impacts associated with any works under any future AHIP. This will involve submitting Aboriginal Site Impact Form [ASIFS] upon implementing the AHIP.
6.	A Care and Control Agreement will be required with the Registered Aboriginal Parties to determine the final storage location of any Aboriginal objects recovered during the test excavations and under any future AHIPs within the Subject Area.
7.	For any specific proposed development beyond what has been assessed in the current AR/ACHA, especially within the C2 and C3 zones, an assessment of Aboriginal heritage should be undertaken

Recommendations	
	in accordance with the *National Parks & Wildlife Act 1974* (Amended 2010) and *National Parks & Wildlife Amendment Regulation 2019*. This may take the form of an Aboriginal Objects Due Diligence Assessment in the first instance.
	General
8.	All workers should be inducted into the Subject Area, so they are made aware of their obligations under the *National Parks and Wildlife Act 1974* and any conditions of any future AHIP prior and during and after construction activities.
9.	In the event that previously unknown Aboriginal object(s) and/or sites are discovered during the proposed activity, work must stop, and an appropriately qualified archaeologist be contacted to access the nature, extent, and significance of the identified sites and notification is provided to Heritage NSW. Works should not proceed without advice from Heritage NSW or an appropriately qualified archaeologist.
10.	In the unlikely event that suspected human remains are encountered during construction, all work in the area that may cause further impact, must cease immediately and: • The location, including a 20 m curtilage, should be secured using barrier fencing to avoid further harm. • The NSW Police must be contacted immediately. • No further action is to be undertaken until the NSW Police provide written notification to Walker Gillieston Heights Pty Ltd. • If the skeletal remains are identified as Aboriginal, Walker Gillieston Heights Pty Ltd or their agent must contact: ▪ Heritage NSW's Enviroline on 131 555; and representatives of the RAPs. ▪ No works are to continue until Heritage NSW provides written notification to the proponent or their Agent.

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Annex 1: AHIMS extensive search

INFORMATION REMOVED FROM PUBLIC VERSION OF REPORT

Annex 2: AHIMS site cards

INFORMATION REMOVED FROM PUBLIC VERSION OF REPORT

Annex 3: Test Excavation Data

Test Pit 1 – GH21-PAD4 (AHIMS ID# 38-4-2122)

Table 30: Test Pit 1 summary

XU	Start depth (cm)	End depth (cm)	Sediment description	Sediment consistency	Inclusions / disturbance	Notes/ Inclusions
1	0	10	Dark brown soil	Loose	Roots and grass	
2	10	20	Dark to light brown soil, increasing sand content	Loose	Roots and grass	
3	20	30	Dark to dark grey sandy soil, increasing moisture	Loose	Some small grass roots	1 silcrete flake
4	30	40	Dark brown clay	Compact / cemented		

Plate 58: General location photo of test pit 1

Plate 59: End of excavation of test pit 1

Plate 60: Photo of wall section of test pit 1

Test Pit 2 – GH21-PAD4 (AHIMS ID# 38-4-2122)

Table 31: Test Pit 2 summary

XU	Start depth (cm)	End depth (cm)	Sediment description	Sediment consistency	Inclusions / disturbance	Notes/ Inclusions
1	0	10	Dark brown loamy topsoil transitioning to slightly lighter brown sandy loam	Friable	Roots, grass, small water rolled gravels <5%, worms	
2	10	20	Transition to light brown mottled sandy clay with yellow-brown clay mottling and some root staining	Firm	Roots, gravels <2%	Excavation eased due to sterile clay base

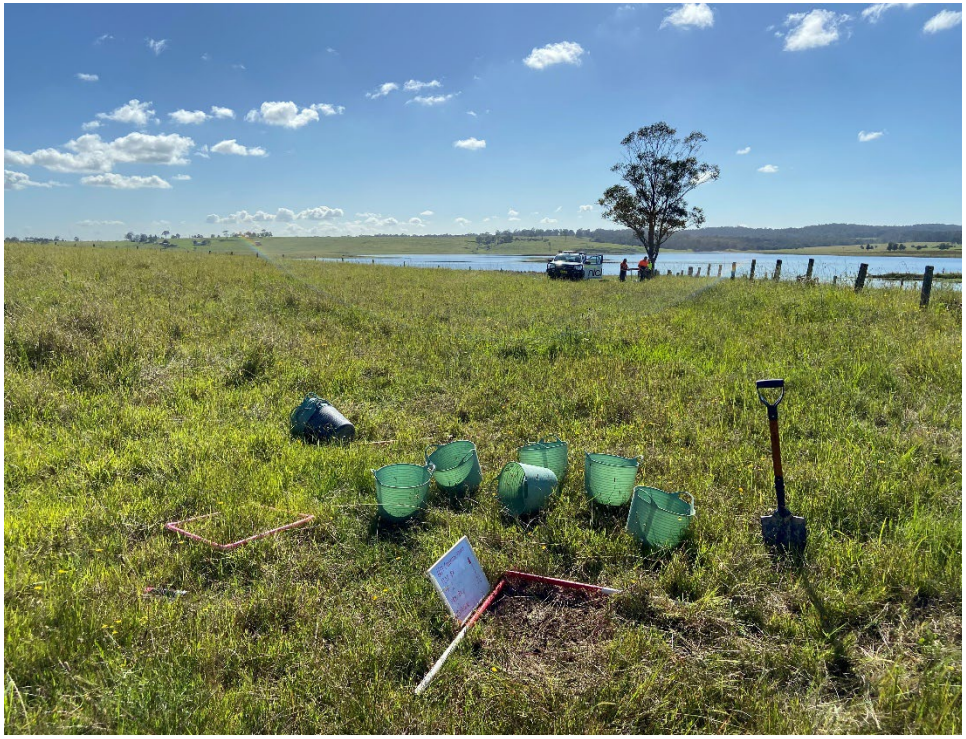

Plate 61: General location photo of test pit 2

Plate 62: End of excavation of test pit 2

Plate 63: Photo of south wall section of test pit 2

Test Pit 3 – GH21-PAD4 (AHIMS ID# 38-4-2122)

Table 32: Test Pit 3 summary

XU	Start depth (cm)	End depth (cm)	Sediment description	Sediment consistency	Inclusions / disturbance	Notes/ Inclusions
1	0	10	Dark brown sandy topsoil	Loose	Roots, grass, gravels, worms	Red silcrete distal flake
2	10	20	Slight transition to lighter brown sandy silt	Loose	Roots, gravels	
3	20	30	Brown sandy silt transitioning to firm greyish-brown sandy clay	Firm / compact	Rootlets	

Plate 64: General location photo of test pit 3

Plate 65: End of excavation of test pit 3

Plate 66: Photo of northern wall section of test pit 3

Test Pit 4 – GH21-PAD4 (AHIMS ID# 38-4-2122)

Table 33: Test Pit 4 summary

XU	Start depth (cm)	End depth (cm)	Sediment description	Sediment consistency	Inclusions / disturbance	Notes/ Inclusions
1	0	10	Dark grey silty top soil with mottling	Loose	Roots, insects	
2	10	20	Dark grey clay with mottling of orange clay	Compact / cemented	Rootlets	Excavation eased due to sterile clay

Plate 67: General location photo of test pit 4

Plate 68: End of excavation of test pit 4

Plate 69: Photo of northern wall section of test pit 4

Test Pit 5 – GH21-PAD3 (AHIMS ID# 38-4-2121)

Table 34: Test Pit 5 summary

XU	Start depth (cm)	End depth (cm)	Sediment description	Sediment consistency	Inclusions / disturbance	Notes/ Inclusions
1	0	10	Dark brown sandy topsoil	Friable	Roots, grass, small gravels	
2	10	20	Dark brown sandy loam. Transition to a sandy loam clay	Friable	Roots, grass, frequent small gravels and waterworn cobble (200mm)	Chert flake
3	20	30	Transition to brown, orange mottled sandy clay	Firm	Some small rootlets, gravels <1%, some degraded ironstone	Excavation eased due to sterile clay

Plate 70: General location photo of test pit 5

Plate 71: End of excavation of test pit 5

Plate 72: Photo of northern wall section of test pit 5

Test Pit 6 – GH21-PAD3 (AHIMS ID# 38-4-2121)

Table 35: Test Pit 6 summary

XU	Start depth (cm)	End depth (cm)	Sediment description	Sediment consistency	Inclusions / disturbance	Notes/ Inclusions
1	0	10	Dark brown soil	Loose / friable	Roots, grass, insects, bioturbation	
2	10	20	Brown silty soil, becoming compact, western boundary at clay	Firm / compact	Roots, grass, small rocks (sandstone)	

Plate 73: General location photo of test pit 6

Plate 74: End of excavation of test pit 6

Plate 75: Photo of northern wall section of test pit 6

Test Pit 7 – GH21-PAD3 (AHIMS ID# 38-4-2121)

Table 36: Test Pit 7 summary

XU	Start depth (cm)	End depth (cm)	Sediment description	Sediment consistency	Inclusions / disturbance	Notes/ Inclusions
1	0	10	Dark brown sandy loam topsoil	Friable	Roots, grass, gravels (<10%)	
2	10	20	Transition to light brown-orange sandy loam and onto glossy brown, orange clay base	Firm	Roots, gravels	Excavation ceased as sterile clay base reached

Plate 76: General location photo of test pit 7

Plate 77: End of excavation of test pit 7

Plate 78: Photo of northern wall section of test pit 7

Test Pit 8 – GH21-PAD3 (AHIMS ID# 38-4-2121)

Table 37: Test Pit 8 summary

XU	Start depth (cm)	End depth (cm)	Sediment description	Sediment consistency	Inclusions / disturbance	Notes/ Inclusions
1	0	10	Dark brown sandy loam topsoil	Friable	Roots, frequent gravels 1-5 mm	
2	10	20	Dark brown sandy loam	Firm	High root content, ants, gravels (<5%)	
3	20	30	Dark brown sandy loam transitioning to mottled brown-orange clay	Firm/ compact	Small rootlets, gravels (<2%)	

Plate 79: General location photo of test pit 8

Plate 80: End of excavation of test pit 8

Plate 81: Photo of northern wall section of test pit 8

Test Pit 9 – GH21-IF-3 (AHIMS ID# 38-4-2118)

Table 38: Test Pit 9 summary

XU	Start depth (cm)	End depth (cm)	Sediment description	Sediment consistency	Inclusions / disturbance	Notes/ Inclusions
1	0	10	Dark brown sandy topsoil. Large rock in northern section	Loose / friable	Roots, grass, gravels (>10%)	
2	10	20	Dark brown sandy loam transitioning to brown-orange loam	Loose	Rootlets, gravels (>10%)	
3	20	30	Transition to brown-orange sandy clay	Friable	Small rootlets, gravels (<5%)	Small, fragmented carbon/ charcoal

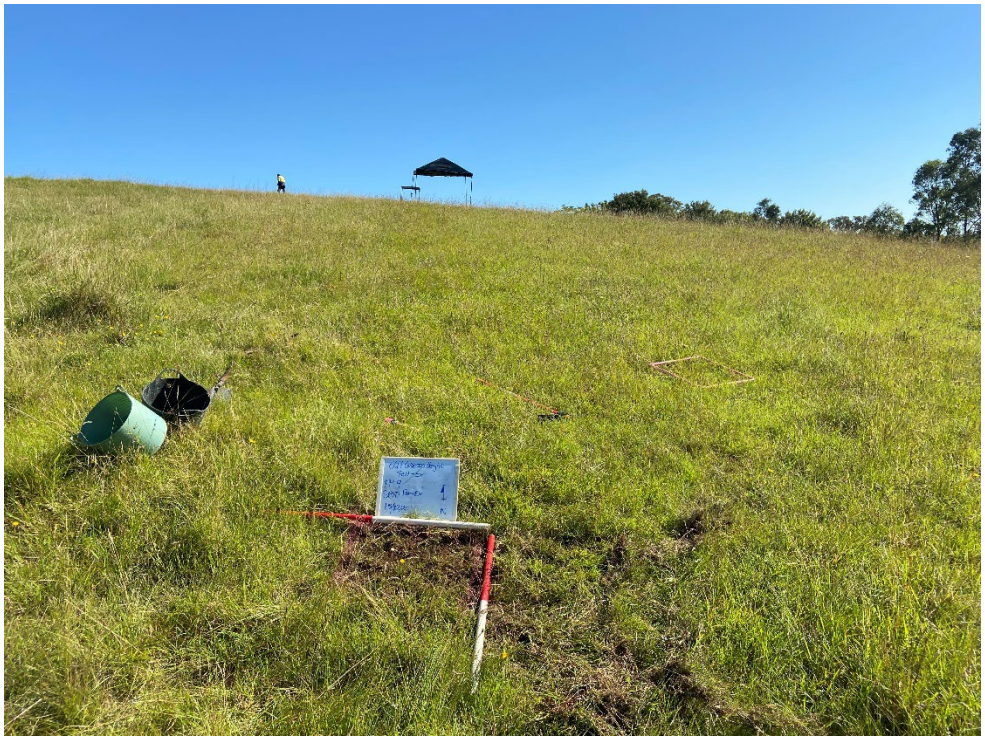

Plate 82: General location photo of test pit 9

Plate 83: End of excavation of test pit 9

Plate 84: Photo of northern wall section of test pit 9

Test Pit 10 – GH21-IF-3 (AHIMS ID# 38-4-2118)

Table 39: Test Pit 10 summary

XU	Start depth (cm)	End depth (cm)	Sediment description	Sediment consistency	Inclusions / disturbance	Notes/ Inclusions
1	0	10	Dark brown sandy loam topsoil with some clay	Loose	Roots, grass, gravels, ants	
2	10	20	Dark brown sandy loam,	Friable	High gravel content (>10%), roots, ants	Some charcoal in western portion of pit
3	20	30	Transition to brown-orange sandy clay	Firm	Degraded sandstone/ironstone gravels	

Plate 85: General location photo of test pit 10

Plate 86: End of excavation of test pit 10

Plate 87: Photo of northern wall section of test pit 10

Test Pit 11 – GH21-IF-3 (AHIMS ID# 38-4-2118)

NOT EXCAVATED

Test Pit 12 – GH21-IF-3 (AHIMS ID# 38-4-2118)

Table 40: Test Pit 12 summary

XU	Start depth (cm)	End depth (cm)	Sediment description	Sediment consistency	Inclusions / disturbance	Notes/ Inclusions
1	0	10	Dark brown sandy loam topsoil	Loose	Roots, grass, gravel	
2	10	20	Dark brown sandy loam increasing in compaction	Loose / friable	Roots, gravels, insects	
3	20	30	Transition to brown, orange mottled sandy clay	Friable / firm	Some gravels	

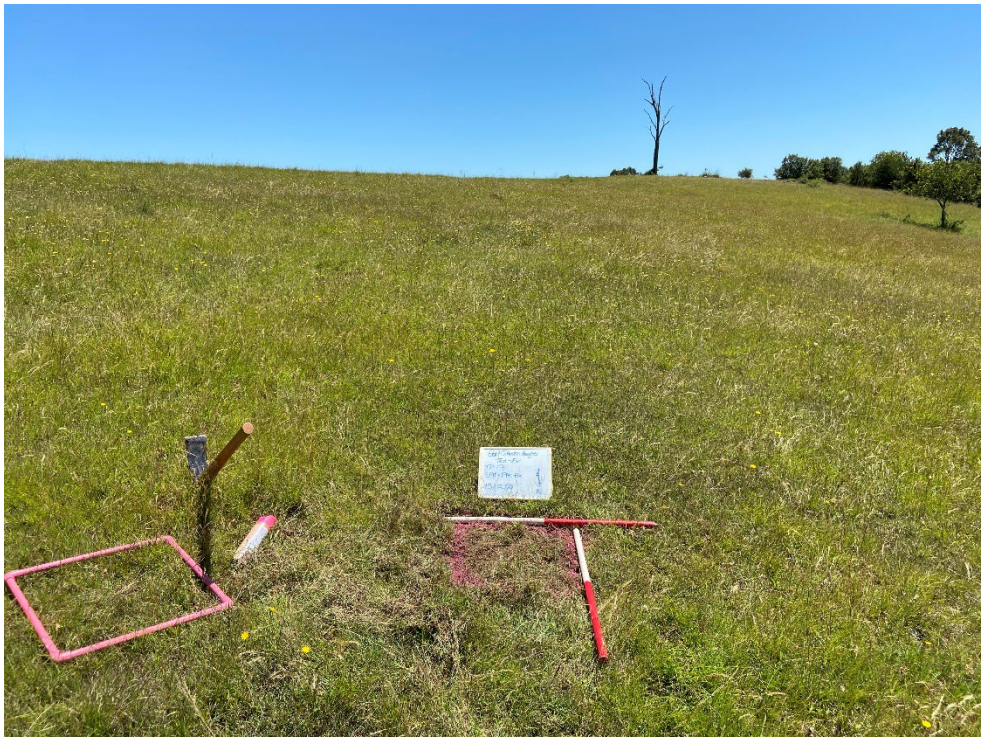

Plate 88: General location photo of test pit 12

Plate 89: End of excavation of test pit 12

Plate 90: Photo of northern wall section of test pit 12

Test Pit 13 – GH21-IF-3 (AHIMS ID# 38-4-2118)

Table 41: Test Pit 13 summary

XU	Start depth (cm)	End depth (cm)	Sediment description	Sediment consistency	Inclusions / disturbance	Notes/ Inclusions
1	0	10	Loose brown soil	Loose	Roots, grass, bioturbation	
2	10	20	Brown to dark brown sediment with few inclusions	Loose/ friable	Roots, bioturbation	
3	20	30-40	Dark brown soil transitioning to mottled clay at base	Friable/ compact	Some rootlets	

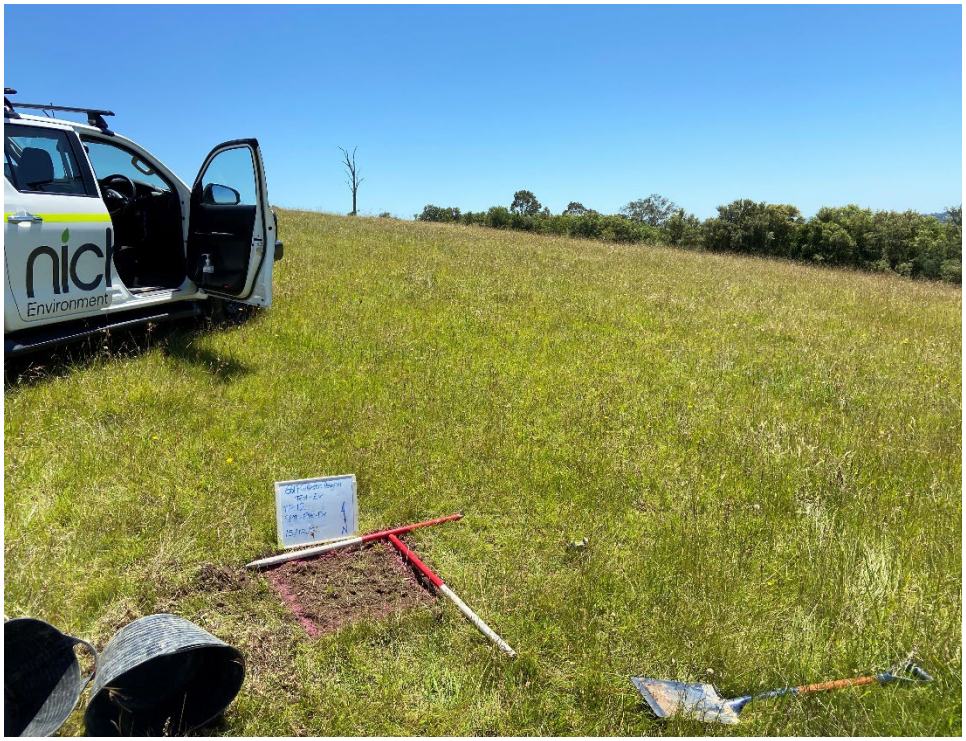

Plate 91: General location photo of test pit 13

Plate 92: End of excavation of test pit 13

Plate 93: Photo of northern wall section of test pit 13

Test Pit 14 – GH21-IF-3 (AHIMS ID# 38-4-2118)

Table 42: Test Pit 14 summary

XU	Start depth (cm)	End depth (cm)	Sediment description	Sediment consistency	Inclusions / disturbance	Notes/ Inclusions
1	0	10	Dark brown sandy topsoil with some mottled orange clay	Friable	Roots, grass, gravels	
2	10	20	Transition to compacted orange mottled clay across pit	Compact	None	

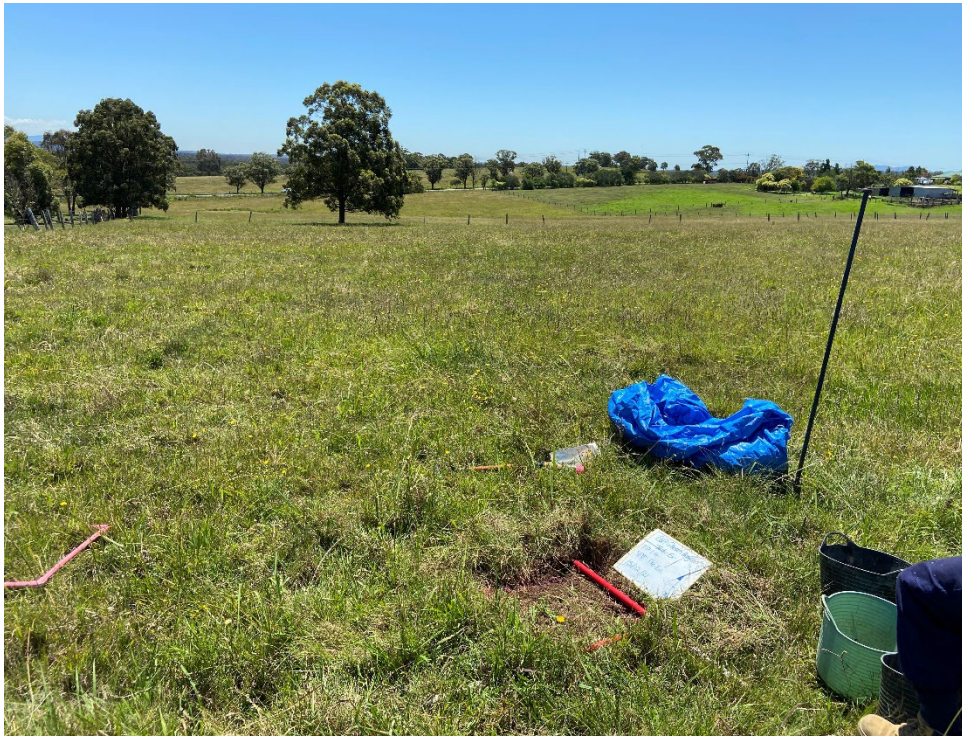

Plate 94: General location photo of test pit 14

Plate 95: End of excavation of test pit 14

Plate 96: Photo of northern wall section of test pit 14

Test Pit 15 – GH21-IF-3 (AHIMS ID# 38-4-2118)

Table 43: Test Pit 15 summary

XU	Start depth (cm)	End depth (cm)	Sediment description	Sediment consistency	Inclusions / disturbance	Notes/ Inclusions
1	0	10	Dark brown sandy loam topsoil transitioning to light brown/orange mottled sandy loam	Loose	Roots, grass, gravels	
2	10	20	Brown/orange mottled sandy clay with degraded sandstone base	Firm	Roots, gravels	

Plate 97: General location photo of test pit 15

Plate 98: End of excavation of test pit 15

Plate 99: Photo of northern wall section of test pit 15

Test Pit 16 – GH21-IF-3 (AHIMS ID# 38-4-2118)

Table 44: Test Pit 16 summary

XU	Start depth (cm)	End depth (cm)	Sediment description	Sediment consistency	Inclusions / disturbance	Notes/ Inclusions
1	0	10	Dark brown sandy topsoil	Loose	Roots, grass, gravels	
2	10	20	Light brown sandy loam with some clay	Loose. friable	Roots, gravels (>10%)	
3	20	30	Brown/orange mottled sandy clay	Friable/ firm	Roots, gravels (>25%)	
4	30	40	Brown/orange mottled sandy clay	Compact	Gravels (<10%)	

Plate 100: General location photo of test pit 16

Plate 101: End of excavation of test pit 16

Plate 102: Photo of northern wall section of test pit 16

Test Pit 17 – GH21-PAD3 (AHIMS ID# 38-4-2121)

Table 45: Test Pit 17 summary

XU	Start depth (cm)	End depth (cm)	Sediment description	Sediment consistency	Inclusions / disturbance	Notes/ Inclusions
1	0	10	Dark brown to light brown sandy topsoil	Loose	Roots, grass, gravels	
2	10	20	Orange mottled clay base	Firm	Roots	

Plate 103: General location photo of test pit 17

Plate 104: End of excavation of test pit 17

Plate 105: Photo of northern wall section of test pit 17

Test Pit 18 – GH21-PAD3 (AHIMS ID# 38-4-2121)

Table 46: Test Pit 18 summary

XU	Start depth (cm)	End depth (cm)	Sediment description	Sediment consistency	Inclusions / disturbance	Notes/ Inclusions
1	0	10	Dark brown sandy topsoil, fine grained	Loose	Roots, grass, gravels, ants	
2	10	20	Light brown sandy loam – coarse grained	Loose	Roots, grass, gravels, ants	
3	20	30	Brown sandy loam with pockets of light brown/ yellow sand overlying compacted orange mottled clay	Loose	Disturbance from ploughing	

Plate 106: General location photo of test pit 18

Plate 107: End of excavation of test pit 18

Plate 108: Photo of northern wall section of test pit 18

Test Pit 19 – GH21-PAD3 (AHIMS ID# 38-4-2121)

Table 47: Test Pit 19 summary

XU	Start depth (cm)	End depth (cm)	Sediment description	Sediment consistency	Inclusions / disturbance	Notes/ Inclusions
1	0	10	Brown firm soil with some mottling of clay	Firm / compact	Roots, gravels, insects	Highly disturbed, some carbon fragments
2	10	15	Orange / brown mottling of clay	Compact	Roots, some gravels	

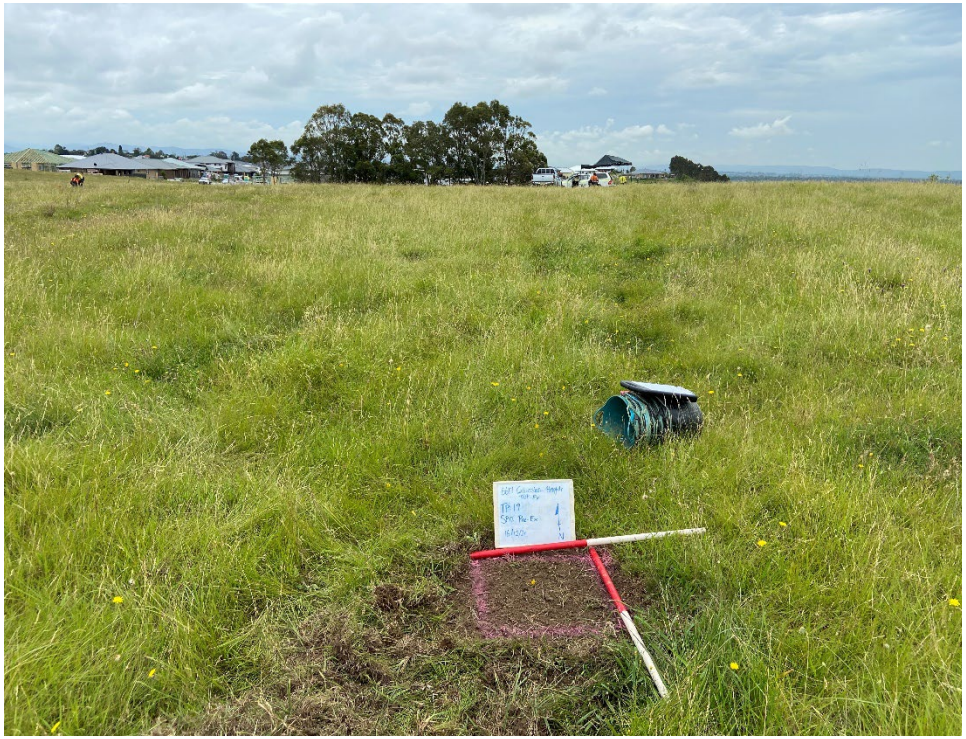

Plate 109: General location photo of test pit 19

Plate 110: End of excavation of test pit 19

Plate 111: Photo of northern wall section of test pit 19

Test Pit 20 – GH21-PAD3 (AHIMS ID# 38-4-2121)

Table 48: Test Pit 20 summary

XU	Start depth (cm)	End depth (cm)	Sediment description	Sediment consistency	Inclusions / disturbance	Notes/ Inclusions
1	0	10	Dark brown sandy topsoil	Loose	Roots, grass, gravel	Carbon/charcoal fragment
2	10	20	Dark brown sandy loam	Loose	Roots, grass, gravels (<5%)	
3	20	30	Transition to orange mottled sandy clay	Compact	Some rootlets	

Plate 112: General location photo of test pit 20

Plate 113: End of excavation of test pit 20

Plate 114: Photo of northern wall section of test pit 20

Test Pit 21 – GH21-PAD3 (AHIMS ID# 38-4-2121)

Table 49: Test Pit 21 summary

XU	Start depth (cm)	End depth (cm)	Sediment description	Sediment consistency	Inclusions / disturbance	Notes/ Inclusions
1	0	10	Dark brown sandy topsoil	Loose	Roots, grass, gravels (1-5 mm) (<25%)	
2	10	20	Transition from brown sandy loam to pale brown sand with high gravel content	Loose	Roots, grass, gravels (1-10 mm)	
3	20	30	Transition to mottled orange sandy clay	Firm/ compact		

Plate 115: General location photo of test pit 21

Plate 116: End of excavation of test pit 21

Plate 117: Photo of northern wall section of test pit 21

Test Pit 22 – GH21-PAD3 (AHIMS ID# 38-4-2121)

Table 50: Test Pit 22 summary

XU	Start depth (cm)	End depth (cm)	Sediment description	Sediment consistency	Inclusions / disturbance	Notes/ Inclusions
1	0	10	Dark brown sandy topsoil transitioning to light brown sandy loam	Loose	Roots, grass, gravels (1-5 mm)	
2	10	20	Light brown sandy loam	Loose/ friable	Roots, gravels (1-5 mm) (<20%)	
3	20	30	Transitioning to orange mottled sandy clay	Firm	Gravels	

Plate 118: General location photo of test pit 22

Plate 119: End of excavation of test pit 22

Plate 120: Photo of northern wall section of test pit 22

Test Pit 23 – GH21-PAD3 (AHIMS ID# 38-4-2121)

Table 51: Test Pit 23 summary

XU	Start depth (cm)	End depth (cm)	Sediment description	Sediment consistency	Inclusions / disturbance	Notes/ Inclusions
1	0	10	Brown silty soil	Loose	Roots, small gravels	
2	10	20	Mottled orange clay	Compact	Gravels	

Plate 121: General location photo of test pit 23

Plate 122: End of excavation of test pit 23

Plate 123: Photo of northern wall section of test pit 23

Test Pit 24 – GH21-PAD3 (AHIMS ID# 38-4-2121)

Table 52: Test Pit 24 summary

XU	Start depth (cm)	End depth (cm)	Sediment description	Sediment consistency	Inclusions / disturbance	Notes/ Inclusions
1	0	10	Dark brown sandy topsoil mottled with yellow sand	Loose	Roots, grass, gravels (1-10 mm) (<20%)	
2	10	20	Dark brown sandy loam with some mottling of lighter brown sand	Loose	Roots, gravels (<5%)	Carbon/ charcoal (<1%)
3	20	30	Brown sandy loam onto orange mottled sandy clay	Friable/ firm	Rootlets, gravels	Carbon/ charcoal (<1%)

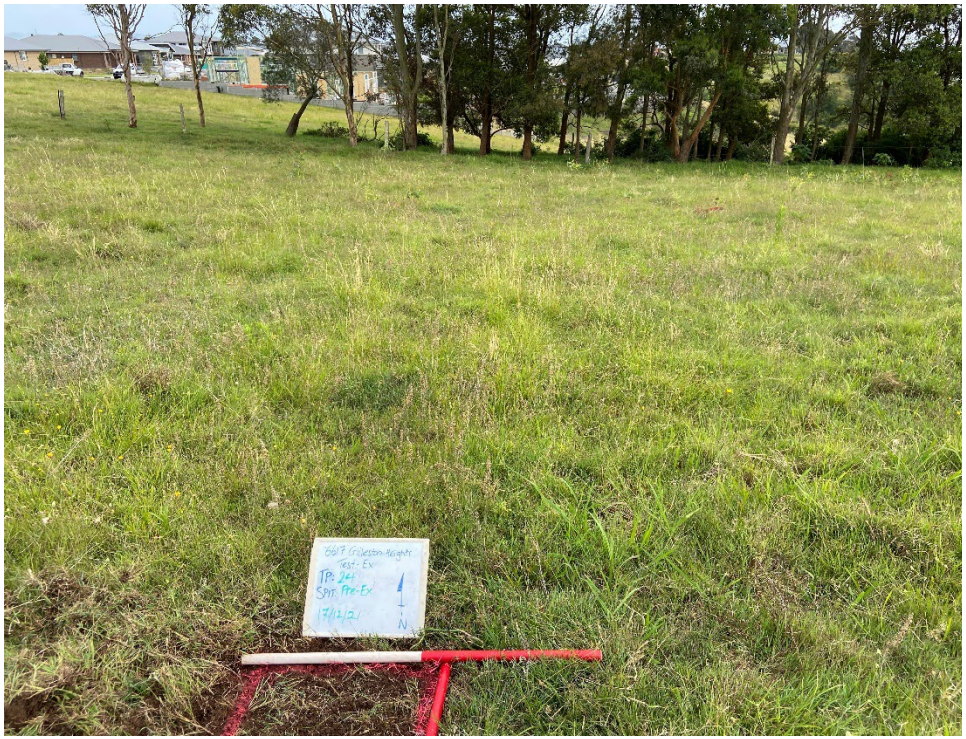

Plate 124: General location photo of test pit 24

Plate 125: End of excavation of test pit 24

Plate 126: Photo of northern wall section of test pit 24

Test Pit 25 – GH21-PAD3 (AHIMS ID# 38-4-2121)

Table 53: Test Pit 25 summary

XU	Start depth (cm)	End depth (cm)	Sediment description	Sediment consistency	Inclusions / disturbance	Notes/ Inclusions
1	0	10	Brown to dark brown soil with some clay	Loose	Roots, grass, gravels	Highly disturbed / mixed soil profiles
2	10	20	Mottled orange and brown clay	Compact	Gravels, bioturbation	

Plate 127: General location photo of test pit 25

Plate 128: End of excavation of test pit 25

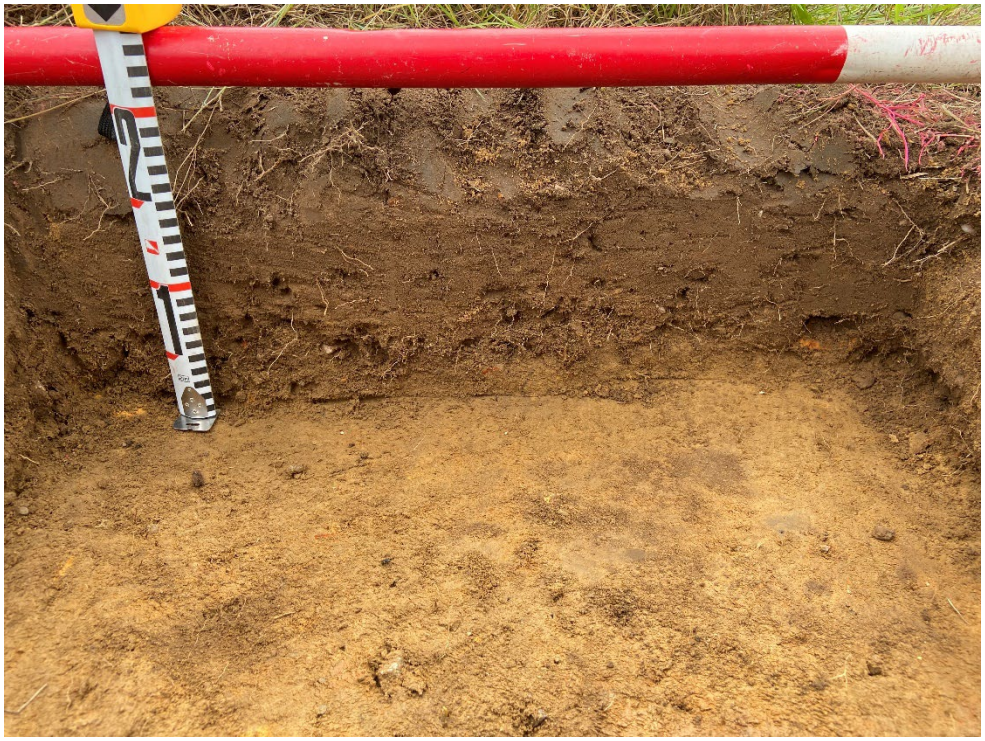

Plate 129: Photo of northern wall section of test pit 25

Test Pit 26 – GH21-PAD3 (AHIMS ID# 38-4-2121)

Table 54: Test Pit 26 summary

XU	Start depth (cm)	End depth (cm)	Sediment description	Sediment consistency	Inclusions / disturbance	Notes/ Inclusions
1	0	10	Dark brown sandy topsoil	Loose	Roots, gravels	
2	10	20	Brown sandy loam	Friable	Roots, gravels	
3	20	39	Brown sandy loam transitioning to orange/ yellow sandy clay	Firm	Rootlets, gravels	

Plate 130: General location photo of test pit 26

Plate 131: End of excavation of test pit 26

Plate 132: Photo of northern wall section of test pit 26

Test Pit 27 – GH21-PAD3 (AHIMS ID# 38-4-2121)

Table 55: Test Pit 27 summary

XU	Start depth (cm)	End depth (cm)	Sediment description	Sediment consistency	Inclusions / disturbance	Notes/ Inclusions
1	0	10	Dark brown sandy topsoil	Loose	Roots, grass	
2	10	20	Dark brown loosely compacted sandy loam	Loose	Roots, gravels (<5%), ants	
3	20	30	Brown sandy loam with some mottling of clay	Loose	Roots, gravels	
4	30	40	Brown sandy loam	Friable	Roots, gravels	
5	40	50	Transition from brown sandy loam to orange mottled sandy clay	Firm/ compact	Roots, gravels	

Plate 133: General location photo of test pit 27

Plate 134: End of excavation of test pit 27

Plate 135: Photo of northern wall section of test pit 27

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Illawarra
Port Macquarie
Cairns
Canberra
Coffs Harbour
Central Coast
Gold Coast

Our services

Ecology, biodiversity offsets and natural capital

Terrestrial ecology
Aquatic ecology
Biodiversity offsetting
Strategic advisory

Heritage management

Heritage planning and advice
Archaeology
Cultural heritage management

Environmental planning, approvals and management

Planning and advisory
Assessment and approvals
Management and compliance

Geospatial and knowledge management

Spatial visualisation, storage and analysis
Insight and risk management
Field operations support