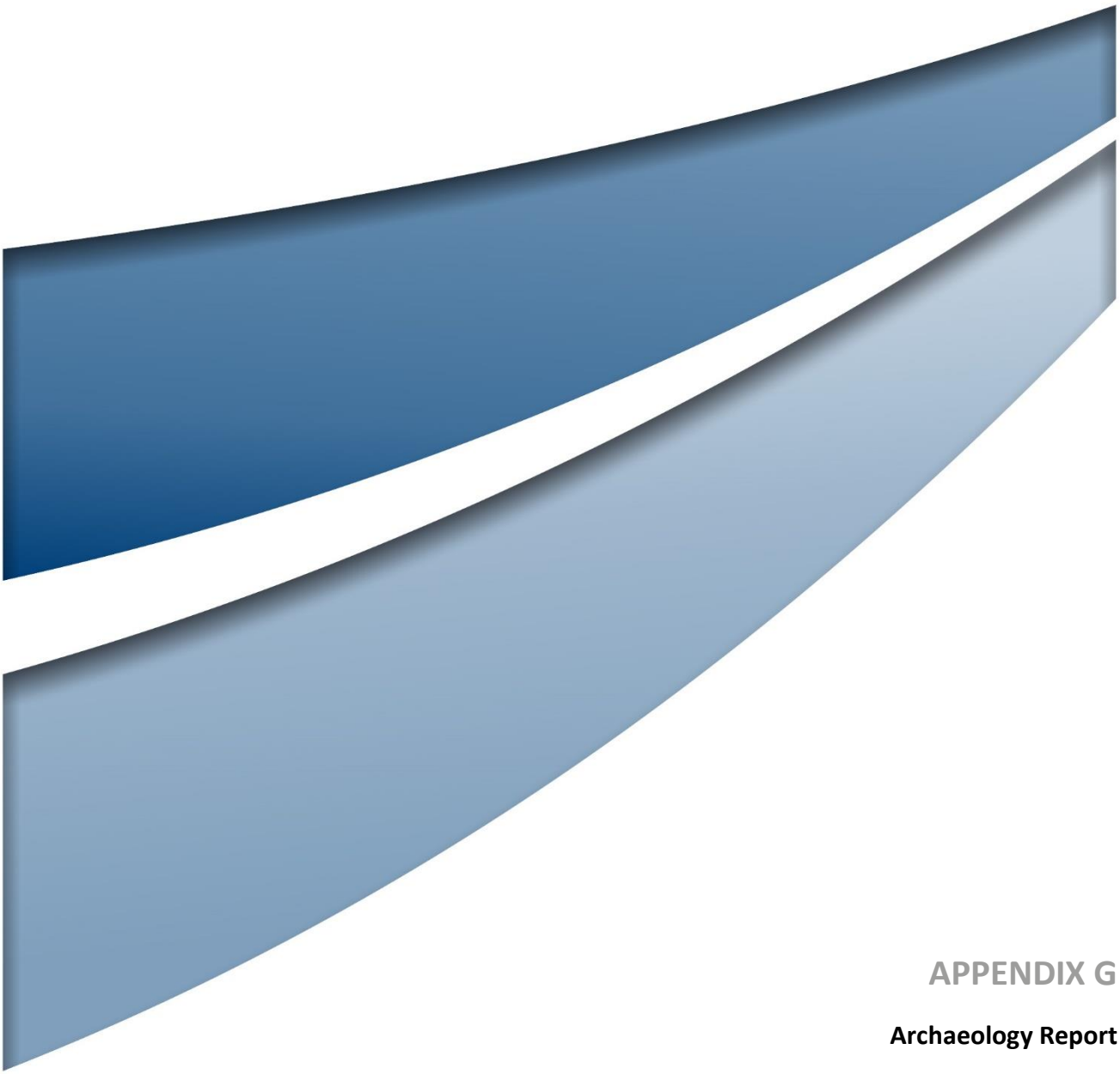

APPENDIX G

Archaeology Report

Silver City Energy Storage Project
Broken Hill, New South Wales

Archaeological Report

Report to Umwelt (Australia)

July 2024

v. 3.0

Lantern Heritage

shining a light on people and place

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Project Client
A-CAES NSW Pty Ltd

Project Name
Silver City Energy Storage Project
Broken Hill, NSW.

Archaeological Report

Project Reference Number
128-174

Local Government Area
City of Broken Hill

Report Authors
Jo Dibden, Christine Gant-Thompson, Elle Lillis and Amy Tabrett

Version	Date	Reviewer(s)	Notes /Changes
1.0	March 2023	Simon Greenwood	Initial draft
1.0	March 2023	Penelope Williams (Umwelt)	Initial review
1.1	March 2023	Lantern Heritage	Feedback incorporated
2.0	30 March 2023	Bec Parkes	Internal review of edits
2.0	April 2023	Penelope Williams/Lantern Heritage	2nd Client review and edits
2.1	July 2023	BHLALC/Lantern Heritage/Umwelt	RAP review and edits
2.2	February 2024	HNSW	HNSW
2.3	March 2024		Update of report with revised disturbance area
2.4	May 2024		BHLALC April 2024 workshop feedback incorporated
3.0	June 2024		Update of report with 2nd revision of disturbance area
3.0	22 July2024	Penelope Williams (Umwelt)	Revisions from client incorporated

EXECUTIVE SUMMARY

Project background

A-CAES NSW Pty Ltd (the Proponent), is proposing to construct the Silver City Energy Storage (SCES) Project (the Project) which will use advanced compressed air energy storage (A-CAES) technology to provide large-scale, long duration energy storage at Broken Hill, NSW.

The proposed SCES facility is located approximately 3 kilometres (km) northeast of Broken Hill within the Broken Hill City local government area (Figure 1). The Project is State Significant Development (SSD) and approval is sought via an application under Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act).

The Project consists of several components:

- the SCES facility which will utilise existing infrastructure at Potosi Mine (including mine shafts and underground workings). The SCES facility includes a 300 Mega Litre (ML) water reservoir and underground cavern for the storage of compressed air;
- a water pipeline connecting the existing Stephens Creek Water Pipeline to the SCES facility and
- a 16km long 220kV transmission line connecting the SCES facility to the TransGrid Broken Hill substation off Pinnacles Road, southwest of Broken Hill.

These project components have the potential to impact Aboriginal cultural heritage.

The Proponent commissioned Umwelt Pty Ltd (Australia) to prepare an Environmental Impact Statement (EIS) for the Project. Umwelt Pty Ltd commissioned Lantern Heritage Pty Ltd (Lantern Heritage) to prepare an Aboriginal cultural heritage assessment (ACHA) for the Project.

Field survey results

Archaeological field surveys of the Project Area were undertaken in two phases, Phase 1 during August 2022 and Phase 2 (following Project Area update) in February 2023. The surveys were completed by representatives from Lantern Heritage and Broken Hill Local Aboriginal Land Council (BHLALC).

Forty-four (44) Aboriginal sites were identified during the Phase 1 survey with a further twenty-one sites identified during the Phase 2 survey. Parts of the Project Area have been subject to prior survey associated with separate development assessment, therefore the total of sixty-five (65) sites recorded during both survey phases associated with the Project includes previously recorded and newly recorded sites.

During survey it was noted that the Project Area was subject to varying levels of disturbance from erosional forces and activities such as vegetation clearing, vehicle tracks, mining and rubbish dumping.

The initial Phase 1 assessment recommended a program of archaeological test excavation at seven test zones within four highly archaeologically sensitive landforms. The aim of testing was to determine the nature, extent and archaeological significance of each test zone.

Test excavation results

A total of seventy (70) test pits were excavated within seven test zones in February 2023 in accordance with the Office of Environment and Heritage Code of Practice for the Archaeological Investigation of Aboriginal Objects in New South Wales 2010.

Fifteen (15) of the seventy (70) test pits contained artefacts, and sixty-nine (69) artefactual specimens were recovered. Sixty-two (62) of these specimens (89.9%) were recovered from eleven pits within a 40m by 5m area in the southern end of testing zone 6 (see Appendix 4). Subsurface artefacts were not located in the test pits excavated in test zones 2, 9 or 10.

Excavation confirmed that there are various levels of disturbance throughout the Project Area and that subsurface integrity was highly variable within each test zone. The subsurface potential of all test zones was revised to low with the exception of zones 4 (moderate) and zone 6 (moderate-high at the southwest end of the Project Area).

Excavation showed that the surface artefact scatters on the plain and flats within the Project Area are likely located on lag surfaces subject to deflation or aeolian processes resulting in a loss of topsoil. Despite the variability of subsurface archaeological deposits, a program of surface salvage conducted with participation of RAPs recognised by the BHLALC and Wilyakali Aboriginal Corporation is recommended prior to construction. The recommended approach is a program of staged subsurface salvage within sites of moderate-high or greater scientific value and landforms with high archaeological sensitivity.

Aboriginal sites/objects identified within Project Area likely to be impacted by the Project

Direct impacts will result from the proposed works to the following 34 sites located within the Proposed Disturbance Area:

AHIMS #	Site Name	AHIMS #	Site Name
23-5-0170	Broken Hill (ACAES) AFT 1	23-5-0183	Broken Hill (ACAES) AFT 44
23-5-0177	Broken Hill (ACAES) AFT 13	23-5-0154	FD-IF16
23-5-0178	Broken Hill (ACAES) AFT 14	23-5-0123	PM-Q6
23-5-0179	Broken Hill (ACAES) AFT 15	23-5-0122	PM-Q5
23-5-0180	Broken Hill (ACAES) AFT/HTH 16	23-5-0121	PM-Q4
23-5-0169	Broken Hill (ACAES) AFT 18	23-5-0063	BH1-48
23-5-0168	Broken Hill (ACAES) AFT 19	23-5-0112	FD-G001
23-4-0697	Broken Hill (ACAES) AFT 20	23-5-0153	FD-IF7
23-4-0682	South airports regency area isolated artefacts	23-5-0156	FD-IF14
23-4-0698	Broken Hill (ACAES) AFT 22	23-5-0125	PM-G02
23-4-0699	Broken Hill (ACAES) AFT 23	23-5-0139	FD-IF02
23-4-0700	Broken Hill (ACAES) AFT 25	23-5-0171	Broken Hill (ACAES) AFT 3
31-1-0723	Broken Hill (ACAES) AFT/HTH 26	23-5-0172	Broken Hill (ACAES) AFT 4
23-4-0701	Broken Hill (ACAES) AFT 28	31-1-0725	Broken Hill (ACAES) AFT 41
23-4-0702	Broken Hill (ACAES) AFT 29	23-5-0185	Broken Hill (ACAES) AFT 53
23-4-0640 (duplicate of Kanandah 2 23-4-0641)	Kanandah 1	23-5-0131 (duplicate of PM-G04 23-5-0132)	PM-IF6
23-5-0152	FD-IF18	23-5-0186	Broken Hill (ACAES) HTH 52

Viewshed analysis of potential impacts on views to and from the Pinnacles was completed for the Project. The results of this analysis show that whilst it is undeniable that views of the transmission line will be most prominent at the western edge of the alignment, this visibility will not have a significant impact on the views to and from the Pinnacles or their aesthetic values.

Consultation

A draft copy of the ACHAR was forwarded to all Registered Aboriginal Parties (RAPs) for their review and comment prior to submission. No formal feedback was received from three of the five RAPs with Wilyakali Aboriginal Corporation referring to correspondence from BHLALC. As requested by BHLALC an additional 28 days was provided to review the draft report. BHLALC provided written feedback on 13 June 2023.

Following exhibition of the EIS, Lantern completed a number of changes to the draft reports based on feedback from BHLALC. On 6 April 2024 a meeting was held between the Proponent and

BHLALC. Lantern was unable to attend this meeting. The workshop discussed the Heritage NSW submission and the Lantern's changes to the ACHAR as requested by BHLALC in 2023. A number of additional changes were requested at this workshop by BHLALC. Lantern addressed these changes in both the ACHAR and AR.

This report has been revised to address the submission received from Heritage NSW during the exhibition period of the EIS and to capture the revised disturbance area proposed as an amendment to the Project. The project area has been revised to refine the extent of disturbance associated with the transmission line (however does not propose any change to the location of the infrastructure) and to accommodate the refined SCES Facility layout and provide sufficient space for temporary construction activities (laydown areas and vehicle man overing). The revised disturbance area is ~58 ha (previously ~46 ha).

Conclusion and recommendations

While avoidance of impacts to sites is the preferred mitigation measure, this is not possible in all cases. Where impacts to sites are unavoidable surface collection of artefacts and movement away from harm is the preferred strategy. A staged salvage approach is recommended at four sites with moderate-high or greater scientific value and in 19 landforms with high archaeological sensitivity. This targeted salvage approach is based on the results of test excavation and the extensive disturbance to the Project Area's sediment deposits from a range of previous activities.

The location for salvage excavations will be targeted using a geoarchaeological approach to archaeological prospection, based on borehole survey and deposit modelling. This approach provides a rapid and scientifically rigorous means of understanding site formation processes and the distribution of archaeologically sensitive sediments across large areas (Goldberg and Macphail, 2006; Historic England, 2015; Carey et al., 2017), such as the present Project Area.

Results of the borehole survey will allow a more accurate assessment of the archaeological potential across the entirety of the Project Area and will inform further stages of salvage excavation as detailed in Section 10.

On the basis of the investigations undertaken for the Project the following recommendations are made:

1. Preparation and implementation of a Cultural Heritage Management Plan (CHMP) in consultation with the Wilyakali Aboriginal Corporation and BHLALC RAPs, Heritage NSW and the Department of Planning and Environment.

2. That a program of staged salvage (surface and subsurface), following the stages outlined in Section 10.3 of the ACHAR is completed with participation of RAPs recognised by the BHLALC and the Wilyakali Aboriginal Corporation prior to construction. The salvage program comprises surface salvage of artefacts across the Disturbance Area and subsurface salvage within sites of moderate- high or greater scientific value and landforms with high archaeological sensitivity.

3. The final location of collected artefacts must be determined through consultation with RAPs recognised by BHLALC and the Wilyakali Aboriginal Corporation and Requirement 26 of the Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW (DECWW 2010b).

4. That prior to construction commencing, all contractors associated with the Project receive cultural heritage inductions delivered by a representative of BHLALC or Wilyakali Aboriginal Corporation.

5. In the event that Ancestral remains, or suspected Ancestral remains, are encountered during any of the proposed construction activities or salvage actions, all work must stop and the procedures outlined in the Salvage Methodology be implemented (Section 10).

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1 PROJECT OVERVIEW

1.1 Introduction

A-CAES NSW Pty Ltd. (the Proponent) is proposing the Silver City Energy Storage (SCES) Project (the Project) which will use Hydrostor's advanced compressed air energy storage (A-CAES) technology to provide large-scale, long duration energy storage at Broken Hill, NSW.

The Project Area is located on the outskirts of Broken Hill, extending in a linear curve commencing c. 3km northeast of the inland city and terminating c. 2km southwest of the city limits (Figure 1). The Project is classified as a State Significant Development (SSD), the Secretary's Environmental Assessment Requirements (SEARs) were issued on 30 September 2022 (SSD-47065463).

The Project proposes to utilise the established mine infrastructure at Potosi Mine approximately 3km northeast of Broken Hill and includes the construction of the SCES Facility (including underground cavern, approximately 300 ML water reservoir, access roads, creek diversion and above ground pipeline. The Project also includes an approximate 16 km transmission line (overhead with two in-ground sections) (Figure 2). These activities have the potential to impact Aboriginal cultural heritage. The activity area for the purposes of this assessment is defined as the proposed disturbance area and the activity is the Project.

In order to determine the possible impact(s) the Project may have on places and objects of Aboriginal cultural heritage; Umwelt have commissioned Lantern Heritage Pty. Ltd. to prepare an Aboriginal cultural heritage assessment (ACHA) for the Project.

This report documents the Aboriginal cultural heritage and archaeological assessment (ACHA) undertaken for the proposed activity, including background research, field survey and consultation with Registered Aboriginal Parties (RAPs). It was originally prepared as part of an Environmental Impact Statement (EIS) for the project. The ACHA details the overall assessments of cultural significance and potential impacts to Aboriginal cultural values.

The AR and ACHA have been revised to address submissions received from Heritage NSW during the exhibition period of the EIS and to capture the revised disturbance area proposed as an amendment to the Project. The project area has been revised to refine the extent of disturbance associated with the transmission line (however does not propose any change to the location of the infrastructure) and to accommodate the refined SCES Facility layout and provide sufficient space for temporary construction activities (laydown areas and vehicle man overing). The revised disturbance area is ~58 ha (previously ~46 ha).

This report has been prepared in accordance with the Guide to investigating, assessing and reporting on Aboriginal Cultural Heritage in NSW (OEH 2011) and the Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance (Australia ICOMOS, 2013). It is supported by the Silver City Energy Storage Project Archaeological Report (AR) (Appendix 1).

1.2 Location of Project Area

The Project Area as shown on Figure 1, is located within the Broken Hill LGA in the parishes of Picton, Soudan, Nadbuck, Naradin and Bolaira, County of Yancowinna. Proposed activities associated with the Project are shown in Figure 3.

The Project Area is located on gentle to moderate slopes rising to ridges of rock outcrops, relief ranging from c.30 to 200m, dissected by trellised drainage patterns including main tributaries to Willa Willyong Creek in the north, Acacia Creek and Kellys Creek in the south (see Figure 1). Willa Willyong, a semi-permanent creekline, runs northeast-southwest before heading east to north-east towards the artificial dam, Stephens Creek Reservoir. Kellys Creek and Acacia Creek, similarly semi- permanent watercourses, run in a south westerly direction eventually joining Pine Creek to the south.

The Project Area encompasses all aspects of the Project. All ground disturbance activities associated with the Project will be contained within the Proposed Disturbance Area associated with the conceptual layout.

1.3 Legislative Framework

The SSD and the SEARs was issued on 30 September 2022.

The SEARs require:

- an assessment of the impact to Aboriginal cultural heritage items (cultural and archaeological) in accordance with the Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW (OEH, 2011) and the Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW (DECCW, 2010), including results of archaeological test excavations (if required); and

- provide evidence of consultation with Aboriginal communities in determining and assessing impacts, developing options and selecting options and mitigation measures (including the final proposed measures), having regard to the Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW, 2010)

Aboriginal heritage is regulated by the NSW Heritage Division within Department of Planning and Environment (DPE), under the overriding ethos of the International Council on Monuments and Sites (ICOMOS) *Burra Charter.* As the Project is SSD under Part 4 of the *EP&A Act*, the Project is exempt from obtaining permits under the *National Parks and Wildlife Act* 1974 (*NP&W Act*).

1.3.1 Aims and Objectives

This Archaeological Report has been prepared to support the ACHAR for the Project. The assessment detailed in this report documents potential harm from the Project to Aboriginal objects. This report sets out which impacts are avoidable, and which are not, and where applicable, recommendations to reduce the extent and severity of harm to Aboriginal objects. It includes actions to be taken before, during and after an activity to manage and protect Aboriginal objects where harm cannot be avoided.

1.3.2 Report restrictions and copyright

This report is to remain confidential until consultation is complete and some information may remain confidential by request on the grounds of cultural heritage as noted below.

In accordance with BHLALC report review and feedback (refer to Table 8 of the ACHA), it is recommended culturally sensitive information is not to be shared or published without BHLALC agreement.

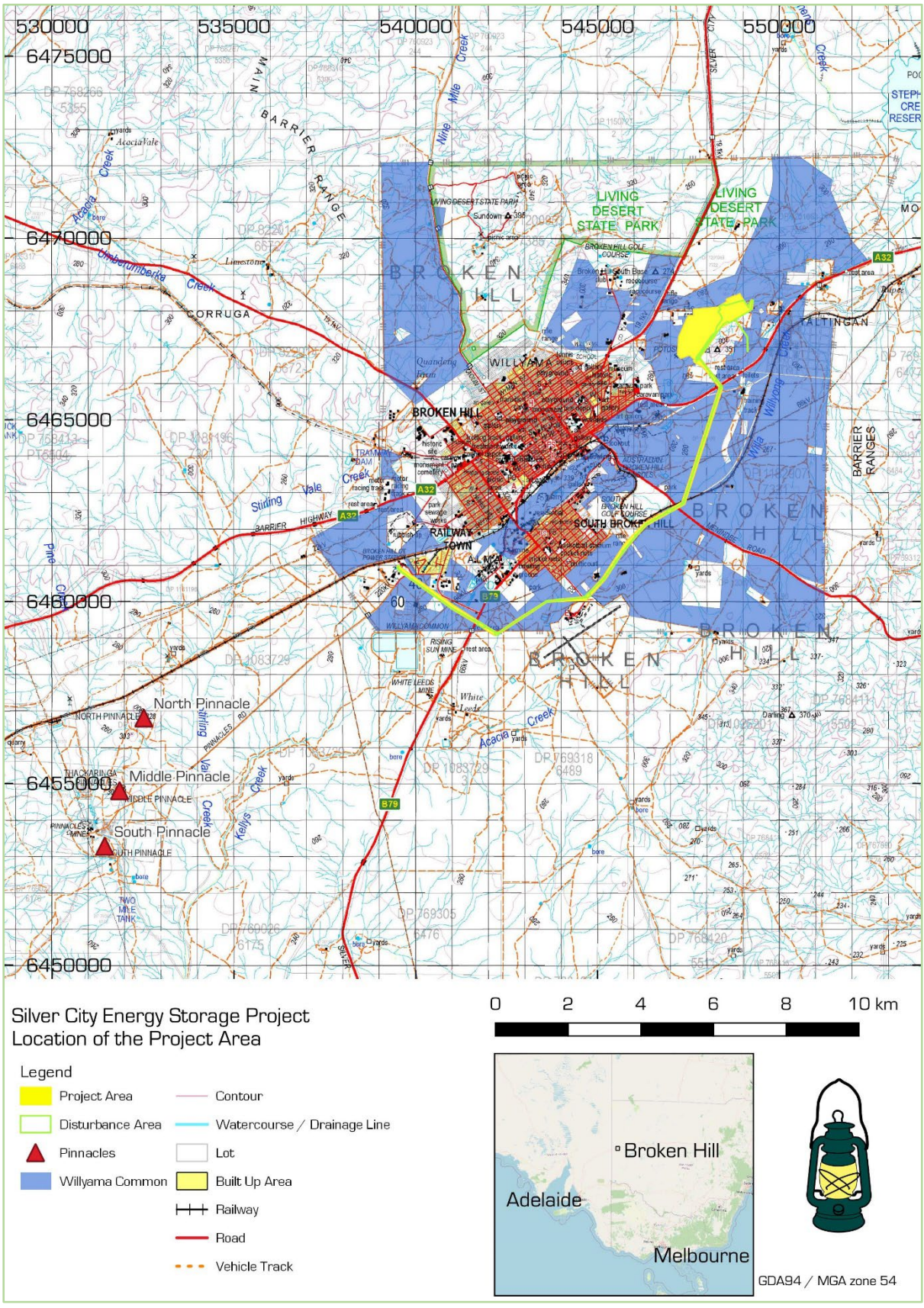


Figure 1: Location of the SCES Project Area, east of the City of Broken Hill, NSW.

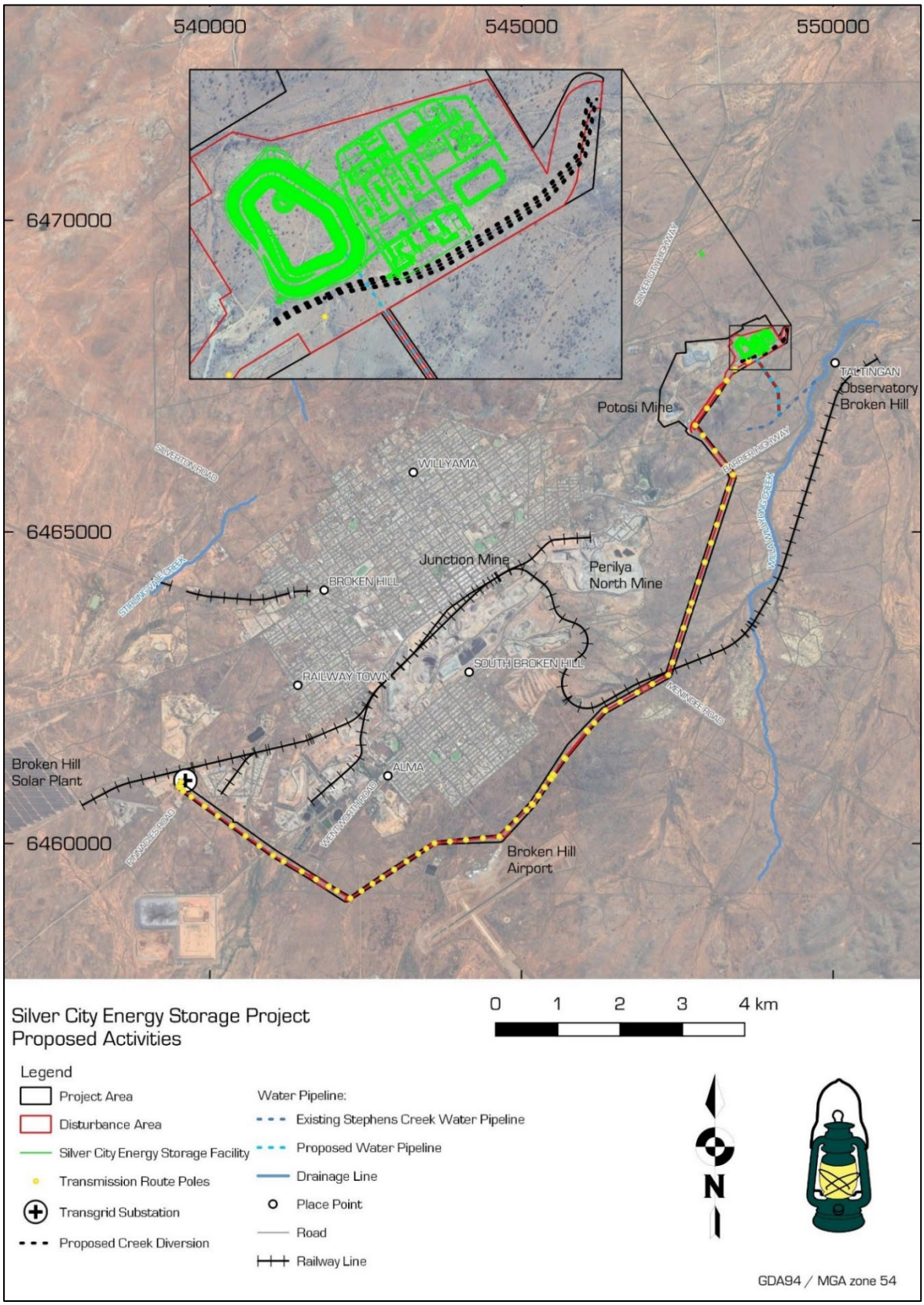


Figure 2: Conceptual Project Layout (supplied by Umwelt - March 2023)

1.4 Investigators and contributors

The following members of Lantern Heritage undertook the archaeological investigation documented in this report: Phase 1 field survey: Glenn van der Kolk (Archaeologist – Project Manager). Glenn holds a BA (Hons) and MA in archaeology and over 5 years' experience in investigation of Aboriginal archaeology. Glenn was assisted in the field by Dr Rebecca (Bec) Parkes, Director of Lantern Heritage. Rebecca has a BA (Hons) and a PhD in archaeology; she has over 20 years' experience in consulting archaeology in Australia.

The Lantern Heritage team was assisted in the Phase 1 survey of the Project area by representatives from the Registered Aboriginal Party (RAP) BHLALC, Abishai White, and Raymond O'Donnell Jnr.

Personnel involved in the archaeological test excavation and Phase 2 investigative work for the Project included Lantern Heritage staff and BHLALC staff. Lantern Heritage staff included Jo Dibden (Lead Archaeologist – Assistant Project Manager), Simon Greenwood (Senior Archaeologist – artefact specialist), Rebecca Vartto (Archaeologist), Elle Lillis (Archaeologist), Darren Rowsell (Archaeologist), and Glenn Merrick (Field Assistant).

The following representatives from BHLALC assisted the Lantern Heritage team in the two weeks test excavation program: Raymond O'Donnell (Jnr), Abishai White, Ricky Menz and Regan O'Donnell.

The background research, analysis of results and report writing were managed and undertaken by Jo Dibden, Christine Gant-Thompson, Conor McAdams and Elle Lillis. Simon Greenwood and Amy Tabrett provided lithic artefact analysis of finds recovered during the test excavation program.

Jo (BArch) has over 10 years' experience in Aboriginal cultural heritage assessments and Simon has 20 years' experience working in Cultural Heritage in Australia including consulting in both Victoria and NSW. Rebecca Vartto, Darren Rowsell and Elle Lillis each have over 10 years' experience in Australian archaeology.

Anna Raudino (Senior Archaeologist) and Simon Greenwood revised the Archaeological Report and Aboriginal Cultural Heritage Assessment Report.

2 DESCRIPTION OF THE PROJECT

2.1 The Proposed Activity

The Project consists of several components:

- the SCES facility which will utilise existing infrastructure and underground workings at the Potosi Mine approximately 3km northeast of Broken Hill. The SCES facility includes a ~300 Mega Litre (ML) water reservoir, creek diversion and underground cavern for the storage of compressed air;
- a water pipeline connecting the existing Stephens Creek Water Pipeline to the SCES facility and
- a ~16km long 220kV transmission line connecting the SCES facility to the TransGrid Broken Hill substation off Pinnacles Road, southwest of Broken Hill.

These project components have the potential to impact Aboriginal cultural heritage.

2.2 Potential Harm to Aboriginal Objects

The potential impacts associated with the Project are described in detail below.

2.2.1 SCES Facility and Associated Infrastructure

2.2.1.1 Construction of the SCES facility

Excavation of soil will have an impact on any Aboriginal objects. Movement of machinery during these activities will have an impact on Aboriginal objects located on the surface of the associated disturbance area. Any stockpiling of materials or laydown areas for machinery and implements may have a crushing impact on Aboriginal objects.

2.2.1.2 Construction of Creek Diversion

The earthworks required to divert an existing channel and the excavation of a new channel and levees has the potential to damage or displace Aboriginal objects. This range of works will result in surface and subsurface ground disturbance, and as such has the potential to directly harm any Aboriginal objects present in this area. Sites not currently impacted by water flows may subsequently be impacted due to the modification of the natural flood plain water catchment movements.

2.2.1.3 Construction of ~300ML surface water reservoir

Removal of vegetation, trees and topsoil followed by excavation of soil deposits to create a ~300ML above ground water reservoir. Excavation of soil will have an impact on any surface and subsurface Aboriginal objects. Movement of machinery during these activities will have an impact on Aboriginal objects located on the surface. Any stockpiling of materials may have a crushing impact on Aboriginal objects. Following construction works, appropriate erosion and sediment control measures will be implemented and maintained. This range of works has the potential to directly harm any Aboriginal objects present in this area.

2.2.1.3.1 Proposed above ground water pipelines

Placement of the proposed above ground water pipeline has the potential to damage or displace Aboriginal objects that may be present on the surface where the supports for the pipeline are laid. However, impacts are considered to be minor and limited in area.

2.2.2 Proposed Transmission Line

2.2.2.1 Construction of Overhead Transmission Line

Placement of transmission access/maintenance tracks (informal single lane) and approximately 16 km of overhead transmission lines and monopoles within a 25m to 50m easement across the Project Area. The full easement will not be disturbed, disturbance will be limited to the pole locations and establishment of access tracks in some locations. Works will include drilling of bore holes for each transmission pole which has the potential to damage or displace Aboriginal objects. In addition, installation of a temporary hardstand at each pole location is required. This range of works will result in ground disturbance, and as such has the potential to directly harm any Aboriginal objects present in this area.

2.2.2.2 Construction of Underground Power Line

Placement of approximately 750 metres (total) of inground powerline at the connection point to the substation and between Pole 29-30 at mid-section of the Project Area to mitigate potential impact during operation associated with the adjacent Rifle Range. Disturbance within the section of underground power line will be limited to the transmission line works. Proposed activities include the use of a large machine to dig a trench for the power cable and this action has the potential to damage or displace Aboriginal objects. This range of works has the potential to directly harm any Aboriginal objects present in this area.

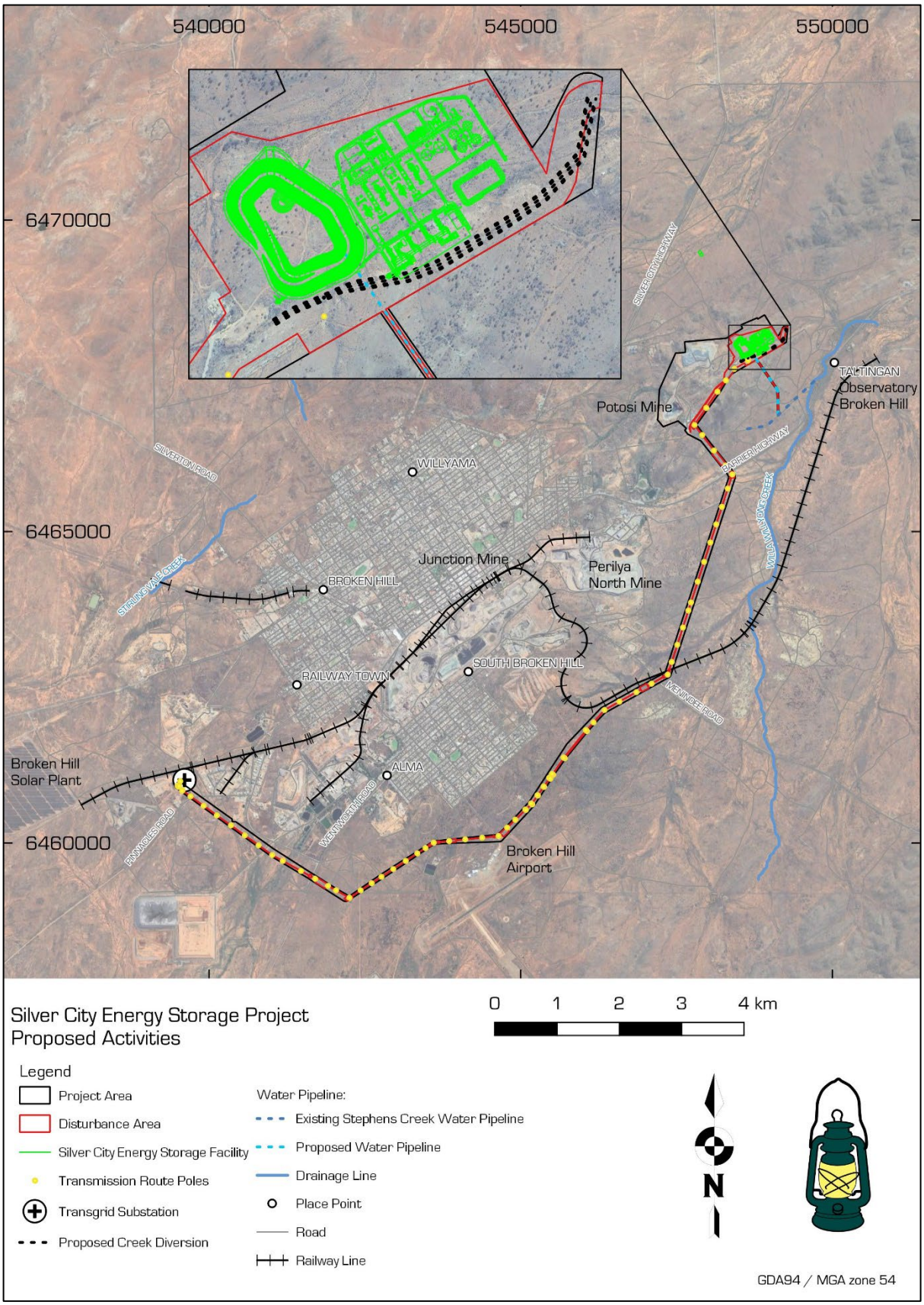


Figure 3: Proposed activities associated with the Silver City Energy System (SCES) Project (supplied by Umwelt - 2024)

3 LANDSCAPE CONTEXT

The Project Area is located within the Broken Hill Complex bioregion, which generally has a hot dry climate, occupying about 4.8% of NSW, and is bounded by the Murray-Darling Depression and Darling Riverine Plains bioregions in the south, and the Simpson-Strzelecki Dunefields and Mulga Lands bioregions in the north and east respectively (NPWS NSW, 2003: 41). The extremely complex geology of the Project Area is the dominant control on topography, and the contrast between ancient, exposed rock surfaces and layered Cenozoic sediments is a primary factor affecting the both the detection of archaeological sites in different parts of the landscape, and the approaches that are necessary to understand archaeological potential and site formation processes in the Australian arid zone (Holdaway and Fanning 2014). Unpredictable climatic conditions and the intensive nature of historic disturbance are also important factors (Douglass 2010: 48).

3.1 Geological context

The basement rocks of the Project Area are part of the Curnamona Province, a 300 km-wide, near-circular area of (late) Palaeoproterozoic (2.5–1.6 Ga) to Mesoproterozoic (1.6–1 Ga) basement rocks that stretches across the northeast of South Australia and west of New South Wales (Conor and Preiss 2008). These ancient rocks are largely obscured by younger sediments, but outcrops are present in the Project Area (Figure 4, Figure 5). These geological features are known as the Willyama inliers (Stevens *et al*. 2008) and consist of very ancient metasediments (gneiss, schists, amphibolite, granites and pegmatites) with northeast trending structural features that determine the topography of the Barrier Ranges. These rock formations contain raw materials that were as useful to Aboriginal communities for tool manufacture (Holdaway *et al.* 2008), as they were attractive to miners seeking rare and precious ores in the historic period. Overlying these ancient basement rocks are complex, Cenozoic sedimentary sequences.

The Project Area is situated in NSW's arid zone, where rainfall is extremely limited. Irregularity in precipitation, a defining feature of Australia's arid zone (Holdaway and Fanning 2014), means that these sediments may be reworked by flood events and either contain little archaeology - as flood events and environmental processes remove artefacts from dynamic landscape settings - or contain archaeological evidence from multiple periods that have either accumulated gradually in a stable landform context, been forcibly combined by extreme weather events, or gradually intermingled through erosive processes (Douglass 2010). Historic disturbance related to mining and agriculture have had a range of impacts on these sediments, further complicating any assessment of archaeological potential within the Project Area. Figure 6 to Figure 8 show the recorded distribution of sedimentary deposits throughout the Project Area. Quaternary alluvial and colluvial deposits are the most likely to retain relatively intact archaeological remains.

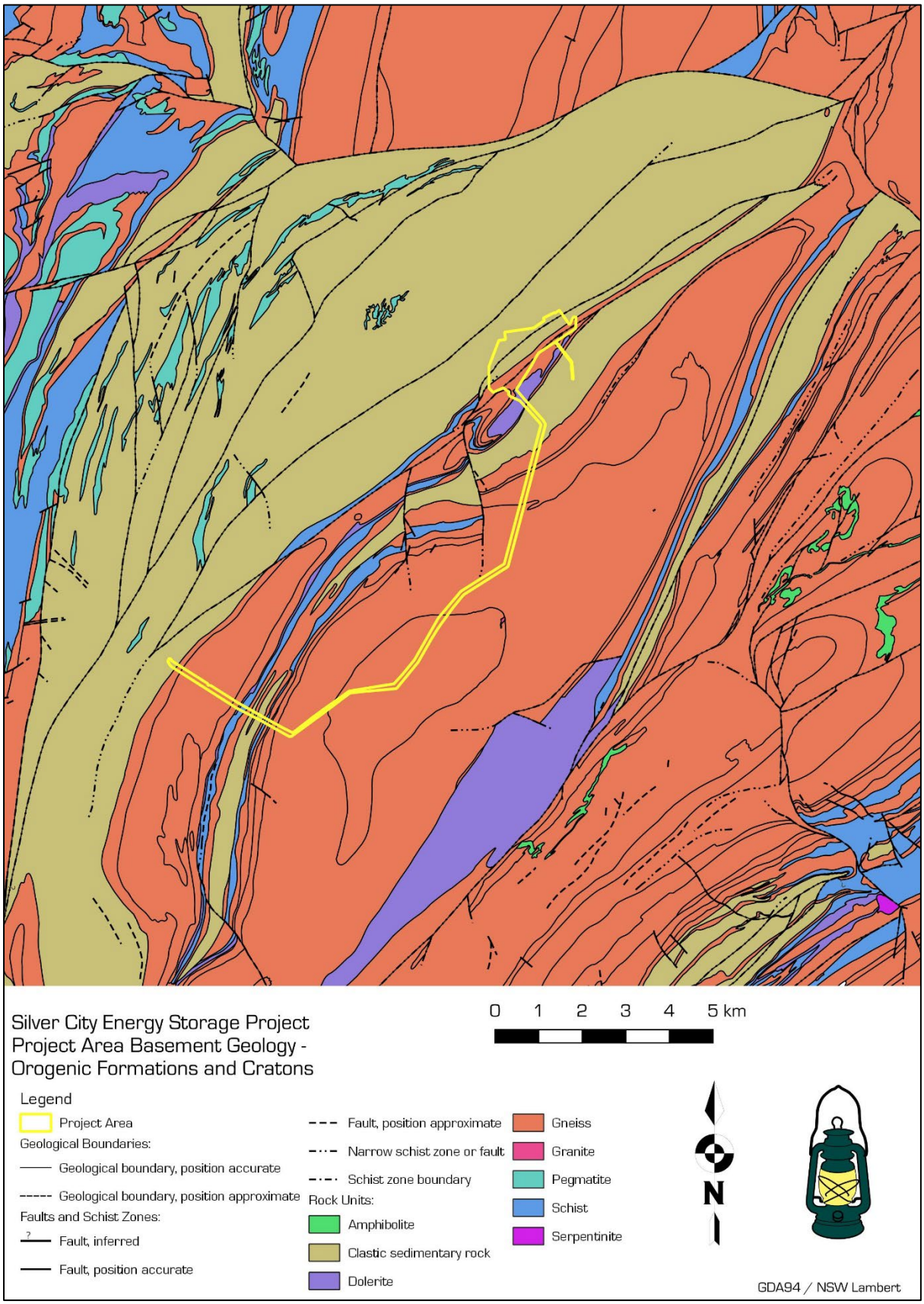


Figure 4: Basement geological context of the Project Area [NSW seamless geology dataset 2022].

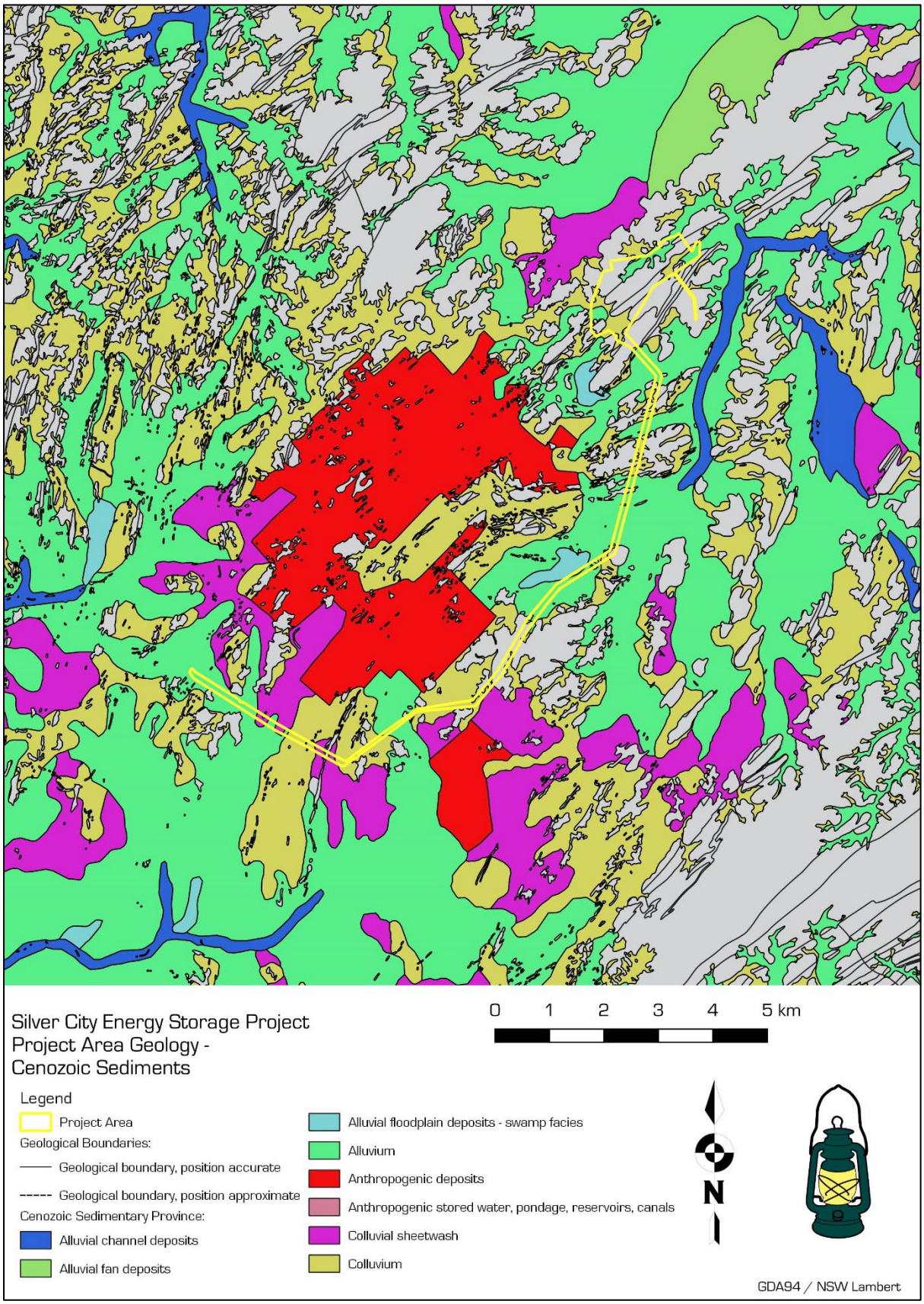


Figure 5: Cenozoic sediments surrounding the Project Area [NSW seamless geology dataset 2022].

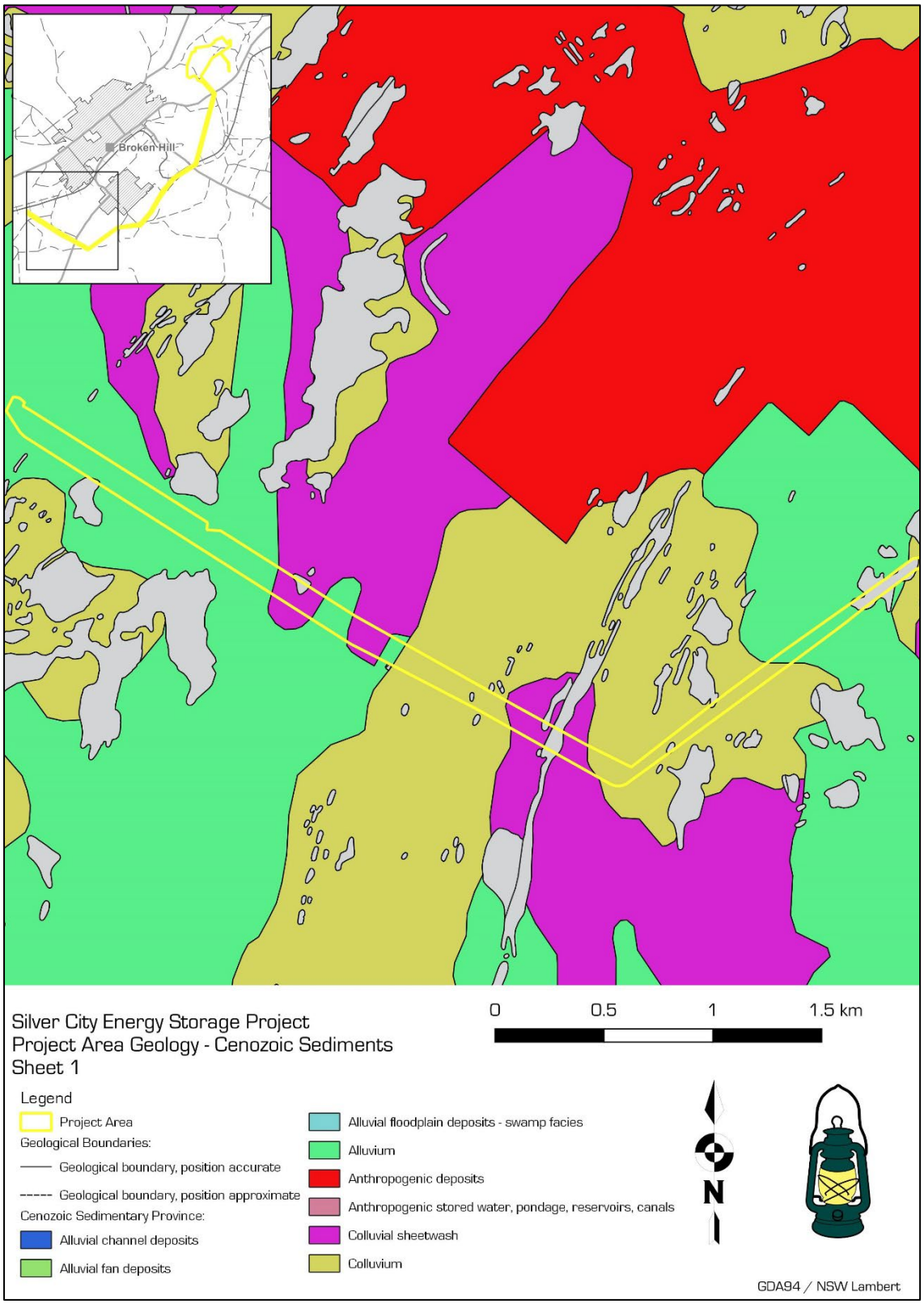


Figure 6: Sediments surrounding the Project Area Section 1 [NSW seamless geology dataset 2022].

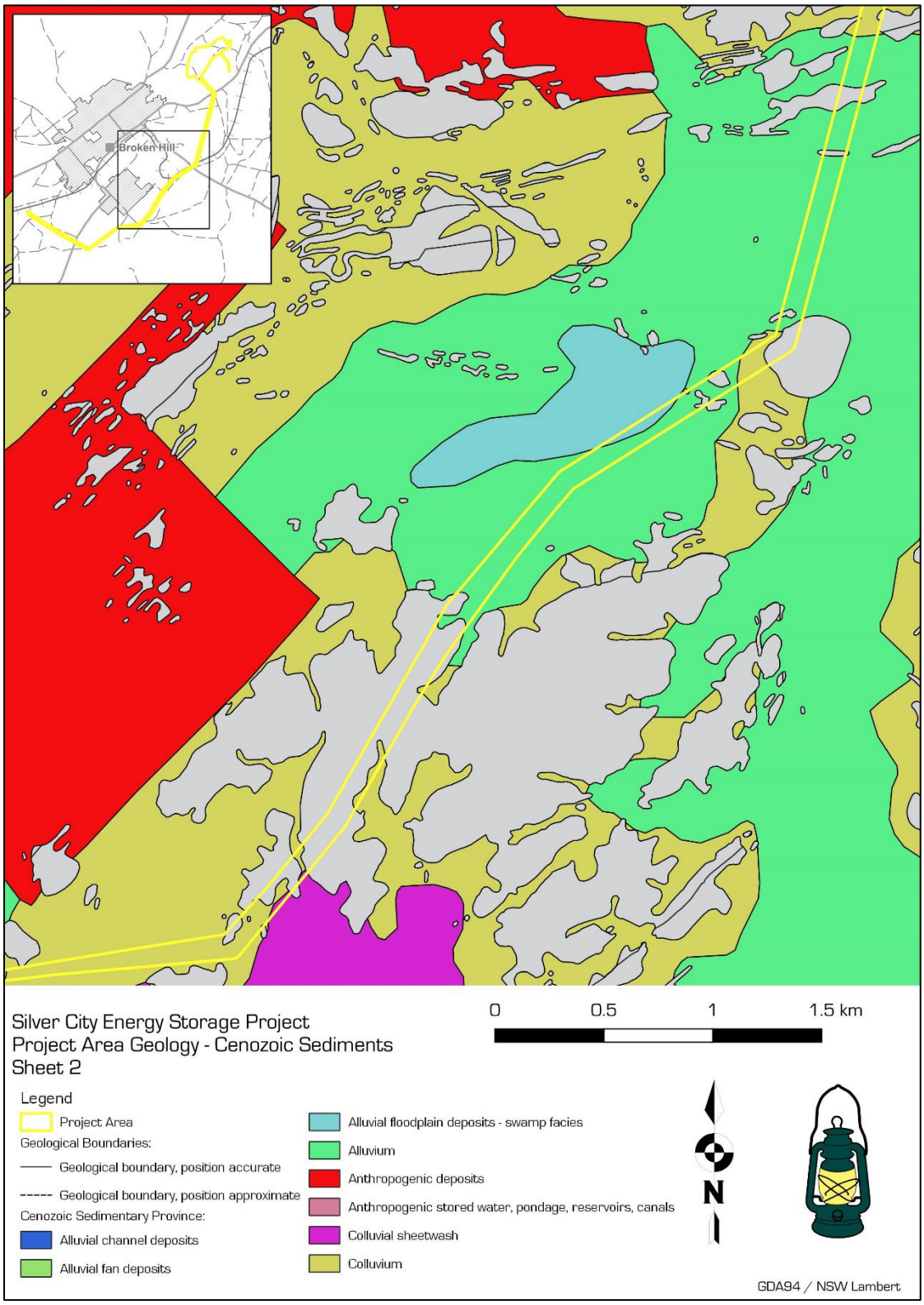


Figure 7: Sediments surrounding the Project Area Section 2 [NSW seamless geology dataset 2022]

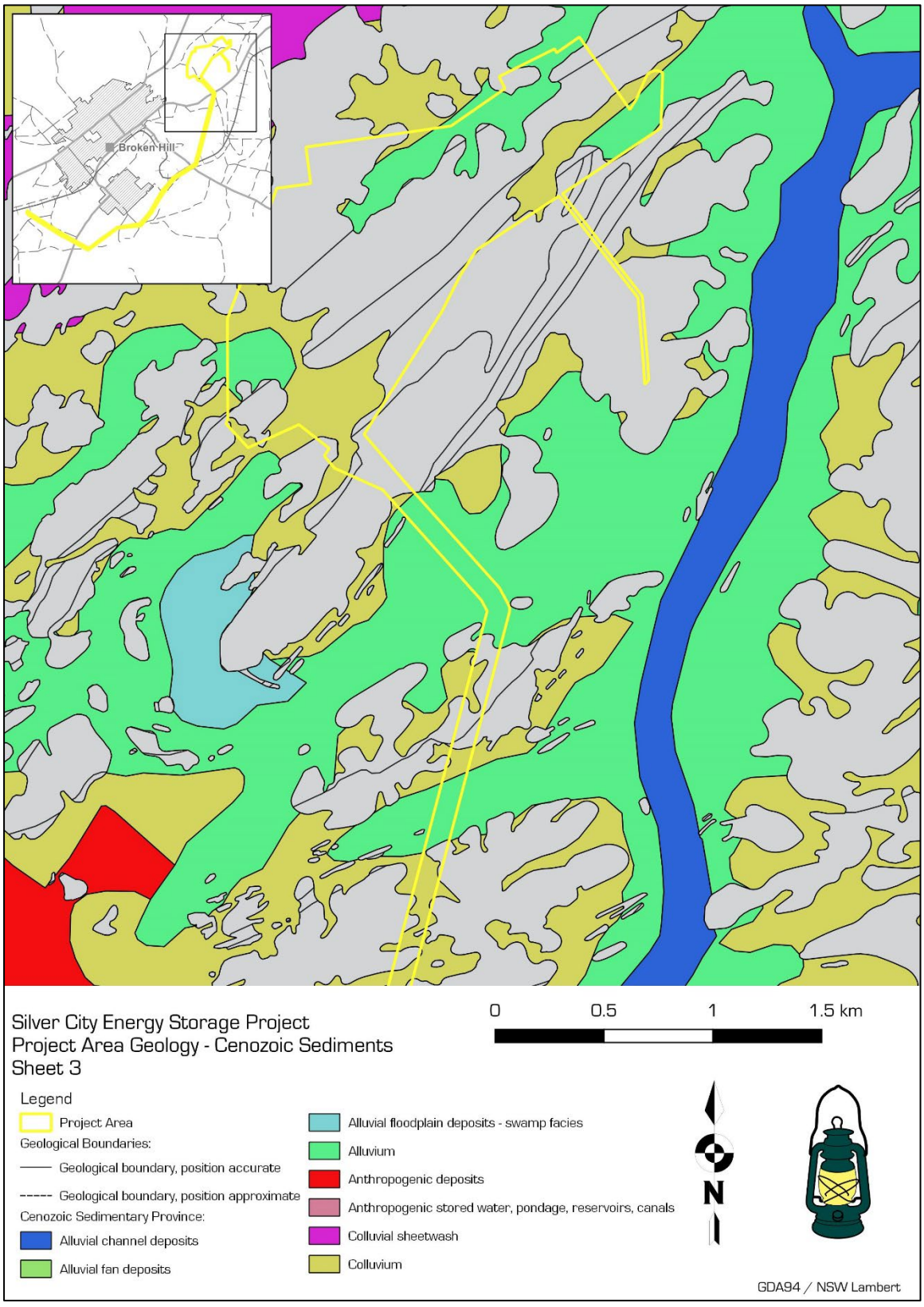


Figure 8: Sediments surrounding the Project Area Section 3 [NSW seamless geology dataset 2022]

3.2 Landscapes, hydrology and geomorphology

Within the Project Area, Mitchell (2002) identified two distinct Mitchell landscapes that roughly correspond to each of these contrasting geological substrates (Figure 8). Broadly speaking, the Barrier Ranges landscape is formed on the exposed areas of basement rock, while the Barrier Downs landscape is formed on the areas of Cenozoic deposit.

3.2.1 Barrier Ranges Landscape

The Barrier Ranges Mitchell landscape, which in the Project Area corresponds to the Barrier land system (State Government of NSW and Department of Planning and Environment 1991), is formed on densely dissected ranges of lower to middle Proterozoic metamorphic rocks and steep, partly bevelled, asymmetric strike ridges on associated dipping upper Proterozoic quartzite, sandstone and shales.

Localised relief ranges from 30 to 200m and watercourses form trellised drainage patterns in strike valleys (Figure 8), which are narrow and incised in higher relief country. These drainage tracts are associated with reddish brown and yellowish-brown texture-contrast soils and contain coarse sands in channels.

Rock outcrops are common and lithosols are found on steep upper slopes. Red texture-contrast soils form on colluvially active lower slopes of metamorphic rock, while shallow, poorly-sorted reddish-brown sands form on calcareous sandstone. Erosional processes are dominated by minor to moderate watersheeting, rilling and gullying of drainage lines, with limited scald formation in lower relief areas and valley bottoms.

Vegetation on Rocky crests with little soil support scattered mulga (*Acacia aneura*), dead finish (*Acacia tetragonophylla*), black bluebush (*Maireana pyramidata*) and bottlewashers (*Enneapogon sp.).* Upper slopes carry mulga, black bluebush, pearl bluebush (*Maireana sedifolia*), bladder saltbush (*Atriplex vesicaria*), copperburr (*Sclerolaena sp.)* and grasses. Thorny saltbush (*Rhagodia spinescens*), prickly wattle (*Acacia victoriae*), belah (*Casuarina cristata*) and black bluebush are present on lower slopes. Alluvial flats support black bluebush, bladder saltbush, belah, prickly wattle, copperburr, bottlewashers, Sida sp. and grasses.

3.2.2 Barrier Downs landscape

The Barrier Downs Mitchell landscape (Mitchell, 2002), corresponding to the Nine Mile landsystem within the Project Area (State Government of NSW and Department of Planning and Environment 1991), is a complex ecosystem formed on the low strike ridges of rock outcrop, slopes and outwash areas of the Barrier Ranges. It consists of steeply rolling lowlands on pre-Cambrian dolomite, calcareous shale with steeply dipping Devonian sandstone and conglomerate. Drainage patterns in this landscape occurs through channels incised up to 3m deep and 50m wide. These are associated with sand or clay levees up to 50 m wide (State Government of NSW and Department of Planning and Environment 1991).

Within the Project Area lithosols or shallow calcareous sandy loams are found on ridges Mitchell (2002), while contour banded slopes are characterised by alternating stony red desert loams and stone-free red clays or solonized brown soils on long slopes. Dunes of deep clayey sand are common, while stony, reddish-brown calcareous sandy loams are found along drainage tracts and alluvial flats with brown self-mulching cracking clays.

Ridges are vegetated with scattered mulga (*Acacia aneura*), prickly wattle (*Acacia victoriae*), low bluebush (*Maireana astrotricha*), scattered black bluebush (*Maireana pyramidata*), dead finish (*Acacia tetragonophylla*), some pearl bluebush (*Maireana sedifolia*) and isolated harlequin fuchsia (*Eremophila duttonii*). Slopes are populated with isolated mulga and needlewood (*Hakea leucoptera*) with scattered shrubs; local stands of dense low bluebush, contour banded bladder saltbush (*Atriplex vesicaria*), cabbage-tree wattle (*Acacia cana*), belah (*Casuarina cristata*), and pearl bluebush (*Maireana sedifolia*), with local clumps of moderately dense belah (*Casuarina cristata*) and mulga, abundant bottlewashers (*Enneapogon sp.*) and copperburr (*Sclerolaena sp.*). Flats are populated with copperburr, thorny saltbush (*Rhagodia spinescens*) and grasses

and drainage lines with prickly wattle, western boobialla (*Myoporum montanum*), sandalwood (*Santalum lanceolatum*), rosewood (*Alectryon oleifolium*), belah (*Casuarina cristata*), white cypress pine (*Callitris glaucophylla*) and black box (*Eucalyptus largiflorens*).

3.2.3 Summary

The Project Area is situated in an extremely complex environment in terms of geology, geomorphology, pedology and hydrology. The dynamic, varied and complex nature of deposits that are likely to be encountered, along with the extensive historic impacts that can be anticipated, make it difficult to accurately assess the archaeological potential of specific areas within the Project Area based on a background environmental study. A number of general observations can, however, be made:

- Stratified archaeological sites and materials are most likely to be encountered in undisturbed areas of quaternary alluvium and colluvium.
- The drainage systems that operate within the Project Area mean that associated sediments are most likely to be encountered in lower-lying areas that correspond with the Barrier Downs Mitchell Landscape.
- Higher areas are likely to be associated with the outcropping basement rocks that form the foothills of the Barrier Ranges, with thin soils and steeply incised, trellised drainage channels. In these areas it is most likely that stone quarries and surface scatters will be encountered, probably accumulated due to erosional and deflationary processes.

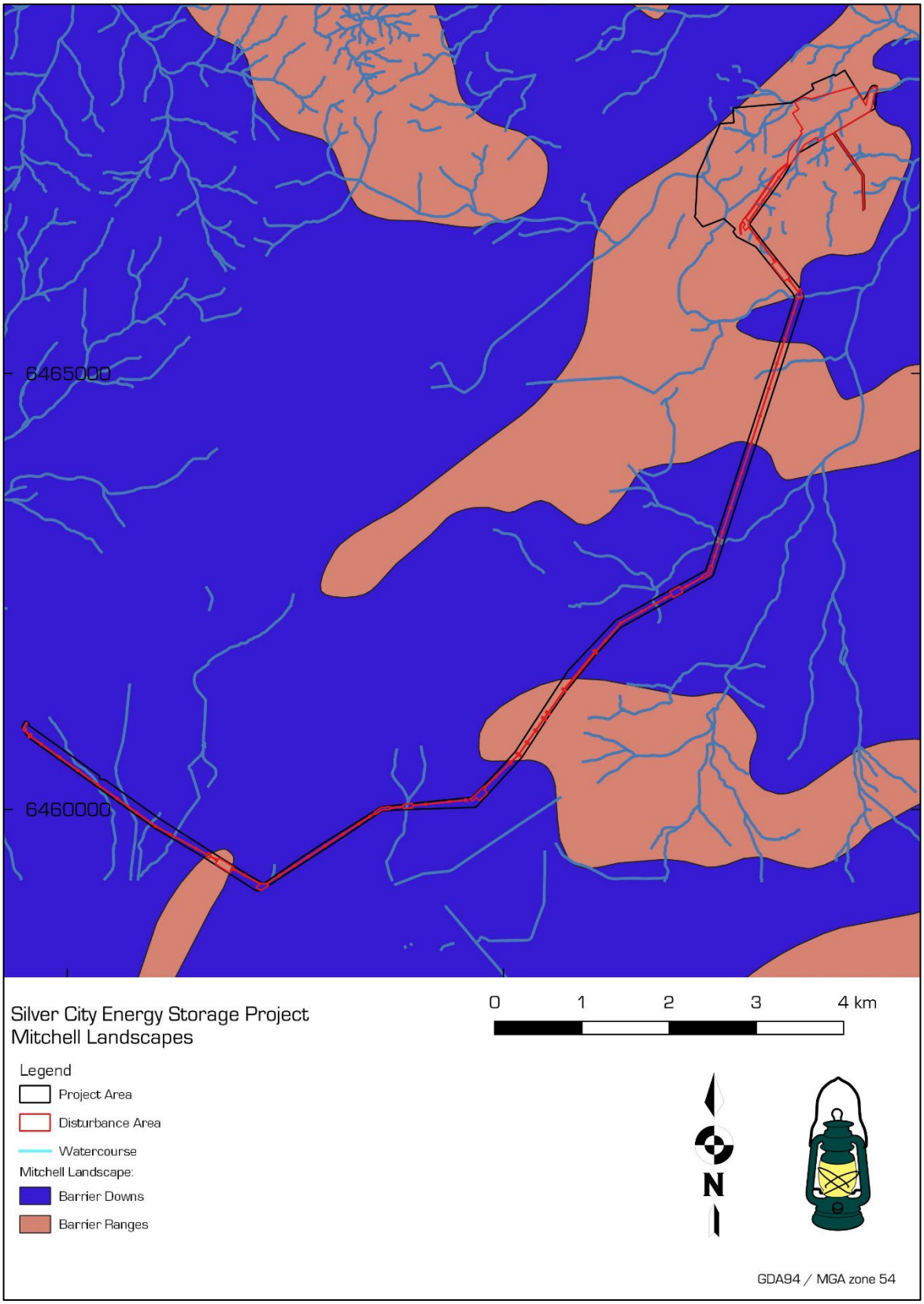


Figure 9: Mitchell landscapes and hydrology of the *Project Area* (Mitchell, 2002)

3.3 Land-use History

Early colonial settlement of far western NSW took place along the major waterways, which coincided with locations that the majority of Aboriginal groups concentrated their activities. By the 1870's, most of these far west Aboriginal tribal groups were dispossessed of their traditional lands and losing resource gathering rights, with only the most arid dwelling Aboriginal people traditionally subsisting (NPWS 2003).

During the 1860's and 1870's, colonial station owners utilised local Aboriginal men as stockmen and shearers and the Aboriginal women as domestic helpers (HO and DUAP 1996). Colonial settlement in the region restricted the traditional Aboriginal way of life and forced reliance on missions and stations in order to exist.

As detailed in Section 5, a combination of timber clearing (to fuel steam trains and use as mine props) and heavy stocking rates associated with colonial settlement as well as low rainfall resulted in major reduction in ground cover causing significant and widespread erosion in the region (colossal losses of the characteristic red soils of the far west) (HO and DUOP 1996; NSW NPWS 1991).

Following the discovery of silver and lead lodes at Mount Gipps in 1883, Broken Hill was established as the major township in the Broken Hill Complex bioregion by 1885 (NPSW 2003). The 1920's saw the development of several new mines in the region boosting Broken Hill's population growth and at the same time, placing pressure on the town's water supply (water had to be transported from the Darling River) (NPWS 2003; NSW NPWS 1991). The prior and existing incidence of extensive mining activities within and near to the Project Area have caused changes to the terrain within the immediate area at the Potosi Mine and surrounding the Project Area, having an associated effect on the archaeological resource.

The Project Area has been subject to numerous prior impacts including vegetation clearance, livestock grazing, construction of main roads and recreational trails, mineral mining and construction of associated infrastructure. The degree of impacts vary greatly along the length of the Project Area, with greatest impacts within the Potosi Mine located at the northern end and at the far southwestern end in areas of many braided tracks, buried water pipes and a high voltage transmission line corridor. Areas of minimal previous impacts include the low strike rocky ridges.

3.4 Natural resources and features

The Project Area falls within land that has been occupied by Aboriginal peoples for thousands of years prior to colonial settlement in the area. Aboriginal populations utilised both bodies of water and land resources for a variety of uses including food, medicines and raw materials. It is also likely fire management techniques were used on local vegetation.

Aboriginal people thrived on the seasonal food resources available across the semi-arid regions of NSW. Small tubers were in season during spring, summer and autumn, with wattle seeds plentiful in July and August. Lizards, birds and large grazing marsupials such as wallabies and kangaroos were hunted throughout the year. Within the Project Area, there are a number of high points with drainage lines that would have provided intermittent water sources that supplemented the more reliable water from Willa Willyong Creek and tributaries of the Darling River. Within the Darling River catchments a variety of aquatic resources including nardoo, waterfowl, fish, turtles and crayfish were harvested (NPWS 2003).

While the vegetation throughout the Broken Hill region has undergone substantial change during the past 150-200 years, the undulating lowlands, ridges of rock outcrop, sandplains and outwash areas would have provided a variety of resources for tools, habitation and food. Traditionally, Wilyakali Aboriginal Corporation (aka Wiljakali) people occupied the lands around Broken Hill (HO and DUAP 1996) and also participated in annual journey to the Menindee Lakes to visit the Barkindji people (NPWS 2003).

4 ABORIGINAL ARCHAEOLOGICAL CONTEXT

An extensive site search was conducted via the Aboriginal Heritage Information Management System (AHIMS) on the 6th June 2022 (AHIMS Search . #688761). The search was conducted in GDA, Zone 54, utilising a search area defined by a GIS Shape File to include the Project Area with a buffer of 2km (Appendix 1).

4.1 AHIMS search results

One hundred and six (106) Aboriginal sites or objects were listed as being present within the AHIMS search area (Table 1). Of these, 24 are sites previously recorded within or less than 100 metres from the Project Area (see Table 3). Figure 9 illustrates the locations of these sites relative to the southern end of the Project Area and Figure 10, the northern end.

Table 2 provides an overview of the previously recorded sites within or adjacent to the Project Area according to site types and features.

The majority of sites are artefact scatters (87). Other site types include 13 quarries, three Potential Archaeological Deposits (PAD) and one each of resource/gathering site, hearth, and ceremonial sites. The mapping in Figure 10 and Figure 11 shows that sites tend to be clustered along sources of freshwater near to current residential and commercial infrastructure. For further reference, a near image of these features in relation to the far northern end of the Project Area is provided in Appendix 1. The occurrence of sites adjacent to these areas is a reflection of archaeological investigations undertaken as part of the approval process for the associated developments.

Table 1: Summary of AHIMS search results

AHIMS	Site Name	Site Type/Features
23-5-0121	PM-Q4	Stone Quarry
23-5-0153	FD-IF7	Isolated artefact
23-5-0063	BH1-48	Artefact Scatter
23-5-0014	Royal Flying Doc. Mast	Artefact Scatter
23-5-0030	Roy. Fly. Doc. Mast 19	Artefact Scatter
23-5-0136	FD-IF05	Isolated artefact
23-4-0637	Mawsons Quarry Isolated Find 1	Isolated artefact
23-4-0132	South Broken Hill	Artefact Scatter
23-5-0122	PM-Q5	Stone Quarry
23-5-0131	PM-IF6	Isolated artefact
23-5-0157	Access track to railway artefact scatter	Artefact Scatter
23-5-0134	FD-IF08	Isolated artefact
23-5-0148	FD-IF09	Isolated artefact
23-5-0064	BH1-49	Artefact Scatter
23-5-0024	Roy. Fly. Doc. Mast 13	Artefact Scatter
23-5-0025	Roy. Fly. Doc. Mast 12	Artefact Scatter
23-5-0029	Roy. Fly. Doc. Mast 17	Artefact Scatter
23-5-0028	Roy. Fly. Doc. Mast 16	Artefact Scatter
23-5-0143	FD05	Artefact Scatter

AHIMS	Site Name	Site Type/Features
23-5-0066	BH1-54	Artefact Scatter
23-4-0626	Broken Hill Solar - Site #11	Artefact Scatter
23-4-0088	AS9	Artefact Scatter-Destroyed
23-4-0089	AS10	Artefact Scatter-Destroyed
23-4-0085	AS6	Artefact Scatter
23-4-0112	AS2	Stone Quarry
23-5-0132	PM-G04	Artefact Scatter
23-5-0123	PM-Q6	Stone Quarry
23-5-0119	PM-Q2	Artefact Scatter
23-5-0150	FD-IF13	Isolated artefact
23-5-0114	PM-IF1	Isolated artefact
23-5-0015	Royal Flying Doc. Mast	Artefact Scatter
23-5-0145	FD-IF07	Isolated artefact
23-5-0128	FD01	Artefact Scatter/PAD
23-4-0636	Mawsons Quarry Ab. Quarry 1	Stone Quarry
23-5-0141	FD08	Artefact Scatter
23-5-0110	FD07	Artefact Scatter
23-5-0146	FD-IF19	Isolated artefact
23-5-0127	PM-Q7	Stone Quarry
23-5-0125	PM-G02	Artefact Scatter
23-5-0062	BH1-47	Artefact Scatter
23-5-0147	FD-IF10	Isolated artefact
23-5-0018	Royal Flying Doc. Mast;	Artefact Scatter
23-5-0019	Royal Flying Doc. Mast;	Artefact Scatter
23-5-0130	PM-SC10	Artefact Scatter
23-5-0135	FD-IF06	Isolated artefact
23-5-0137	FD-IF04	Isolated artefact
23-5-0065	BH1-51/53	Artefact Scatter
23-5-0115	PM-IF3	Isolated artefact
23-5-0144	FD02	Artefact Scatter/PAD/Aboriginal Ceremony and Dreaming
23-4-0639	Mawsons Quarry Open Site	Artefact Scatter
23-4-0641	Kanandah 2	Artefact Scatter
23-4-0090	AS12	Stone Quarry-Destroyed
23-4-0084	AS5	Artefact Scatter-Destroyed
23-5-0120	PM-Q3	Stone Quarry
23-5-0140	FD-IF01	Isolated artefact
23-5-0126	PM-G03	Artefact Scatter

AHIMS	Site Name	Site Type/Features
23-5-0113	PM-SC7	Artefact Scatter
23-5-0017	Royal Flying Doc Mast	Artefact Scatter
23-5-0020	Royal Flying Doc. Mast	Artefact Scatter
23-5-0013	Royal Flying Doc. Mast	Artefact Scatter
23-5-0108	FD06	Artefact Scatter/PAD
23-5-0142	FD03	Artefact Scatter/PAD
23-5-0116	PM-IF4	Isolated artefact
23-4-0093	AS14	Stone Quarry-Destroyed
23-4-0111	AS11	Artefact Scatter-Destroyed
23-4-0691	BESS-AS1-21	Artefact Scatter
23-5-0139	FD-IF02	Isolated artefact
23-5-0111	PM-SC5	Artefact Scatter
23-5-0151	FD-IF15	Isolated artefact
23-5-0152	FD-IF18	Isolated artefact
23-5-0107	PM-SC1	Artefact Scatter
23-5-0021	Royal Flying Doc. Mast	Artefact Scatter
23-5-0149	FD-IF11	Isolated artefact
23-5-0097	Taltingan	Artefact Scatter
23-4-0638	Mawsons Quarry Open Site 2	Artefact Scatter
23-4-0107	AS13	Stone Quarry-Destroyed
23-4-0092	AS15	Artefact Scatter-Destroyed
23-4-0087	AS8	Artefact Scatter-Destroyed
23-4-0086	AS7	Artefact Scatter-Destroyed
23-4-0082	AS3	Aboriginal Resources and Gathering
23-4-0081	AS1	Stone Quarry
23-5-0156	FD-IF14	Isolated artefact
23-5-0118	PM-Q1	Artefact Scatter
23-5-0022	Royal Flying Doc. Mast	Artefact Scatter
23-5-0023	Roy. Fly. Doc . Mast 11	Artefact Scatter
23-5-0026	Roy.Fly.Doc. Mast 14	Artefact Scatter
23-5-0129	PM-SC9	Artefact Scatter
23-5-0109	FD04	Artefact Scatter
23-4-0640	Kanandah 1	Artefact Scatter
23-4-0091	AS16	Stone Quarry
23-4-0078	PML23	Artefact Scatter
23-5-0096	BM 259	Artefact Scatter
23-5-0075	PML20	Artefact Scatter
23-5-0112	FD-G001	Artefact Scatter/Hearth

AHIMS	Site Name	Site Type/Features
23-5-0061	BH1-45/46	Artefact Scatter
23-5-0154	FD-IF16	Isolated artefact
23-5-0098	Willa Willyong Creek	Artefact Scatter
23-5-0016	Royal Flying Doc. Mast	Artefact Scatter
23-5-0027	Roy. Fly. Doc. Mast 15	Artefact Scatter
23-5-0124	PM-GO1	Artefact Scatter
23-5-0117	PM-IF5	Isolated artefact
23-5-0155	FD–IF12	Isolated artefact
23-4-0682	South airports regency area isolated artefacts	Artefact Scatter
23-4-0083	AS4	Stone Quarry
23-5-0138	FD-IF03	Isolated artefact
23-5-0076	PML13	Artefact Scatter

Table 2: Overview of previously recorded site types within the Project AHIMS search area

Site types	Total
Resource and gathering	1
Artefact scatter & isolated artefacts (existing and destroyed)	87
Artefact scatter/Hearth	1
Artefact scatter/PAD	3
Ceremonial	1
Quarry (existing and destroyed)	13

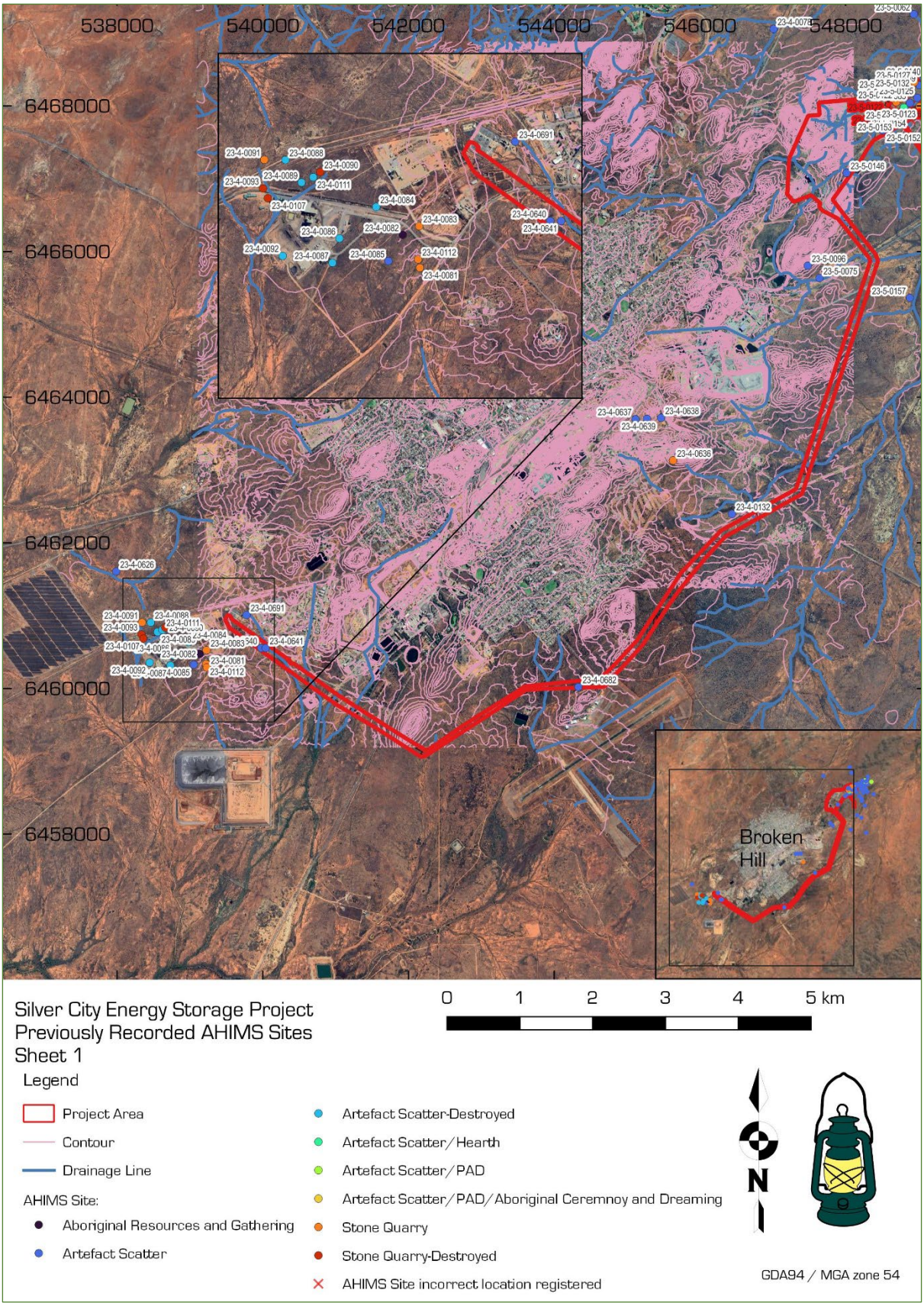


Figure 10: Previously recorded site types in close proximity to the southern section of the Project area.

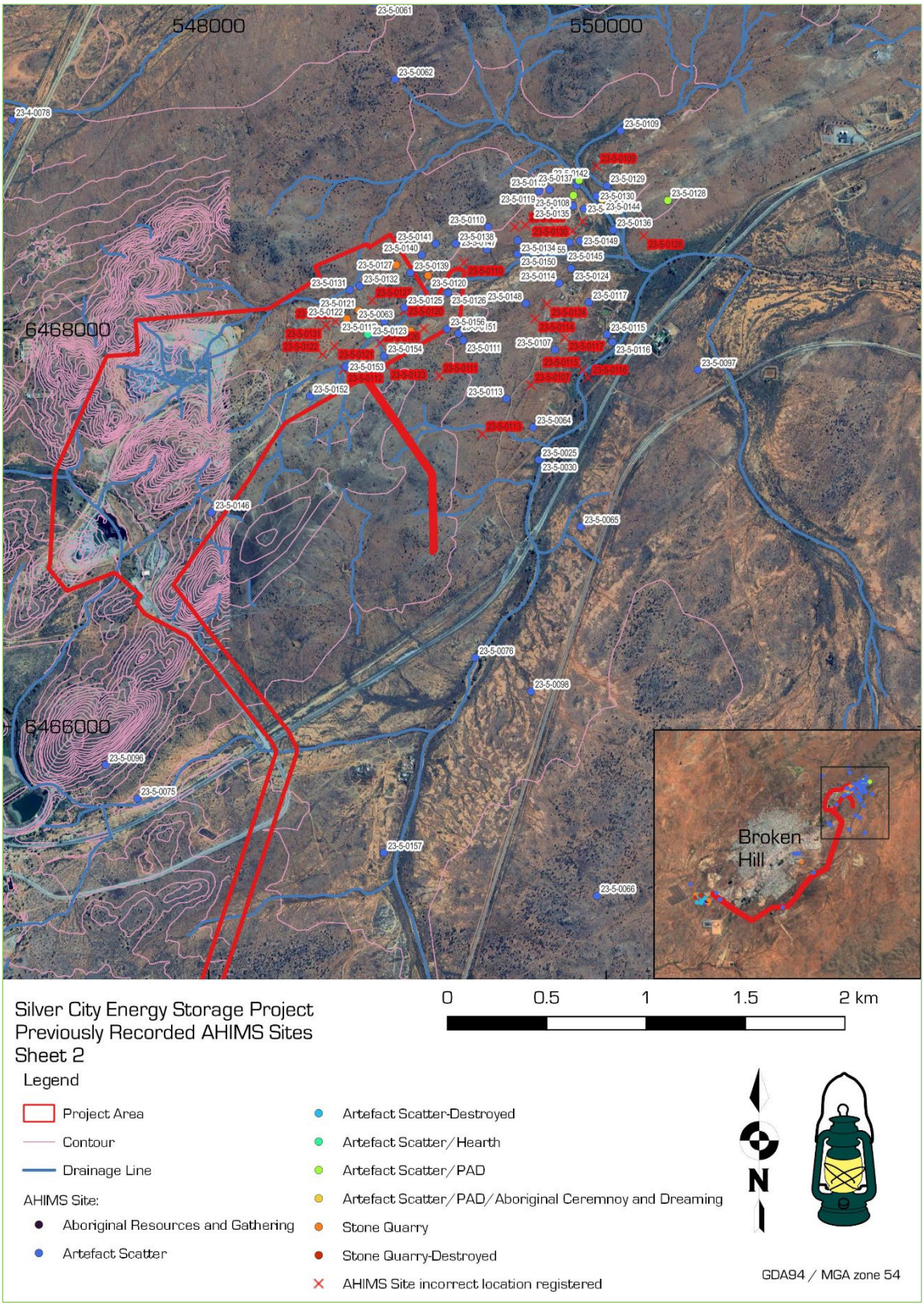


Figure 11: Previously recorded site types in close proximity to the northern section of the Project area.

Of the sites recorded in the AHIMS search there are 24 previously recorded sites located either within, or less than 100m from the Project Area (Table 3). Of these, twenty one (21) are within the Project Area.

Table 3: Previously recorded AHIMS sites located inside Project Area

Site	Site name	Site Type
Sites inside the Project Area		
#23-4-0640	Kanandah 1	Artefact Scatter
#23-4-0641	Kanandah 2	Artefact Scatter
#23-4-0682	South airports regency area isolated artefacts	Artefact Scatter
#23-5-0146	FD-IF19	Artefact Scatter
#23-5-0122	PM-Q5	Stone Quarry
#23-5-0121	PM-Q4	Stone Quarry
#23-5-0125	PM-GO2	Artefact Scatter
#23-5-0063	BH1-48;	Artefact Scatter
#23-4-0132	South Broken Hill	Artefact Scatter
#23-5-0139	FD-IF02	Artefact Scatter
#23-5-0131	PM-IF6	Artefact Scatter
#23-5-0127	PM-Q7	Stone Quarry
#23-5-0112	FD-GO01	Artefact Scatter/Hearth
#23-5-0153	FD-IF7	Artefact Scatter
#23-5-0120	PM-Q3	Stone Quarry
#23-5-0152	FD-IF18	Artefact Scatter
#23-5-0126	PM-GO3	Artefact Scatter
#23-5-0156	FD-IF14	Artefact Scatter
#23-5-0140	FD-IF01	Artefact Scatter
#23-5-0123	PM-Q6	Stone Quarry
#23-5-0154	FD-IF16	Artefact Scatter
Sites located within 100m of Project Area		
#23-5-0151	FD-IF15	Artefact Scatter
#23-5-0141	FD-IF18	Artefact Scatter
#23-5-0110	FD-IF18	Artefact Scatter

4.2 NSW State Heritage Register and Inventory search

The Australian Heritage Database (AHD) contains information about natural, historic and Aboriginal places of World and National heritage significance. The NSW State Heritage Inventory (SHI) is a database that contains sites listed on the NSW State Heritage Register, on Schedule 5 of Local Environmental Plans (LEP) and registered Aboriginal Places. Searches of the SHI and AHD were completed on 7th March 2023 (Appendix 1). The results of the SHI search has shown that an Aboriginal place (SHR/LEP/S170) is listed as approximately 8km southwest of the Project Area.

The registered Aboriginal place (The Pinnacles/SHR/LEP/S170) is important to Aboriginal people from many regions as it relates to story that extends across three different states. Culturally, the Pinnacles are a significant site in the Broken Hill area to the Wilyakali, Paakantyi and Adnyamathanha peoples. Cultural knowledge identifies the Pinnacles themselves as only one aspect of sacred land.

Sacred land also includes a wider area of land, including the Pine and Stirling Vale Creeks, and certain rock outcroppings and trees (BHLALC pers. comm). The location of the Pinnacles is shown on Figure 1.

4.3 Archaeological investigations of the Project Area

This section is a redacted version of archaeological investigations as requested by BHLALC.

A model to predict the location of Aboriginal sites within Willyama Common was completed as part of an assessment of land capability and significance assessment (Appleton 2000). The Willyama Common surrounds the City of Broken Hill and contains the currently Project Area. While some sites had been recorded within the area, a survey had not been conducted of the entire commons. Indeed, this was considered impractical and not cost effective for the survey. Instead, a preliminary predictive model which was developed and tested with targeted survey. The results of this survey were then used to refine the predictive model (Appleton, 2000).

Appleton's field survey of Willyama Common targeted creek and drainage depression areas, as these areas had increased visibility and exposure compared to surrounding areas. The survey identified 28 sites: 16 artefact scatter sites, six isolated artefacts, three campsite sites, two artefact scatters with knapping floors, and one campsite with artefact scatter. A separate archaeological assessment is required prior to any development within the Common (Appleton, 2000).

OzArk (2008) undertook both an Aboriginal and historic heritage assessment of the proposed 340 ha Flying Doctor Project study area adjacent to the northwest boundary of the current Project Area.

A pedestrian survey was conducted in transects over the study area located at the Potosi Mine located approximately 9km northeast of Broken Hill. This assessment identified 22 Aboriginal heritage sites, and five historic heritage sites. Historic heritage was preliminarily assessed as locally significant and comprised of primarily mining structures and associated dumps. Aboriginal sites consisted of eight hearth and artefact scatter complexes, six quarry sites, five isolated artefacts, and three hearth sites. One previously recorded isolated artefact was also located within the study area however this was unable to be relocated (OzArk, 2008).

In terms of mitigation measures, the report recommended avoiding disturbance to Aboriginal sites where possible. If sites could not be avoided, then an AHIP is required prior to the start of works. (OzArk, 2008).

4.4 Summary of previous archaeological investigations

There has been a considerable amount of research into the Aboriginal occupation of western NSW over the last 50 years. Investigations have found evidence for Aboriginal occupation of this region from the Pleistocene, Holocene and recent periods. In general, these investigations found that archaeological evidence represents multiple phases of intermittent use over long periods of time with Aboriginal people moving into an area when resources were easily available and then moving on to another location.

According AHIMS only 10 of the 106 sites listed within the search area have been destroyed by a range of developments. This review of previous archaeological reports shows that the majority of investigations are associated with development of utilities and infrastructure such as water, roads, railways and electricity. There has been limited test excavation within the local Broken Hill area, with surface artefact collection and analysis forming the most common mitigation measures. Many of the previous assessments recommend avoidance of inadvertent impacts to sites through fencing.

The Living Deserts SP is unique in the local area as it provides a conservation area for cultural and natural values while carefully managing impacts from visitor facilities such as walking tracks, carparks, campgrounds and 4WD tracks.

4.5 Predictive Model

Known archaeological sites immediately surrounding the Project Area are confined to a limited range of site types, dominated by artefact scatters, hearths and stone resource quarries (Table 1). In the wider region a range of site types have been discovered (Section 4.3.1), including a stone arrangement (Witter 1987) and burials (Bowler *et al.* 2003). This means that while we may expect to encounter stone artefacts, hearths or stone quarries, the potential to discover a wider range of cultural heritage sites persists.

By understanding the geomorphological and ecological heritage of the Project Area, we can appreciate the factors that may have influenced the occupation of this area by Aboriginal inhabitants in the past. In undulating upland landscapes like many areas throughout the Project Area, slope gradient is a key factor influencing the location of campsites (inferred from open artefact scatters) (Bulbeck and Boot 1990). Where flats or low spurs sit close to water sources, we can assume a relatively high likelihood of encountering isolated artefact, artefact scatters and hearths indicative of past occupation (Section 6.2.2).

Archaeological evidence will often indicate more permanent or repeated occupation occurs on major creeks and rivers and the further from these significant water sources, the more likely sites will be smaller and less complex i.e. one-off occupation sites. It is highly likely major tributaries to Willa Willyong Creek at the northern end and Kelly Creek and Acacia Creek at the southern end of the Project Area may be foci for repeated or long duration occupation. However, environmental factors profoundly affect the detection of archaeological sites. For example, the amount of ground surface exposure, together with erosional features that expose subsoils, will often dictate the likelihood of identifying the presence of stone artefacts during survey (Goldberg and Macphail 2006). This means that the distribution of archaeological sites that are detected may reflect these processes of site degradation, rather than patterns of occupation in the past. A key example of this is the extent of prior historic impacts affecting the distribution of old-growth vegetation. We know that where trees of 150 years old or more persist, there is a likelihood of finding cultural modifications (i.e. scarring), but the impacts of historic settlement have removed such trees from across the Project Area.

Burials are more common in lake and alluvial environments and in association with midden, sand dunes, lunettes, bordering dunes and other soft or sandy sedimentary soils. Burials will be rare in rangeland environments such as the Barrier Ranges (Gilding and DiMaria 2011 in Niche 2017:61).

The archaeological potential for Aboriginal heritage to occur in the Project Area, by site type, is summarised in Table 4.

Table 4: Summary of predictive model for landforms that may occur in the study area

Landscape type	Landform	Potential Sites	Archaeological potential
Undulating uplands	Rock outcrops	Quarries, resource gathering sites	High
	Exposed crests	Isolated artefacts, artefact scatters, ceremonial sites	High
	Steep slopes	Isolated artefacts, artefact scatters	Low
	Moderate slopes	Isolated artefacts, artefact scatters	Low
Alluvial valley	Gentle slopes overlooking water courses	Isolated artefacts, artefact scatters, PAD	High
	Flats and plains	Isolated artefacts, artefact scatters, hearths	High

Landscape type	Landform	Potential Sites	Archaeological potential
	Flats and plains adjacent to water courses	Burials	Low – where soft sediments are available but could occur anywhere

4.6 Summary of predictive statement

Section 4.6 summarises the known and possible site types and site features that might occur within the Project Area, their associated activities, the occupation or material evidence and the physical setting or landscape they might be associated with. The predictions are based on the synthesis of Sections 2, 3 and 4.

In terms of Aboriginal heritage, there are sections of the proposed Project corridor that have been disturbed by the cumulative impact of land surface modification such as vegetation clearance, historic mining, recreational use and service easements. However, there are also parts of the Project Area where there are minimal to no impacts.

Sites in western NSW tend to be within 1km of a reliable more permanent or temporary water source (Cupper 2007 in Niche 2017). Rangelands such as the Project Area are often thought to be less archaeologically sensitive due to the limited and ephemeral nature of the water sources (Cupper 2007:14 in Niche 2017). The Project Area has a number of temporary water sources, mostly located in the lower-lying areas that correspond with the alluvial flats.

Stone artefacts and hearths will comprise the majority of Aboriginal sites within the Project Area with hearth sites occurring more frequently in proximity to low-lying areas where water may be present. The extensive historic impacts and the dynamic nature of the deposits make it difficult to predict the archaeological potential of specific areas within the Project Area accurately. Culturally modified trees may occur where mature age trees are present, however, due to historic timber getting associated with Broken Hill township and mining, it is likely these site types have not survived. Burials will be rare in rangeland environments like those mostly found at the northern end of the Project Area. However, burials may occur anywhere and will be more often found in association with sandy or soft sedimentary soils like the alluvial deposits that are present in select locations within the Project area.

Highly deflated undulating uplands, like those within the Project Area, generally preserve a limited range of Aboriginal sites. These site types are generally restricted to isolated artefacts and artefact scatters that are likely to have been affected by colluvial/alluvial movements and post-formation processes such as land use. Ceremonial places may occur across the landscape and RAP assistance is sought to identify any such places in or near the project area. Important symbolic activities, such as conducting ceremonies and creating rock art, are known to be associated with rocky upland landscapes. In addition, there is also potential for rock outcrops of material suitable for stone tool manufacture.

4.7 Predictive statement for the Project Area

Predictions regarding location of different site types and site features that might occur within the Project Area are:

Isolated artefacts – are found across the entire landscape. These finds can occur in any location as Aboriginal people traversed the country for thousands of years. Isolated finds may end up in a recorded location as a result of humans, erosion or depositional forces. These sites are likely to occur in the Project Area, and three isolated artefacts have previously been identified within the Project Area.

Stone artefact scatters – representing a camping or activity location, these sites are identified by a concentration of stone flakes. They are a common site type as they are more likely to survive in the archaeological record. Artefact scatters will occur across the landscape, usually in association with a resource such as permanent water. Low-gradient landforms close to major water sources were a preferred location for camping. As the Project Area is in close proximity to a number of water

sources, artefact scatters are likely to occur on areas of low gradient close, however, may be present in most landforms within the Project Area.

Potential Archaeological Deposit (PAD) – buried archaeological materials, or soils and sediment thought to contain buried archaeological materials, can occur in locations where past activity created sediment deposition, or where soil and sediment aggradation has been an active geomorphological process. Paradoxically, PADs are most likely to be observed where erosive processes are active, e.g. where sediment exposures reveal the stratigraphy of the subsurface environment.

Scarred/Culturally modified trees – display evidence of human modification and manipulation. They require the presence of mature native trees and are likely to be found in any area that supports old-growth stands. Broken Hill has a history of mass tree clearing following colonial settlement of the area. As such, it is unlikely that mature trees persist in the local region. No scarred trees have been recorded near the Project Area.

Hearths/ovens – indicate locations where a fire was lit for one-off (hearth) or multiple uses (oven) and are identified by presence of charcoal, local stone (mainly gneiss with some quartz) or more rarely, burnt termite mound clay (used as heat retainers). Hearths are recorded either in isolation or in association with other Aboriginal cultural features such as camp sites. Ovens are generally larger than hearths and often include other materials such as bone. Hearths or ovens have been recorded in and near the study area with many affected by erosion. There is a high potential for this site type to be recorded in the Project Area.

Ceremonial places – are found in isolated locations throughout the landscape. The preferred location of these places will vary from region to region. A ceremonial site (AHIMS 23-5-014) was recorded during the AHIMS search.

Landscape features and natural sacred sites – can be found anywhere. The Pinnacles are one such site located within 8km of the Project Area. There is a high potential for this site type to be recorded in the Project Area.

Rock Art – are likely to be located wherever suitable rock surfaces are found.

Quarries – are likely to be located where outcrops of rocks exist that are useful for stone tool manufacture. Quartz quarries are often recorded during surveys in the Broken Hill area and represent intensive exploitation of the good quality quartz with many milky or translucent quartz reefs heavily unutilised. Stone and procurement sites are likely to be present in the Project Area.

Burials – are likely to be found in lake and alluvial environments and in association with midden, sand dunes, lunettes, bordering dunes and other soft or sandy sedimentary soils. Burials will be rare in rangeland environments such as the Barrier Ranges, however, they may occur anywhere. Aboriginal burials in the region are also known to have occurred in trees (usually Box Trees). They may occur in the Project Area where soft sediments are available (refer Figure 13).

Shell middens – show evidence of shell discard after people have collected, eaten and discarded shellfish. Middens may also contain other cultural material including stone artefacts, other faunal remains, human burials, or charcoal from cooking and other remnants of hearths such as heat retainer stones. In the region middens will be dominated by freshwater mussel shell. They are unlikely to be found in upland areas, however, shell midden may be found near to more permanent water sources, such as those in the Project Area.

4.8 Predictive mapping from Aboriginal Site Decision Support Tool

This section provides an overview of the predictive modelling available through the Aboriginal Site Decision Support Tool (ASDST). The ASDST is a modelling tool that was developed in order to provide a set of spatial GIS layers combined with analytical techniques that provide visual and quantitative information regarding the distribution of Aboriginal site features across the landscape and associated accumulated impacts (Ridges 2010; SGNSW & DPIE 2021). The modelling provides GIS layers for likely areas where artefacts, rock art, burials, earth mounds, grinding grooves, hearths, shell middens, stone quarries and culturally modified trees are located. In addition, the ASDST provides GIS layers relating to accumulated impacts, model reliability and survey priority.

For the purposes of this assessment the ASDST modelling has been used to review the accuracy of the predictive model described above. Maps showing results of the ASDST modelling follow with basic interpretation of the modelling below:

- Figure 11 shows the general level of archaeological sensitivity in the area, and suggests that portions of the Project Area are in a moderate to high sensitivity zone; and

- Figure 12 indicates the Project Area is part of an area of moderate to high survey priority. This means that the Project Area would benefit from on-ground assessment.

- Figures 13 indicates the distribution of alluvium in the Project Area which is an indicator of predicted higher sensitivity for subsurface Aboriginal objects (including burials) and archaeological deposit to be present.

Overall, these results are consistent with the predictive model presented above and suggest that Aboriginal sites are most likely to be encountered, especially at the northern and southern end, close to narrow drainage tracts associated with more permanent water sources, Willa Willyong Creek and Acacia Creek. It is important to note that the ASDST modelling is based on imperfect data and incomplete datasets.

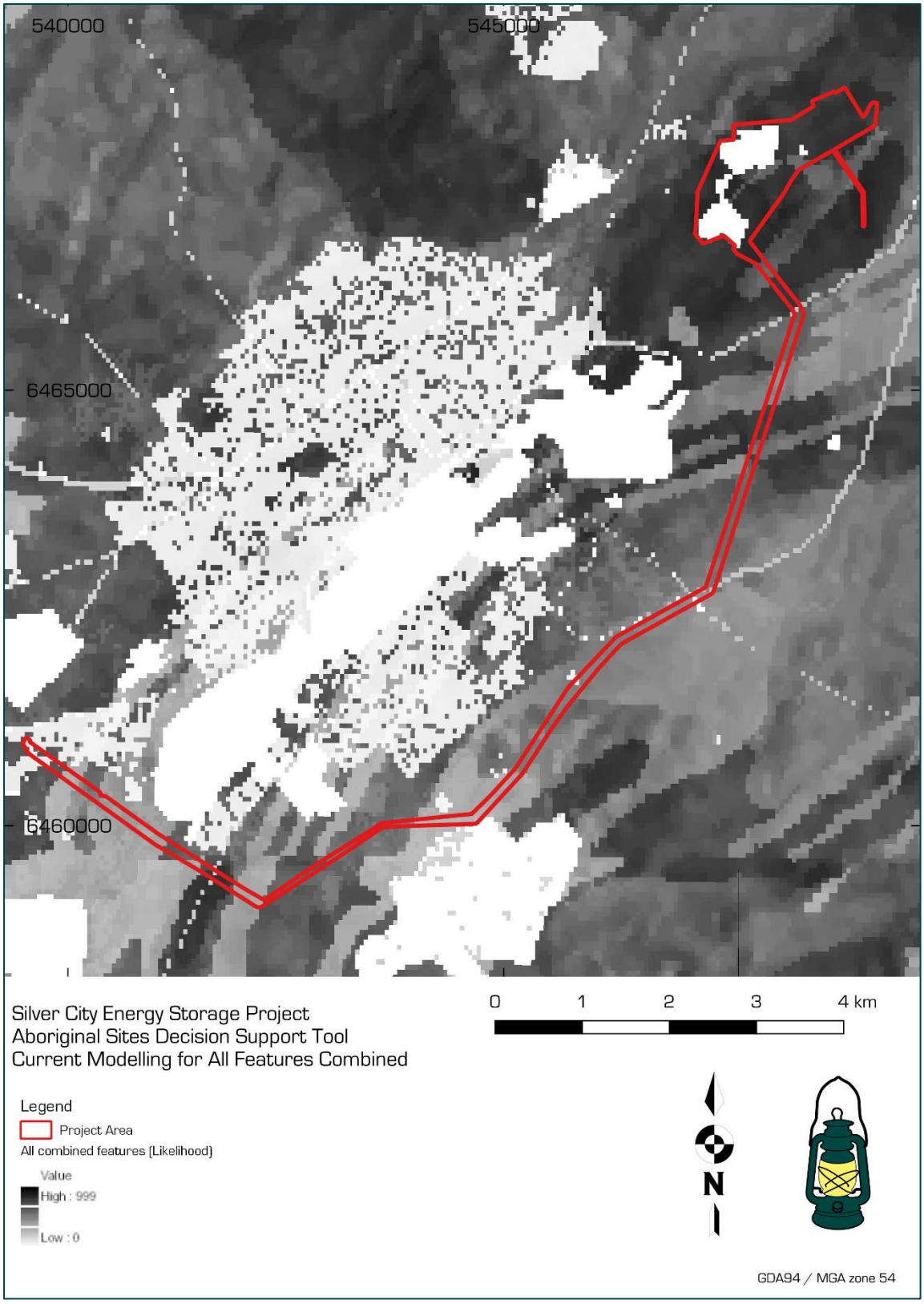


Figure 12: ASDST mapping showing moderate-high archaeological sensitivity of study area based on all types of archaeological features (black represents high sensitivity and white represents low sensitivity).

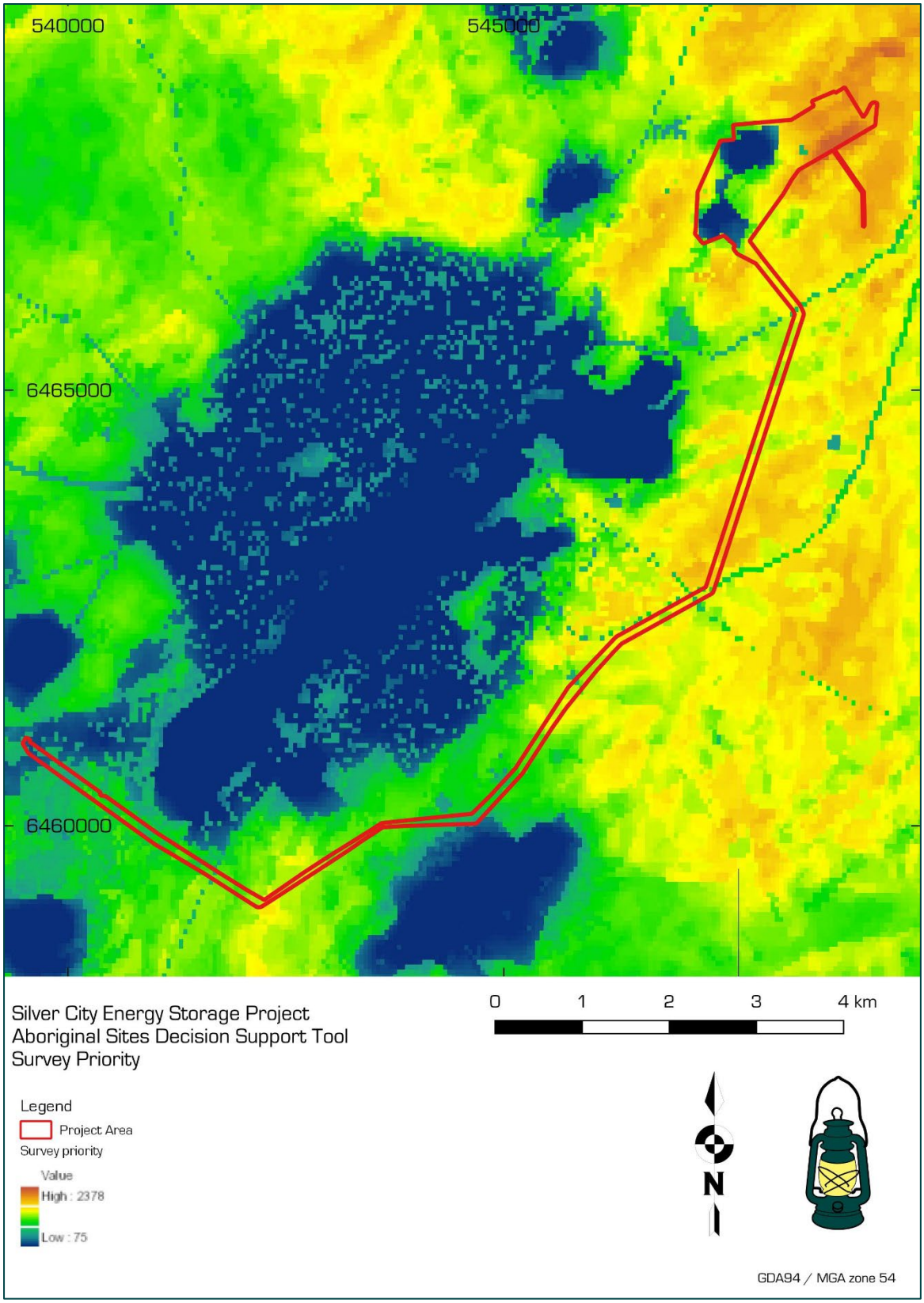


Figure 13: ASDST mapping showing survey priorty areas based on all types of archaeological features (red represents high sensitivity and green represents low sensitivity).

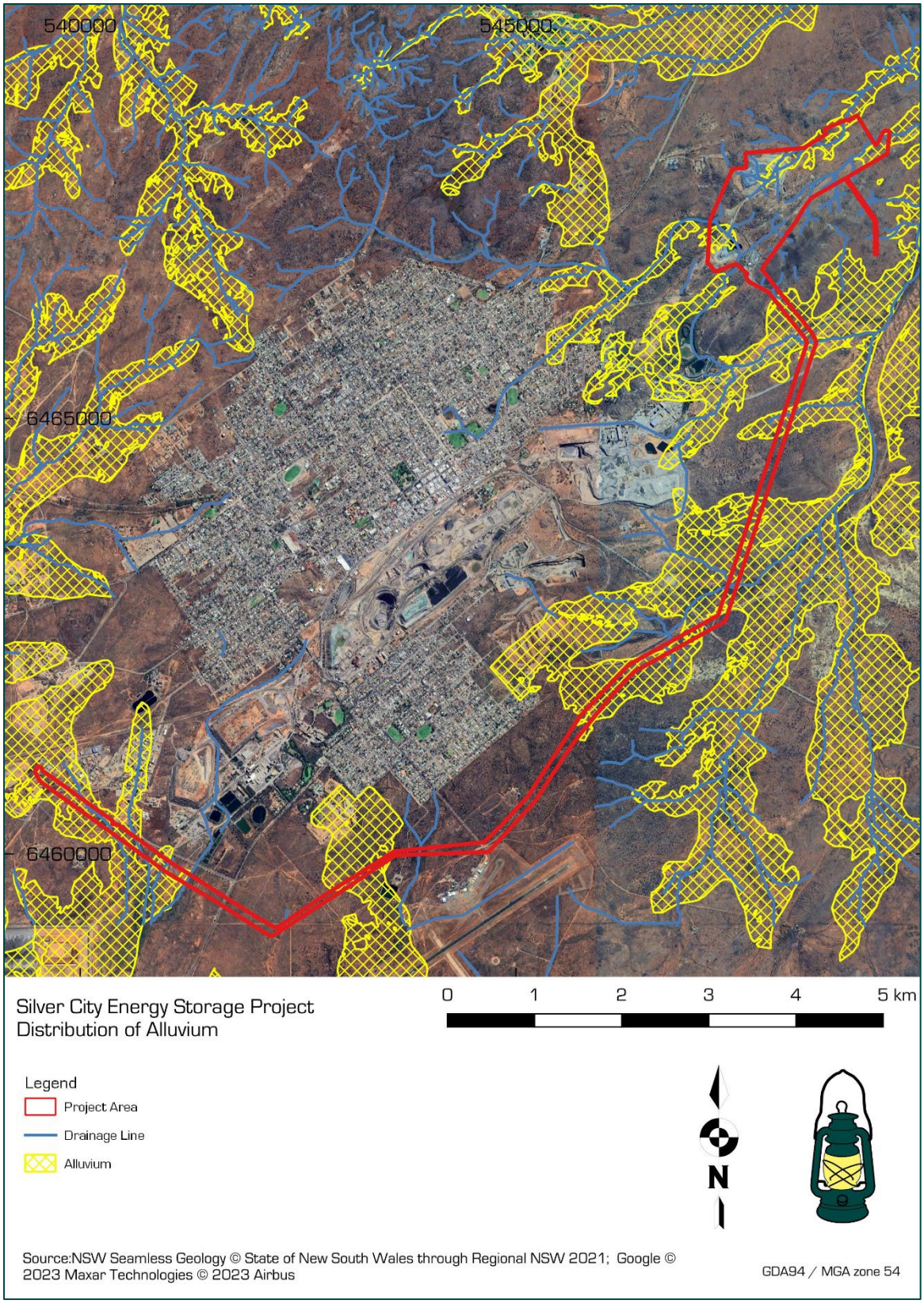


Figure 14: Alluvium mapping showing areas of predicted higher sensitivity for subsurface Aboriginal objects (including burials) and archaeological deposit to be present within the study area.

5 SURVEY FIELD METHODS

The visual inspection of the Project Area was conducted over two phases and guided by Requirement 5 and Requirement 16 of the Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW. Phase 1 was conducted over seven days from the 10th through to the 17th August 2022 by Glenn van der Kolk and Bec Parkes from Lantern Heritage in partnership with BHLALC. Abishai White and Raymond O'Donnell (Jnr) represented BHLALC for Phase 1 survey. Bec has over 20 years' experience in Aboriginal cultural heritage management and Glenn VDK, 5 years.

The Phase 1 visual inspection involved a pedestrian survey along the entire length of the Project Area from northeast of Potosi Mine to southwest of Broken Hill township near Pinnacles Road, including proposed above and below ground pipeline routes and transmission alignment. All areas of ground exposure within, and adjacent to the Project Area were inspected. All rocky outcrops within the Project Area were checked for possible lithic quarry attributes or other signs of Aboriginal cultural modification. It should, however, be noted that vegetation density along some portions of the Project Area inhibited visual assessment.

The Phase 2 visual inspection was conducted over three days on the 1st , 2nd and 9th February 2023. Phase 2 survey was undertaken of areas that were not included in Phase 1 survey (Figure 18). Phase 2 survey was conducted by Simon Greenwood, Elle Lillis, Jo Dibden and Rebecca Vartto from Lantern Heritage in partnership with BHLALC representatives Ricky Menz, Raymond O'Donnell (Snr) and Raymond O'Donnell (Jnr). Simon, Elle, Jo and Rebecca each have a minimum of 10 years' experience in Aboriginal cultural heritage management.

5.1 Sampling Strategy

A comprehensive pedestrian survey of all landforms that would potentially be impacted was completed. Particular focus was given to areas of exposure, however survey was impeded in areas by bushy vegetation cover following recent rains (refer to Section 6.1). As a result, the surveyed area was limited to areas of sheetwash erosion, sections of washout and creek banks. Exposed deposits were also observed in animal and vehicle tracks and schist and quartz outcrops were observed. Active weathering in the form of colluvial and alluvial sand and gravel wash impacted archaeological visibility in some areas of the plains and lower slopes. Consequently, only 60% to 80% of the potential impact area was able to be visually inspected (see Plate1 and Plate 2 for examples of contrasting exposure).

It should also be noted that survey was more heavily focused on landforms predicted to be archaeologically sensitive, and in areas where sites had previously been recorded. So, while survey encompassed all landforms and all areas, and aspects of potential impacts, there was an overall increased ratio of time and effort spent inspecting and recording areas of predicted archaeological sensitivity.

5.2 Survey Method

The archaeological survey was undertaken on foot and included all landforms and areas of potential impacts within the Project Area. The purpose of the survey was to identify and record Aboriginal objects, and areas of potential archaeological deposits that relate to Aboriginal occupation. The participants in the survey were all involved in inspecting ground exposures for the presence of Aboriginal objects. This process involved walking along/across the Project Area with individual participants spaced 10 to 15m apart to inspect all ground exposures that they encountered. The coverage achieved by the survey teams is shown in Figures 14, 15 and 16.

Survey pins (flags) were supplied to mark the locations of identified objects. All survey participants were also involved in discussions regarding the nature of soil deposits, prior impacts and predicted archaeological potential at each landform.

5.2.1 Survey Units

The Project Area was divided into survey units that corresponded to different landform elements (e.g. crest, slope, drainage line, plain). The boundaries of the survey units were identified through a

combination of referring to 1:25,000 topographic maps, and in-field observations of landform soils, gradients and aspects. Where one or more of these landform components changed, a new survey unit was identified.

Microtopographic features and areas of disturbance within a survey unit were also recorded but were not treated as individual survey units.

Within each survey unit, observations were made regarding the soils, geology, vegetation, prior disturbance, ground surface exposures and visibility. All identified Aboriginal objects were also recorded at minor sites and a sample of Aboriginal objects recorded at more extensive sites.

The subsurface archaeological potential within a given survey unit was assessed with reference to landform type, gradient, context and aspect, archaeological visibility and presence of Aboriginal objects at surface, as well as observations regarding the nature and depth of soils, and the nature and extent of prior impacts. The survey unit, or components thereof (e.g. where variable levels of disturbance were encountered), were then assessed as having very low/negligible, low, moderate, high or very high archaeological potential.

The definitions and criteria for these different levels of potential are summarised as follows:

Very low/Negligible - where soil deposits are very shallow (i.e. < 5cm) and where prior subsurface disturbance is extensive (i.e. extends to the full depth of soil deposits), the landform type/gradient/context is predicted to have low potential for Aboriginal objects to be present, and field survey has confirmed that prediction.

Low - where field survey has confirmed that prior disturbance is likely to have removed or substantially disturbed deposits, and the landform type/gradient/context is predicted to have low potential for Aboriginal objects to be present.

Moderate - where soil deposits are at least 5-10cm deep, and the landform type/gradient/context is predicted to have moderate or greater potential for Aboriginal objects to be present, but the actual presence of Aboriginal objects is uncertain (e.g. no identifiable archaeological evidence in any surface exposures), or the nature and extent of prior disturbance is such that the presence of relatively undisturbed deposits is unclear.

High - where soil deposits are at least 10-20cm deep, the landform type/gradient/context is predicted to have high or very high potential for Aboriginal objects to be present, and field survey has confirmed the presence or high likelihood of Aboriginal objects, but there may be uncertainties surrounding the nature and extent of subsurface deposits (e.g. uncertainties surrounding the extent of prior disturbance, or uncertainties regarding the nature and content of archaeological deposits).

Very high - where soil deposits are at least 10-20cm deep, relatively undisturbed (i.e. prior disturbance is minimal in horizontal or vertical extent), the landform type/gradient/context is predicted to have high to very high potential for Aboriginal objects to be present, and field survey has confirmed the presence of Aboriginal objects in situ at surface and within exposed soil profiles, and stratified deposits are known or suspected to be present.

5.2.2 Field Recording

Field recording was primarily undertaken digitally, on an iPad, with supplementary handwritten notes on hard copy maps of the study area. Copies of site cards (digital and hardcopies) for previously recorded sites were carried and referred to during the field survey. All field records were entered and managed by Glenn van der Kolk and Bec Parkes during Phase 1 survey and Simon Greenwood, Elle Lillis and Rebecca Vartto during Phase 2 survey. In-field measurements of all identified stone artefacts were recorded using digital callipers, and a hand tape measure. Stone artefact recording included artefact type, material type and colour, measurements in millimetres for length, width, thickness and maximum dimension, and additional notes as appropriate regarding retouch/use wear, damage, patination, cortex, platforms, terminations etc.

Additional details regarding individual aspects of the survey recording methods (e.g. photography, soils, survey coverage etc.) are provided in the relevant subsections below.

5.2.3 Photography

All photographs were captured on a mobile device with georeferencing of locations enabled. Photographic records of each survey unit include images to illustrate characteristics such as vegetation and visibility, landform context/aspect, soil and bedrock exposures, and locations/details of identified Aboriginal objects. Depending upon the nature of the photographs, either a ranging pole or mini-rod photographic scale was used, except in the instance of more generic landscape photographs that did not illustrate archaeological features.

5.2.4 Soils and geology

Observations were made and recorded within each survey unit and at each occurrence of Aboriginal objects regarding the nature and depth of soils. This included notes on soil colour, texture and inclusions, opportunities to observe soil depth, and where possible, the nature of subsoils, and observations regarding evidence of soil disturbance.

Where surface bedrock was visible, or natural gravels, cobbles or pebbles present at the surface, observations were made regarding rock types. This included notes regarding material, type of occurrence, size and form (e.g. rounded, angular etc.). Particular attention was given to whether or not the background geology included material suitable for artefact manufacture. This was recorded with reference to whether there were sources of procurable stone suitable for artefact manufacture, and with regard to whether examples of flaked stone may be present that were not the result of Aboriginal activity (e.g. natural conchoidal fractures, or material broken by vehicles/modern equipment).

5.2.5 Vegetation and visibility

The presence, nature and composition of vegetation was recorded for each survey unit, including observations regarding vegetation density, height, estimated age and species. Notes were also compiled regarding the frequency and extent of surface ground exposures (areas devoid of vegetation), and constraints on identifying Aboriginal objects within those exposures (e.g. leaf litter, gravels, introduced materials). The average percentage of ground exposure, and visibility within exposures, was recorded to the nearest 10% for each survey unit and occurrence of Aboriginal objects.

5.2.6 Survey coverage and effectiveness

Survey coverage and effectiveness was calculated in accordance with the methods outlined in the Code of Practice (DECCW 2010b). The size of individual survey units was calculated with reference to the field records of survey unit extent, and to the corresponding extent of that landform within the Project area. This was then multiplied by the average incidence of ground surface exposure, and average visibility within those exposures to determine the effective survey coverage area within a given survey unit. The effective survey coverage area was then converted into an overall percentage of the survey unit area.

These calculations of effective survey coverage were then reviewed in terms of landform type, predicted archaeological sensitivity, recorded occurrences of Aboriginal objects, and the overall effectiveness of the survey, i.e. the extent that the survey results could be relied on as an accurate reflection of the presence of Aboriginal objects within a given survey unit, and across the study area as a whole.

5.2.7 Mapping

The boundaries of the Project Area, and locations of any previously recorded sites were uploaded to a mobile device prior to survey. The Avenza Maps app was used in the field to assist with navigation, track survey coverage, and to record geo-spatial information regarding photographs, occurrences of Aboriginal objects, extent of survey units, and observations relating to these recordings. All data collected during the field was then uploaded as GIS files for the purposes of results analysis and mapping within this report.

6 SURVEY AND TEST EXCAVATION RESULTS

The SCES facility area and transmission line corridor were divided into 92 survey units (SU1-SU92), corresponding to crest, ridge, knoll, slopes (upper, mid and lower) plains, open depressions - creeks or drainage features, flats and simple slopes. Aboriginal objects and previously recorded sites were identified within 43 survey units.

As a result of the Phase 1 and Phase 2 surveys 21 previously recorded AHIMS sites and 44 new Aboriginal objects and sites and areas of PAD were recorded within the Project Area. Summary of survey results are provided below while detailed descriptions of the two visual assessments for Phase 1 and Phase 2, including relevant photos, are provided in Appendix 2 and Appendix 3, respectively.

6.1 Survey coverage

Survey coverage along the Project Area varied considerably between survey units. Variations include eroded uplands, flats with lag deposits to areas thick with grasses/weeds/saltbush community vegetation growth. Examples of all landforms within the Project Area recorded during survey are provided below and maps showing each survey unit provided in Figures 14 through19. The survey units with the lowest level of effective survey coverage were the open depression – drainage lines/creek lines/drain (SU53, SU61, SU79, SU81, SU83 and SU85) (refer to Table 5). This survey unit landform was typically characterised by extensive vegetation cover (Plate 2). Nevertheless, where exposures were encountered, stone artefacts and hearth remains were frequently recorded (Plate 15 and Plate16).

While the survey coverage in the survey units with lowered effective survey coverage did not appear to significantly impair the survey effectiveness in terms of identifying the presence of archaeological material, it did mean that there were fewer opportunities to effectively assess the subsurface potential. As such, the assessments of subsurface potential relied heavily on observations regarding prior disturbance, soil deposit types and geomorphic processes. Plates 1 to 16 show examples of survey conditions across each landform.

Plate 1: Example of exposure and archaeological visibility encountered in SU2 – open depression – creekline landform.

Plate 2: Example of an open depression – creekline landform unit displaying challenging survey conditions in SU74.

Plate 3: Example of survey conditions in SU15 – a creek flat landform.

Plate 4: Example of survey conditions in SU3 – a simple slope.

Plate 5: Example of survey conditions in SU 9– a lower slope (gentle).

Plate 6: Example of survey conditions in SU69 – a lower slope.

Plate 7: Example of survey conditions in SU 50– a flat landform.

Plate 8: Example of survey conditions in SU3– a flat landform.

Plate 9: Example of survey conditions in SU73– a plain landform.

Plate 10: Example of survey conditions in SU 7– a crest landform.

Plate 11: Example of survey conditions in SU20 showing rock outcropping– a mid and upper slope landform unit.

Plate 12: Example of survey conditions in SU67– a mid and upper slope (steep).

Plate 13: Example of recreational vehicle tracks in existence throughout the Project area. This image is taken at northern end of the proposed A-CAES site (SU5).

Plate 14: Example of disturbed ground surface in SU86 – a plain landform.

Plate 15: Example of remnant hearth recording showing heat retainers eroding out of the surface deposit. This image is taken at BH site 7 located within the proposed A-CAES Facility Area (SU2).

Plate 16: Example of surface artefact scatter at BH site 20 exposed on a plain landform.

Table 5: Survey coverage within SCES project study area

Survey Unit	Landform	Survey Unit Area (m2)	Visibility %	Exposure %	Effective Coverage Area (m2)	Effective Coverage %
SU1	Flat	41630	30%	60%	7493	18%
SU2	Open Depression - Creek Line	8512	20%	50%	851	10%
SU3	Simple Slope	82418	20%	30%	4945	6%
SU4	Open Depression	12632	30%	60%	2274	18%
SU5	Simple Slope	37198	70%	50%	13019	35%
SU6	Open Depression - Creek Line	37303	20%	10%	746	2%
SU7	Crest	1004	30%	30%	90	9%
SU8	Crest	1000	30%	30%	90	9%
SU9	Slope - Lower (Gentle)	1588	30%	20%	95	6%
SU10	Slope - Mid- and Upper- (Steep)	4193	30%	40%	503	12%

Survey Unit	Landform	Survey Unit Area (m2)	Visibility %	Exposure %	Effective Coverage Area (m2)	Effective Coverage %
SU11	Ridge	471	20%	20%	19	4%
SU12	Open Depression - Creek Line	108	30%	20%	6	6%
SU13	Slope - Mid- and Upper (Steep)	1420	30%	10%	43	3%
SU14	Open Depression - Creek Line	54	20%	20%	2	4%
SU15	Creek Flat	1912	20%	20%	76	4%
SU16	Saddle	1167	60%	50%	350	30%
SU17	Slope - Lower (Gentle)	979	30%	20%	59	6%
SU18	Slope - Mid- and Upper- (Steep)	1108	30%	20%	66	6%
SU19	Open Depression - Creek Line	649	30%	20%	39	6%
SU20	Slope - Mid- and Upper- (Steep)	3738	30%	20%	224	6%
SU21	Simple Slope	1985	80%	30%	476	24%
SU22	Simple Slope	1518	80%	30%	364	24%
SU23	Simple Slope (Gentle)	6052	30%	20%	363	6%
SU24	Open Depression - Creek Line	1066	20%	20%	43	4%
SU25	Ridge Line	7538	20%	20%	302	4%
SU26	Open Depression - Creek Line	421	20%	20%	17	4%
SU27	Slope - Mid- (Steep)	3245	50%	30%	487	15%
SU28	Open Depression - Creek Line	344	20%	20%	14	4%

Survey Unit	Landform	Survey Unit Area (m2)	Visibility %	Exposure %	Effective Coverage Area (m2)	Effective Coverage %
SU29	Slope - Lower (Gentle)	31580	30%	20%	1895	6%
SU30	Open Depression - Drain	769	20%	20%	31	4%
SU31	Slope - Mid- (Steep)	9298	20%	20%	372	4%
SU32	Open Depression - Creek Line	838	20%	20%	34	4%
SU33	Slope - Lower (Gentle)	29271	30%	40%	3513	12%
SU34	Open Depression	1708	20%	20%	68	4%
SU35	Slope - Lower (Gentle)	5207	20%	20%	208	4%
SU36	Open Depression	885	20%	20%	35	4%
SU37	Simple Slope	18311	20%	20%	732	4%
SU38	Open Depression	2054	20%	20%	82	4%
SU39	Open Depression - Creek Line	4877	20%	20%	195	4%
SU40	Simple Slope	17693	20%	20%	708	4%
SU41	Simple Slope	6892	20%	20%	276	4%
SU42	Flat	53916	30%	40%	6470	12%
SU43	Open Depression - Creek Line	9774	60%	70%	4105	42%
SU44	Plain	83211	60%	40%	19971	24%
SU45	Open Depression - Creek Line	3356	20%	40%	268	8%
SU46	Flat	26210	50%	20%	2621	10%
SU47	Simple Slope	33413	50%	20%	3341	10%

Survey Unit	Landform	Survey Unit Area (m2)	Visibility %	Exposure %	Effective Coverage Area (m2)	Effective Coverage %
SU48	Crest	8560	20%	60%	1027	12%
SU49	Simple Slope	78384	20%	20%	3135	4%
SU50	Flat	15403	50%	20%	1540	10%
SU51	Open Depression - Drainage Line	4175	20%	20%	167	4%
SU52	Flat	19115	10%	10%	191	1%
SU53	Open Depression - Drainage Line	3942	10%	10%	39	1%
SU54	Creek Flat	12914	30%	20%	775	6%
SU55	Open Depression - Creek Line	1884	30%	20%	113	6%
SU56	Spur (Gentle)	2184	30%	20%	131	6%
SU57	Open Depression - Creek Line	4550	30%	20%	273	6%
SU58	Creek Flat	6166	0%	0%	0	0%
SU59	Simple Slope (Very Gentle)	94278	30%	10%	2828	3%
SU60	Crest	693	20%	30%	42	6%
SU61	Open Depression - Drain	6470	10%	10%	65	1%
SU62	Plain	122135	60%	20%	14656	12%
SU63	Slope - Lower (Gentle)	6447	40%	20%	516	8%
SU64	Slope - Mid- and Upper- (Steep)	30546	50%	10%	1527	5%
SU65	Crest	344	50%	10%	17	5%
SU66	Open Depression - Drainage Line	6596	40%	40%	1055	16%

Survey Unit	Landform	Survey Unit Area (m2)	Visibility %	Exposure %	Effective Coverage Area (m2)	Effective Coverage %
SU67	Slope - Mid- and Upper- (Steep)	22553	40%	10%	902	4%
SU68	Open Depression - Shallow Drainage Line	6696	30%	10%	201	3%
SU69	Slope - Lower (Gentle)	46312	30%	10%	1389	3%
SU70	Knoll	4296	50%	10%	215	5%
SU71	Slope - Mid- and Upper- (Steep)	8564	40%	10%	343	4%
SU72	Slope - Lower (Gentle and Undulating) lower slopes	25509	30%	10%	765	3%
SU73	Plain	100618	30%	10%	3019	3%
SU74	Open Depression - Creek Line	10193	30%	10%	306	3%
SU75	Plain	214130	30%	40%	25696	12%
SU76	Slope - Mid- and Upper- (Gentle)	34667	50%	80%	13867	40%
SU77	Slope - Lower (Gentle)	20761	40%	10%	830	4%
SU78	Plain	39763	20%	70%	5567	14%
SU79	Open Depression - Drain Line	4074	10%	10%	41	1%
SU80	Slope (Gentle)	27340	80%	50%	10936	40%
SU81	Open Depression - Creek Line	1987	10%	<10%	20	1%
SU82	Plain	37498	10%	<10%	375	1%
SU83	Open Depression - Drain	2700	<10%	<10%	27	1%

Survey Unit	Landform	Survey Unit Area (m2)	Visibility %	Exposure %	Effective Coverage Area (m2)	Effective Coverage %
SU84	Plain	49141	10%	10%	491	1%
SU85	Open Drain - Creek Line	12345	<10%	<10%	123	1%
SU86	Plain	78097	60%	10%	4686	6%
SU87	Undulating alluvial plain in the north of the survey area	110,455	70%	60%	46,391	42%
SU88	Northwest facing ridge slope	37,919	75%	60%	17,064	45%
SU89	Ridge crest	39,087	65%	80%	17,589	45%
SU90	Southeast facing ridge slope	58,726	60%	75%	26,427	45%
SU91	Undulating alluvial plain in the south of the survey area	139,996	60%	70%	58,798	42%
SU92	North facing slope in the southwest corner of the project area	11,464	50%	50%	2,866	25%

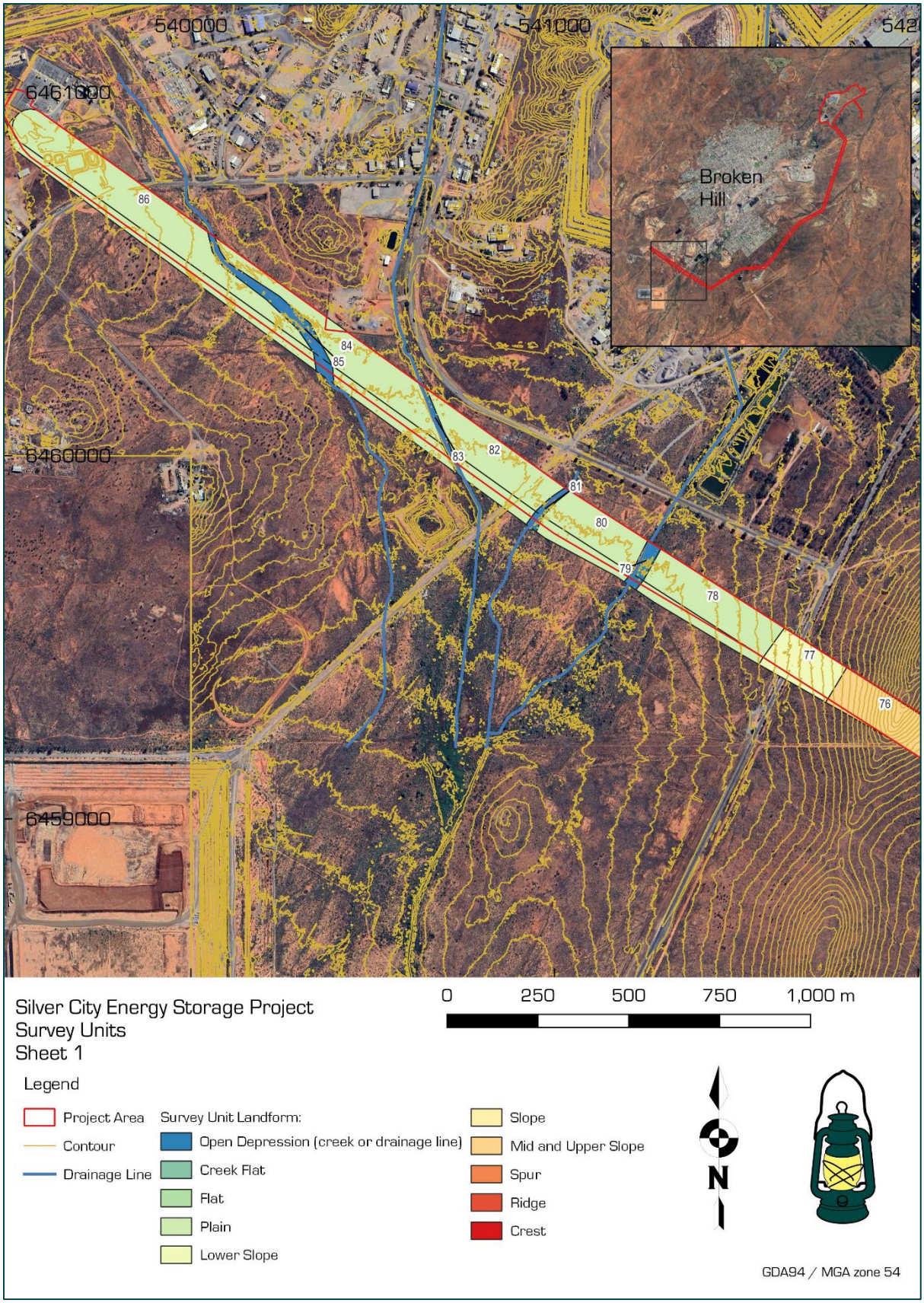


Figure 15: Phase 1 survey area (southern extent) with Survey Unit landforms recorded within the Project Area.

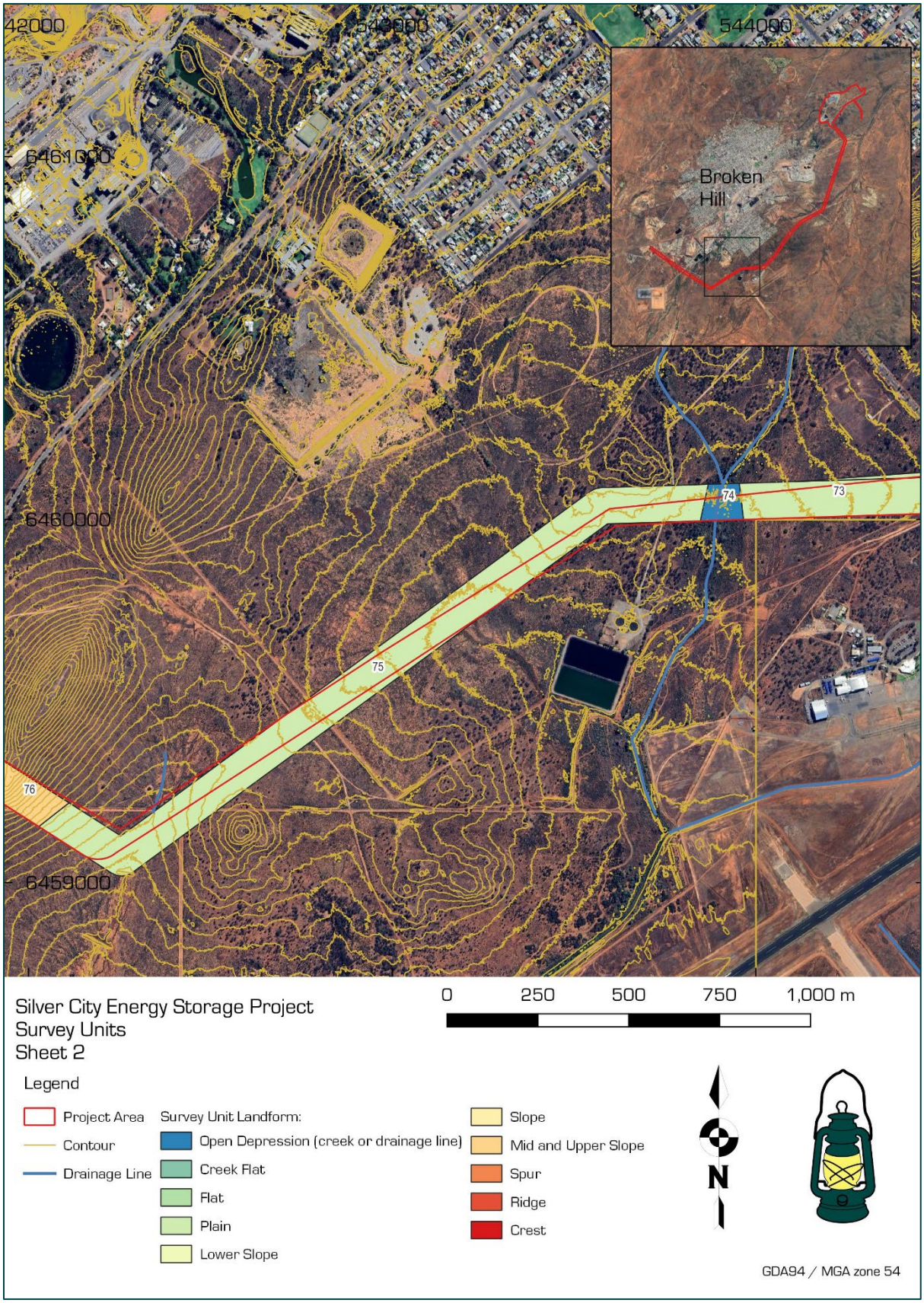


Figure 16: Phase 1 survey area (mid-section) with Survey Unit landforms recorded within the Project Area.

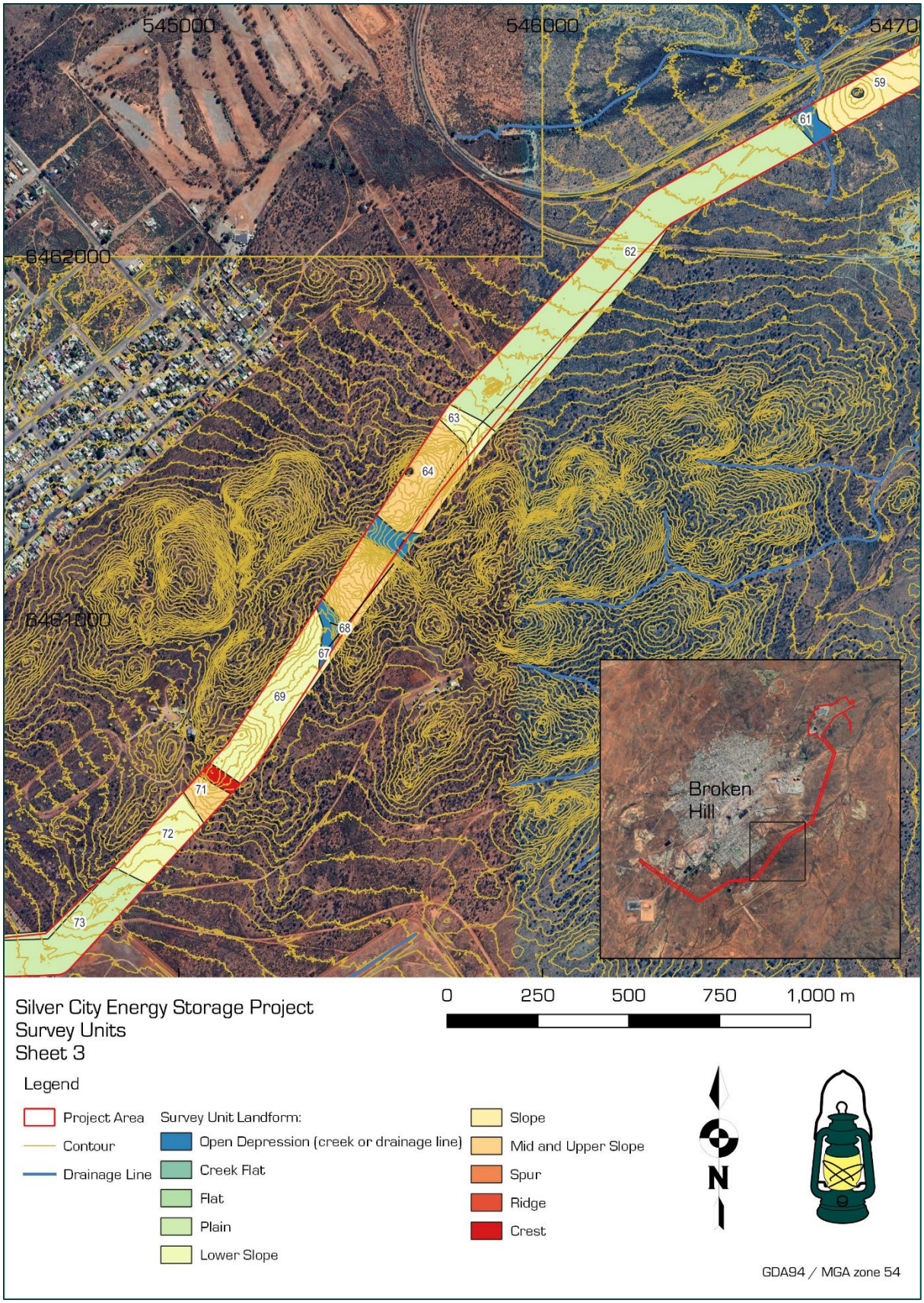


Figure 17: Phase 1 and Phase 2 survey area (mid-section) with Survey Unit landforms recorded within the Project Area.

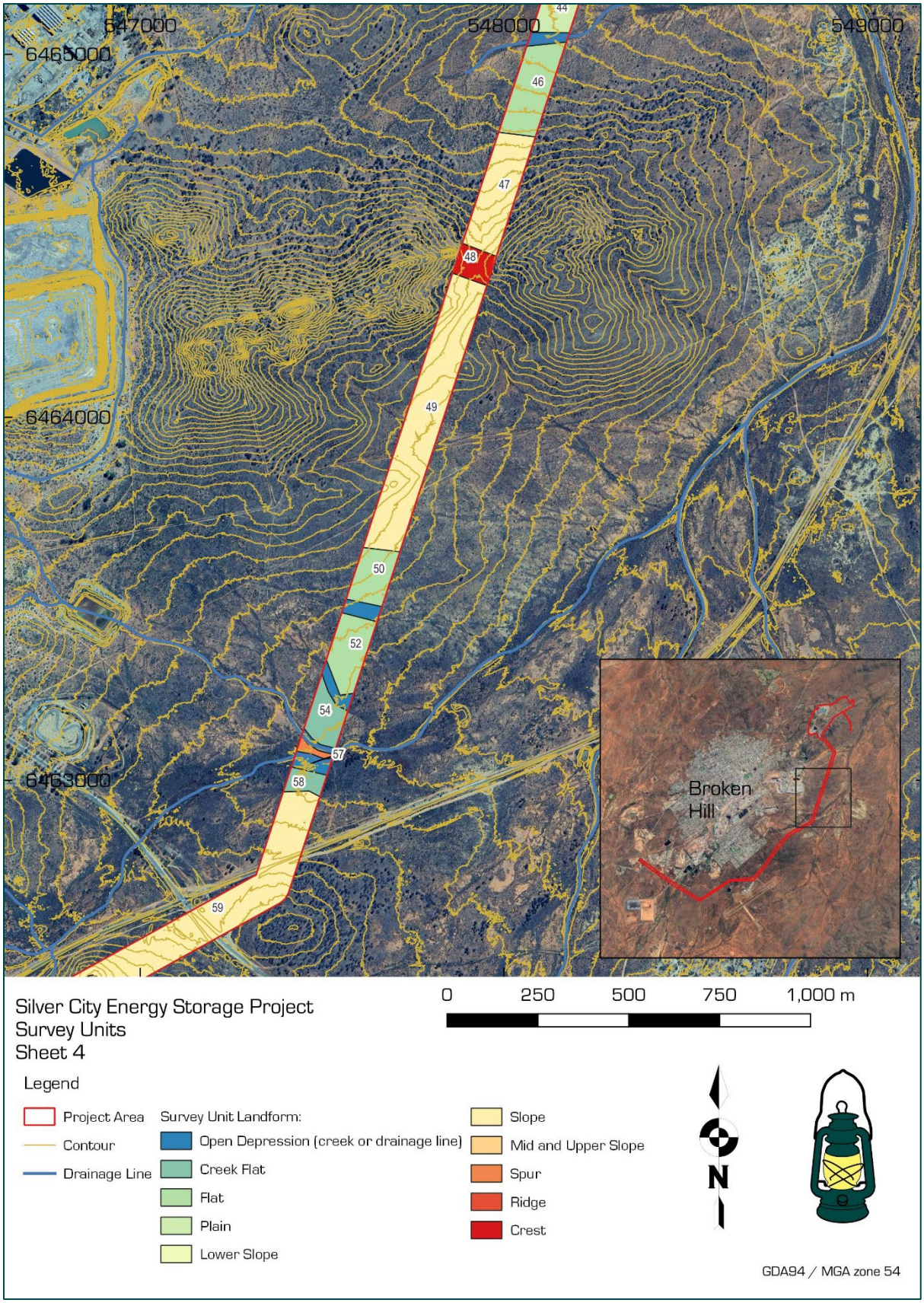


Figure 18: Phase 1 and Phase 2 survey area (mid-section) with Survey Unit landforms recorded within the Project Area.

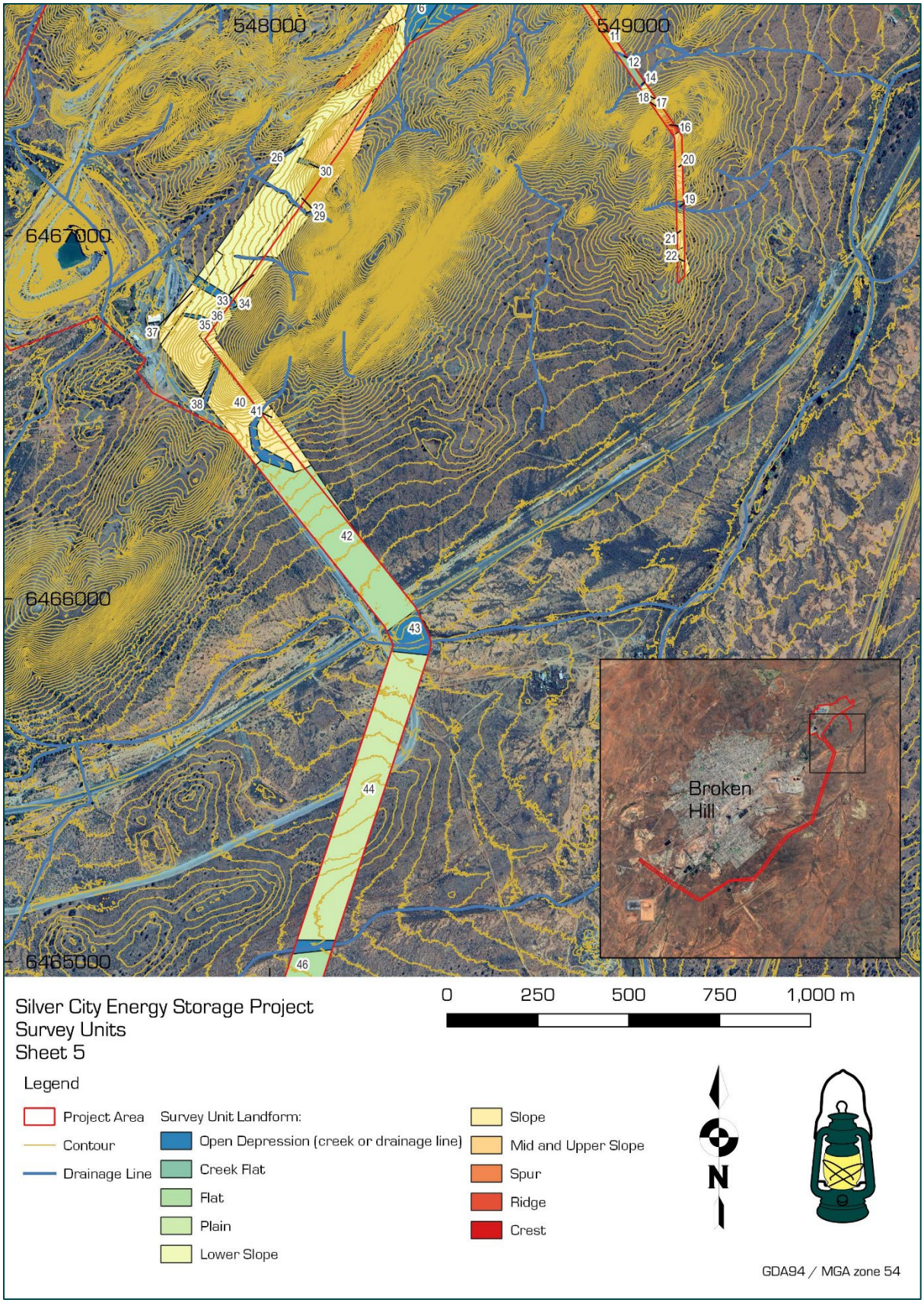


Figure 19: Phase 1 and Phase 2 survey area (northern section) with Survey Unit landforms recorded within the Project Area.

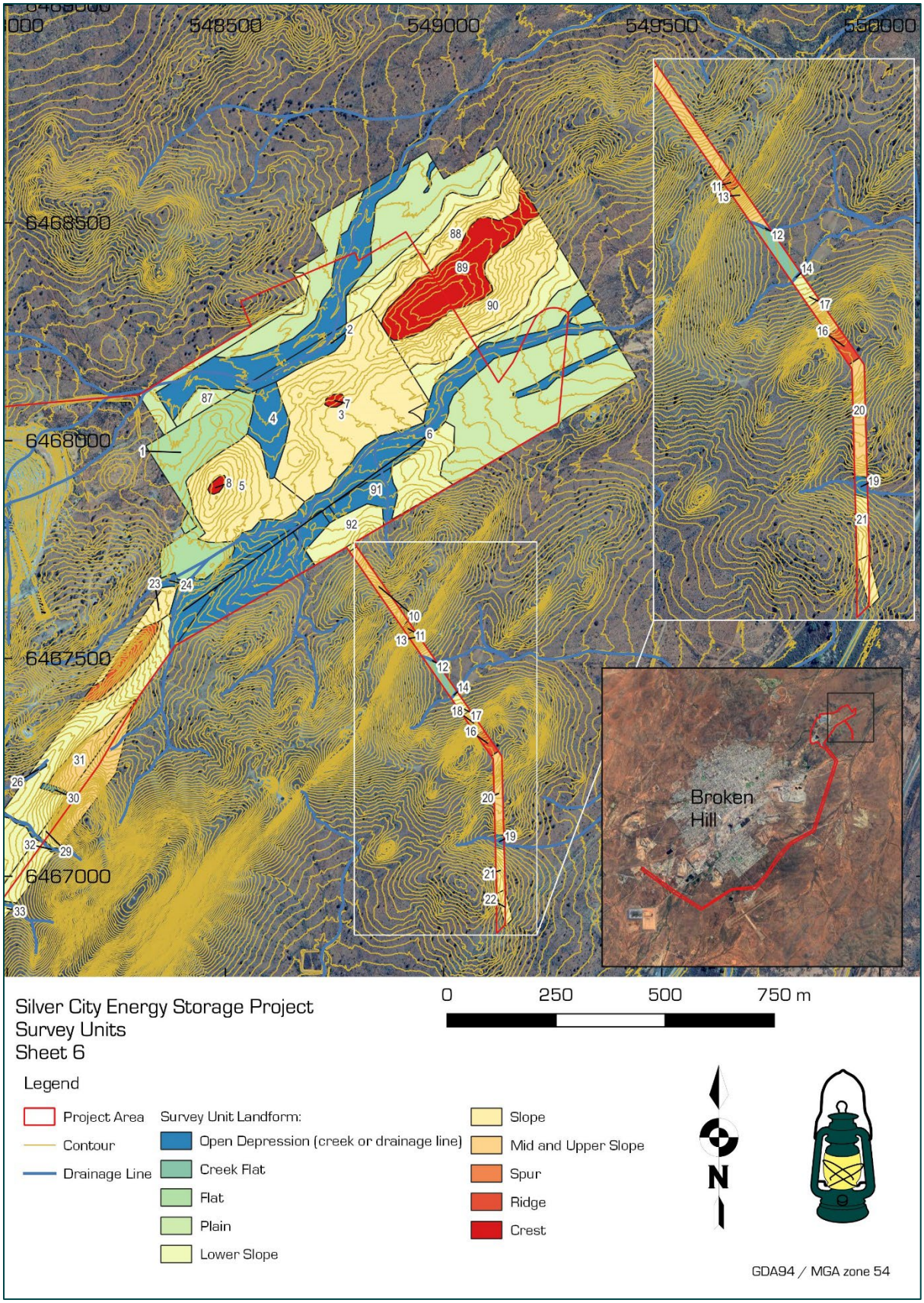


Figure 20: Phase 1 and Phase 2 survey area (northern section) with Survey Unit landforms recorded within the Project Area.

6.2 Summary of the Phase 1 and Phase 2 survey coverage

A summary of survey coverage, in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (Department of Environment, Climate Change and Water 2010a) for each survey area is outlined above and in Appendices 3 and 4.

The survey coverage data by landform type shows that, even when effective survey coverage was less than 10%, the available exposures usually provided a good opportunity to assess the presence of archaeological material. i.e. stone artefacts and hearth material was typically recorded even in instances where the visibility and exposures were limited in frequency or extent.

Despite areas of low visibility within the Project Area, the exposures along the vehicle tracks and denuded ground allow a sample of what to expect of the archaeology within any surrounding PAD. Incision of the current vehicle tracks, washouts and eroded surfaces, whilst detrimental to the integrity of the sites, has allowed us to gain some understanding of what may occur in those areas with low visibility.

Overall, the results indicate that the interface between lower slopes, plains within close range of an open depression as well as low gradient crests support the predictive model and high likelihood of finding cultural material in these landforms where there are easily accessible resources. Plains are the landforms that contained the highest occurrences of both stone artefacts and hearth remains. Further details of the recorded occurrences of Aboriginal objects are provided in the site descriptions below.

6.3 Site Descriptions – Phase 1 survey

The aim of the Phase 1 survey was to review and update existing site descriptions; identify additional sites and site elements and review the definition of site boundaries. Rather than record additional small sites, Lantern used a large-scale landform based approach to defining site boundaries. This also resulted in several of the previously recorded sites being combined into larger sites where appropriate. Due to several changes in the project layout some sites recorded during the Phase 1 survey are now located outside the Project Area (Figure 18).

The Phase 1 survey relocated ten (10) previously recorded sites and identified thirty-five (35) new sites, two (2) previously recorded sites were not relocated during the survey. Post survey analysis found that four newly recorded sites are duplicates of previously recorded sites, as such a total of forty-four (44) sites are described below.

Artefact scatter sites AHIMS #23-5-0146 and #23-5-0152 were not relocated during the survey.

All grid references presented below are GDA 94 Zone 54 centre points (centroids), unless stated otherwise.

Table 6: BH AFT 1 (AHIMS #23-5-0170)

Broken Hill (A-CAES) AFT/HTH 1				
BH Site 1	**AHIMS:**	#23-5-0170	**Site type:**	Artefact scatter and hearth
Associated sites:	**Easting:**	548409	**Northing:**	6468001
n/a	**Exposure:**	60%	**Visibility:**	30%
Site Description:	Site comprises possible hearth feature and scatter of five quartz and one silcrete artefacts. The hearth and heat retainer materials are eroding out of a rill, 5m to the east of a vehicle track (Figure 22). The hearth is associated with low density artefact scatter measuring 30m (east-west) by 10m (north-south). A sample recording of artefacts is provided below. Vegetation is saltbush community and soil depth is estimated to be <10cm deep. This site is located on a flat landform (SU1) and within 120m of an un-named 3rd order ephemeral creek line. Exposure was good, however, the mobile sands and gravels impeded archaeological visibility. The site area is eroded and, in many areas, highly deflated. Approximately 15% of the area has been subject to notable disturbance from erosion and recreational driving. It is predicted that there is a low potential for *in situ* archaeological deposits across this flat landform. A portion of this site is located within the proposed A-CAES Facility 2024 disturbance area. The hearth is located outside of the 2024 disturbance area.			
				
BH AFT/HTH 1, site overview, oriented west.			BH AFT/HTH 1 view of hearth materials.	

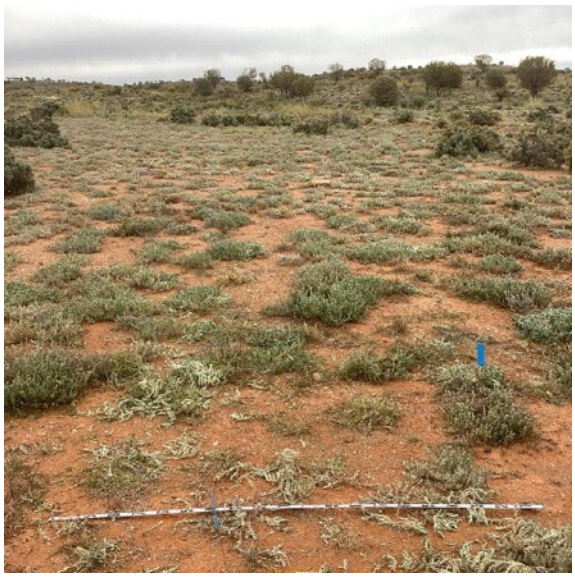
Table 7: Artefacts recorded at BH AFT 1 (AHIMS #23-5-0170)

#	Description/Notes	Length (mm)	Width (mm)	Thickness (mm)
1	A white quartz flake, with plain platform and step termination	21	16	7

#	Description/Notes	Length (mm)	Width (mm)	Thickness (mm)
2	A crystal clear quartz flake, with crushed platform and feather termination	14	11	4
3	A beige, silcrete distal flake, with step termination.	15	12	3
4	A white quartz flake with flaked platform and feather termination	17	11	3
5	A white quartz bipolar flake, with crushed platform and feather termination	17	8	7
6	A white quartz bipolar flake with crushed platform and termination	21	13	5

Table 8: BH Site 2 and AHIMS #23-5-0112

Broken Hill (A-CAES) BH1-48				
BH1-48	**AHIMS:**	#23-5-0063	**Site Type:**	Artefact and hearth site
Associated sites:	**Easting:**	548857	**Northing:**	6468009
BH Site 2 and AHIMS #23-5-0112	**Exposure:**	10%	**Visibility:**	20%
Site Description:	BH Site 2 was identified in 2022 between two previously recorded sites: BH1-48 (#23-5-0063) and PM-SC6 / FD-G001 (#23-5-0112). The site comprises one silcrete and one quartz artefact with remnant hearth features. A sample recording of artefacts is provided below. It is located within an open depression landform along a 3rd order water course tributary to Willa Willyong Creek (Figure 22). Soils at this location comprise deep orange red gravelly sand of an estimated 15-90cm depth. Approximately <5% of the area has been subject to notable disturbance. Saltbush scrubland covered most of the site area and exposures were assessed as very low. At least 5% of site area is actively eroding and has limited potential for subsurface archaeological deposits. However, outside these disturbed areas subsurface archaeological potential is assessed to be moderate to high with moderate to high potential for *in situ* archaeological deposits. Based on proximity to sites BH1-48 (30m to northeast) and FD-G001 (50m to southwest) it is considered that BH Site 2 is part of a larger complex of sites located on the north side of an ephemeral creekline. BH1-48 was originally recorded in 1996 as an isolated chert flake located on an upper valley flat approximately 40m north of an ephemeral watercourse. While PM-SC6 FD-G001 was originally recorded in 2008 as a hearth with artefact scatter. The same locality was recorded in 2017 as FD-F001 and was reported as being in poor condition due to erosion. Following the 2022 survey, the revised extent of BH1-48 (#23-5-0063) now measures 120m (NE-SW) by 35m (east-west). A portion of this site is located within the proposed A-CAES Facility 2024 disturbance area. The hearth is located outside of the 2024 disturbance area.			



Broken Hill (A-CAES) BH1-48	
BH AFT 2, site overview, oriented south-southwest.	BH AFT 2, example artefact.

Table 9: Artefacts recorded at BH AFT 2

#	Description/Notes	Length (mm)	Width (mm)	Thickness (mm)
1	A grey, silcrete distal flake with feather termination	21	17	9
2	A white quartz flake, with a focal platform and feather termination	25	18	8

Table 10: BH Site 3 AHIMS #23-5-0171

Broken Hill (A-CAES) AFT 3				
BH Site 3	**AHIMS:**	#23-5-0171	**Site Type:**	Isolated artefact
Associated sites:	**Easting:**	548705	**Northing:**	6467873
n/a	**Exposure:**	10%	**Visibility:**	20%
Site Description:	This site is an isolated white quartz artefact eroding from the surface of a bare patch of ground. Vegetation cover is mostly saltbush community with an occasional small Beulah tree. The aspect is open to southerly. Visible site area is 1m x 1m. Site is located 50m north of a 3rd order creekline ephemeral in nature (Figure 22). The area appears to have been subject to minimal disturbance. There is an estimated artefact density of 1 artefact/m^2. within an estimated 15-80cm deep deposit. Subsurface archaeological potential is assessed to be moderate to high This site is located within the proposed A-CAES Facility 2024 disturbance area.			

Broken Hill (A-CAES) AFT 3	
BH AFT 3, site overview, oriented southwest.	BH AFT 3, isolated artefact.

Table 11: BH Site 4. AHIMS #23-5-0172

Broken Hill (A-CAES) AFT 4				
BH Site 4	**AHIMS:**	#23-5-0172	**Site Type:**	Isolated artefact
Associated sites:	**Easting:**	548667	**Northing:**	6467868
n/a	**Exposure:**	10%	**Visibility:**	20%
Site Description:	This site is an isolated silcrete artefact located eroding from the surface of a bare patch of ground at the base of a minor slope. Located 40m west of BH site 3, the visible site area is 1m x 1m (Figure 22). Vegetation cover is saltbush community with an occasional small Belah tree. The aspect is open to southerly. Site 4 is located 37m northwest of an ephemeral 3rd order creekline. The area appears to have been subject to minimal disturbance. Archaeological visibility was low, impeded by background gravels and a dynamic surface created by aeolian, colluvial and alluvial processes. The site area has an estimated 15-80cm deep deposit with minimal disturbance evident. Subsurface archaeological potential is assessed to be moderate to high. This site is located within the proposed A-CAES Facility 2024 disturbance area.			
				
BH AFT 4, example artefact.		BH AFT 4, landform overview, oriented east.		

Table 12: BH Site 5 AHIMS #23-5-0122

Broken Hill (A-CAES) PM-Q5					
Site:	PM-Q5	**AHIMS:**	#23-5-0122	**Site Type:**	Resource site (quarry)
Associated sites:		**Easting:**	548699	**Northing:**	6468049
BH Site 5		**Exposure:**	30%	**Visibility:**	20%
Site Description:		A white quartz outcrop identified as a stone quarry during a 2008 assessment (Figure 22). In 2022 this site was recorded as a southwest to northeast trending quartz vein of poor to moderate quality that is very grainy in appearance. There is possible evidence of manmade modification, however it is not conclusive. Quartz scree is distributed approximately 20m downslope to the east, with approximately 95% natural breakage. Site appears to have limited diagnostic features. Site PM-Q5 is located within an area with an estimated 15-30cm deep deposit. There is no visible disturbance to the site. It is predicted that there is a low potential for *in situ* archaeological deposits across this crest. This site is located within the proposed A-CAES Facility 2024 disturbance area.			
					
PM-Q5, site overview, oriented west-northwest.			PM-Q5, overview of outcrop, oriented southwest.		

Table 13: BH Site 6 AHIMS #23-5-0121

Broken Hill (A-CAES) PM-Q4					
Site:	PM-Q4	**AHIMS:**	#23-5-0121	**Site Type:**	Resource site (quarry)
Associated sites:		**Easting:**	548747	**Northing:**	6468091
BH Site 6		**Exposure:**	30%	**Visibility:**	30%
Site Description:		A white quartz outcrop identified as a stone quarry during a 2008 assessment. In 2022 this site was recorded a northeast to southwest trending vein of poor-quality quartz (Figure 22). The outcrop measures approximately 8m x 3m and 50cm high. Natural break scree is distributed			

Broken Hill (A-CAES) PM-Q4	
	downslope, measuring approximately 8x9m. Two white quartz flakes are recorded in association with this site. A sample recording of artefacts is provided below. BH Site 6 appears to have limited diagnostic features and soil deposit is estimated at 15-30cm deep. There is no visible disturbance to the site. It is predicted that there is a low potential for *in situ* archaeological deposits across this crest. This site is located within the proposed A-CAES Facility 2024 disturbance area.
	
PM-Q4, site overview, oriented southwest.	PM-Q4, site overview, oriented southeast.

Table 14: Artefacts recorded at BH AFT 6 (AHIMS# 23-5-0121

#	Description/Notes	Length (mm)	Width (mm)	Thickness (mm)
1	A white quartz flake, with focal platform and feather termination	18	12	3
2	A white quartz flake, with plain platform and feather termination	13	12	3

Table 15: BH Site 7 and AHIMS #23-5-0132

Broken Hill (A-CAES) PM-IF6					
Site:	PM-IF6	**AHIMS:**	#23-5-0131	**Site Type:**	Artefact and hearth
Associated sites:		**Easting:**	548736	**Northing:**	6468209
BH Site 7 and AHIMS #23-5-0132		**Exposure:**	50%	**Visibility:**	20%
Site Description:		BH Site 7 was identified during 2022 survey between two previously recorded sites: PM-IF6 (#23-5-0131) and PM-G04 (#23-5-0132) (Figure 22). The site is located on a northwest facing basal slope adjacent to an ephemeral along			

Broken Hill (A-CAES) PM-IF6	
	a 3rd order water course tributary to Willa Willyong Creek. BH Site 7 comprises a scatter of 10 quartz and 1 silcrete artefacts in association with a deflated hearth feature. The hearth measures 1m diameter by 20cm high and is eroding out of the north side of the site into a wash. While a number of heat retainer stones are present, no charcoal or organic material is visible. Site contains a high proportion of crystal quartz artefacts. A sample recording of artefacts is provided below. Low visible surface artefact density of approximately 1/m^2. Soils at this location comprise an estimated 15-80cm deep orange red gravelly sand deposit. Saltbush scrubland covered most of the site area and exposures were assessed as low. Approximately 50% of the area has been subject to notable disturbance from erosion and vehicle track. There are areas of PAD in higher relief on the southeast margin of the site. It is predicted that there is a moderate potential for *in situ* archaeological deposits across landform. Based on proximity to sites PM-IF6 (25m to southwest) and PM-G04 (30m to northeast) it is considered that BH Site 7 is part of a larger complex of sites located on a basal slope landform adjacent to an ephemeral creekline. PM-IF6 was originally recorded in 2008 as an isolated artefact. While PM-G04 was recorded as a ground oven (hearth). The revised extent of PM-IF6 (#23-5-0131) now measures 85m (NE-SW) x 30m. A portion of this site is located within the proposed A-CAES Facility 2024 disturbance area.
	
PM-IF6, site overview, oriented southwest.	PM-IF6 example artefact.

Table 16: Artefacts recorded at BH Site 7 (AHIMS# 23-5-0131)

#	Description/Notes	Length (mm)	Width (mm)	Thickness (mm)
1	A white quartz distal flake, with feather termination	35	30	13
2	A crystal clear quartz flake, with plain platform and feather termination	15	17	9

#	Description/Notes	Length (mm)	Width (mm)	Thickness (mm)
3	A white quartz flake with flaked platform, and feather termination	19	12	4
4	A crystal clear quartz flake, with plain platform, and feather termination. Dark pigment is visible within the quartz matrix.	15	16	6
5	A white quartz distal flake, with feather termination	13	19	5
6	A white quartz flake, with plain platform, and feather termination	18	15	6
7	A crystal clear quartz flake with flaked platform, and feather termination	19	29	7
8	A crystal clear quartz flake with crushed platform and feather termination	14	12	5
9	A white quartz flake, with flaked platform and feather termination.	28	12	7
10	A white quartz core	34	28	13
11	A beige silcrete flake, with focal platform and hinge termination. Possible use flaking visible on the left lateral margin, and striations on the dorsal area of the left lateral margin.	21	16	5

Table 17: BH Site 8 and #23-5-0173

Broken Hill (A-CAES) AFT 8				
BH Site 8	**AHIMS:**	#23-5-0173	**Site Type:**	Artefact scatter
Associated sites:	**Easting:**	548965	**Northing:**	6467477
n/a	**Exposure:**	20%	**Visibility:**	20%
Site Description:	Site comprises of a scatter of at least 20 white quartz artefacts across the interface of a lower slope and creek flat landform, extending over approximately 50m to the south (Figure 22). The site area is assessed to have an approximate 8/m^2 artefact density The aspect is easterly. Site is located approximately 40m to the southwest of a nearby building ruin. A sample recording of artefacts is provided below. Vegetation is predominantly saltbush community and shrubs of varying height. Ground surface consists of quartz and gneiss gravel in fine, somewhat compacted, orange red, coarse sand matrix. There is an estimated 15-80cm deep deposit. Approximately 10% of the area has been subject to disturbance from erosion and vegetation clearance. It is predicted that there is a moderate potential for *in situ* archaeological deposits across this landform. This site is located directly adjacent and outside of the proposed above ground waterpipe 2024 disturbance area.			

Broken Hill (A-CAES) AFT 8

BH AFT 8, site overview, oriented north.

BH AFT 8, example artefacts.

Table 18: Artefacts recorded at BH AFT 8 (AHIMS# 23-5-0173)

#	Description/Notes	Length (mm)	Width (mm)	Thickness (mm)
1	A white quartz flake with plain platform, and axial termination	31	28	10
2	A white quartz distal flake, with feather termination	13	11	5
3	A white quartz proximal flake, with plain platform	14	12	6
4	A white quartz medial flake	13	14	6
5	A white quartz proximal flake with flaked platform	34	13	10
6	A white quartz proximal flake with plain platform	19	11	6
7	A white quartz flake, with flaked platform and feather termination	16	21	5
8	A white quartz proximal flake, with plain platform	25	28	10
9	A white quartz flake with a flaked platform, and feather termination.	25	26	6
10	A white quartz flake, with plain platform and feather termination.	16	22	5

Table 19: BH Site 9 #23-5-0153

Broken Hill (A-CAES) FD-IF7					
Site:	FD-IF7	**AHIMS:**	#23-5-0153	**Site Type:**	Artefact scatter
Associated sites:		**Easting:**	548733	**Northing:**	6467832
BH Site 9		**Exposure:**	20%	**Visibility:**	30%
Site Description:	BH Site 9 was identified during 2022 survey 32m east northeast of previously recorded site FD-IF7 (#23-5-0153) (Figure 22). The site comprises four quartz artefacts located on a creek flat landform adjacent to the confluence of two minor drainage features. During the Phase 2 survey in 2023, up to 50 quartz and white quartz artefacts, were recorded over a 70m by 50m area (centre point GDA 94 zone 54 548767E, 6467853N). A sample recording of artefacts is provided below. This artefact scatter is bounded to east, south and west by ephemeral creeks and is located on the lower flats of an alluvial plain. Soils at this location comprise quartz and gneiss gravel in fine orangey red, silty sand of an estimated 15-80cm depth. Large concentrations of gravels and natural quartz pieces were observed within site boundary. Saltbush scrubland covered most of the site area and exposures were assessed as very low. Approximately 25% of the site has been disturbed as a result of erosion and the area is actively eroding. However, outside these disturbed areas subsurface archaeological potential is assessed to be moderate with low potential for *in situ* archaeological deposits due to the effects of erosional processes in this location. Based on the proximity to site FD-IF7 on the same landform, it is considered that BH Site 9 is part of this original recording. Site FD-IF7 was originally recorded in 2017 as an isolated artefact. The revised extent of FD-IF7 now measures 55m (NE-SW) by 20m. This site is located within the proposed A-CAES Facility 2024 disturbance area and includes the creek diversion and Transmission Line easements.				
					
FD-IF7 site overview, oriented west.				FD-IF7 landform overview, oriented west.	

FD-IF7 additional scatter area, looking south showing very high surface visibility and artefact locations.

FD-IF7 additional scatter area artefact 5.

Table 20: FD-IF7 / BH Site 9 AHIMS # 23-5-0153 Sample Artefact Recording

#	Description/Notes	Length (mm)	Width (mm)	Thickness (mm)	Max Dimension (mm)
1	Complete flake, white quartz, bipolar, no cortex, crushed platform, crushed termination.	34	16	10	34
2	Proximal flake, white quartz, no cortex, plane platform, platform width 14mm, platform thickness 5mm.	25	27	7	30
3	Core, white quartz, core, no cortex, single platform.	20	36	34	48
4	Left split, white quartz, left split, no cortex, blunt termination.	41	29	16	48
5	Complete flake, white quartz, no cortex, plane platform, crushed termination, bipolar.	34	32	15	36

Table 21: Artefacts recorded at FD-IF7 during Phase 2 survey

#	Description/Notes	Length (mm)	Width (mm)	Thickness (mm)
1	A white quartz flake with plain platform and axial termination.	18	12	5
2	A crystal clear quartz multiplatform core artefact, with at least eight scars. A dark pigmented vein is visible in the matrix.	41	34	21
3	A crystal clear quartz proximal flake, with flaked platform.	15	17	8
4	A crystal clear quartz distal flake, with feather termination	12	17	5

Table 22: BH Site 10 AHIMS # 23-5-0174

Broken Hill (A-CAES) AFT/HTH 10				
BH Site 10	**AHIMS:**	#23-5-0174	**Site Type:**	Artefact scatter and hearth site
Associated sites:	**Easting:**	548351	**Northing:**	6467630
n/a	**Exposure:**	20%	**Visibility:**	20%
Site Description:	Site BH AFT/HTH 10 comprises a scatter of seven quartz artefacts and remnant hearth features located on a gentle northeast facing slope between the confluence two minor drainage features (Figure 22). A sample recording of artefacts is provided below. The site measures 80m (N-S) by 45m and artefact density is estimated at 6 per m^2. Of the six hearth features, the most intact feature measures 80cm diameter defined by a border of 5cm diameter rocks with visible charcoal fragments. Soils at this location comprise compacted orange red gravelly sand of an estimated 15-80cm depth. Approximately 20% of the area has been subject to disturbance from erosion and vehicle tracks. Saltbush scrubland covered most of the site area and ground surface visibility was assessed as very low. The subsurface archaeological potential is assessed to be moderate to high with moderate potential for *in situ* archaeological deposits. This site is located outside the Project Area.			
				
BH AFT/HTH 10, overview of hearth feature, oriented west.			BH AFT/HTH 10, example of artefacts.	

Table 23: Artefacts recorded at BH AFT 10 (AHIMS# 23-5-0174)

#	Description/Notes	Length (mm)	Width (mm)	Thickness (mm)
1	A crystal clear quartz, multidirectional core with five scars	13	13	7
2	A white quartz flake, with crushed platform and feather termination	3	1	1

#	Description/Notes	Length (mm)	Width (mm)	Thickness (mm)
3	A white quartz multifaceted core, with multidirectional flaking, and four scars	6	5	3
4	A white quartz flake with plain platform and feather termination	8	10	2
5	A white quartz resource rock, with one flake extracted from the upper most face.	9	5	0
6	A white quartz flake with plain platform and step termination	4	2	1
7	A white quartz flake with crushed platform and hinge termination	3	9	2

Table 24: BH Site 11 AHIMS 23-5-0175

Broken Hill (A-CAES) AFT 11				
BH Site 11	**AHIMS:**	#23-5-0175	**Site Type:**	Artefact scatter
Associated sites:	**Easting:**	548266	**Northing:**	6467436
n/a	**Exposure:**	20%	**Visibility:**	20%
Site Description:	Site BH AFT 11 comprises a scatter of two quartz artefacts located at the base of a steep, rocky southeast facing slope approximately 90m west from a minor drainage feature. The site measures approximately 40m (NE-SW) by 20m (Figure 22). A sample recording of artefacts is provided below. Soils at this location comprise compacted orange red gravelly sand with <10cm deep deposit. Approximately 10% of the area has been subject to disturbance from erosion and vehicle tracks. Saltbush scrubland covered most of the site area and ground surface visibility was assessed as very low. The subsurface archaeological potential is assessed to be low with low potential for *in situ* archaeological deposits. A portion of this site is located within the footprint of the proposed transmission line easement, outside the proposed 2024 disturbance area.			

BH AFT 11, site overview, oriented west.	BH AFT 11, landform overview, oriented west.

Table 25: Artefacts recorded at BH AFT 11 (AHIMS# 23-5-0175)

#	Description/Notes	Length (mm)	Width (mm)	Thickness (mm)
1	A crystal clear quartz flake, with a crushed platform and feather termination. A flake scar is visible on the lateral and dorsal margins.	54	22	13
2	A white quartz pounding stone, with pitting on one end.	150	140	90

Table 26: BH AFT 12 (AHIMS# 23-5-0176)

Broken Hill (A-CAES) AFT 12				
BH Site 12	**AHIMS:**	#23-5-0176	**Site Type:**	Artefact scatter
Associated sites:	**Easting:**	548045	**Northing:**	6466316
n/a	**Exposure:**	40%	**Visibility:**	30%
Site Description:	Site BH AFT 12 comprises a scatter of three white quartz artefacts located on a gentle southeast facing slope approximately 400m from a minor drainage feature (Figure 21). A sample recording of artefacts is provided below. The site measures 20m (NE-SW) by 8m and artefact density is estimated at 1 per m^2. Soils at this location are skeletal and comprise compacted orange red gravelly sand of an estimated 10cm depth. Approximately 10% of the area has been subject to disturbance from erosion, vegetation clearance and vehicle tracks. Saltbush scrubland covered most of the site area and ground surface visibility was assessed as very low. The subsurface archaeological potential is assessed as low with low potential for *in situ* archaeological deposits. This site is located outside the Project Area.			
				

Broken Hill (A-CAES) AFT 12	
BH AFT 12, site overview, oriented west.	BH AFT 12, example artefacts.

Table 27: Artefacts recorded at BH AFT 12 (AHIMS# 23-5-0176)

#	Description/Notes	Length (mm)	Width (mm)	Thickness (mm)
1	A white quartz flake with crushed platform, and feather termination	41	26	13
2	A white quartz distal flake, with feather termination. Flake scars on the dorsal surface show core rotation.	28	21	11
3	A white quartz flake with crushed platform and feather termination.	31	23	5

Table 28: BH Site 13 AHIMS # 23-5-0177

Broken Hill (A-CAES) AFT 13				
BH Site 13	**AHIMS:**	#23-5-0177	**Site Type:**	Artefact scatter
Associated sites:	**Easting:**	548324	**Northing:**	6466021
n/a	**Exposure:**	40%	**Visibility:**	30%
Site Description:	Site BH AFT 13 comprises a scatter of two white quartz and one grey silcrete artefacts located on level landform located approximately 200m from a minor drainage feature (Figure 21). A sample recording of artefacts is provided below. The site measures 18m (NE-SW) by 8m and artefact density is estimated at 1 per m^2. Soils at this location are skeletal and comprise compacted orange red gravelly sand of an estimated <10cm depth. Approximately 20% of the area has been subject to disturbance from erosion, vegetation clearance and vehicle tracks. Saltbush scrubland covered most of the site area and ground surface visibility was assessed as very low. The subsurface archaeological potential is assessed as low with low potential for *in situ* archaeological deposits. A portion of this site is located within the transmission line easement extending into the proposed 2024 disturbance area.			

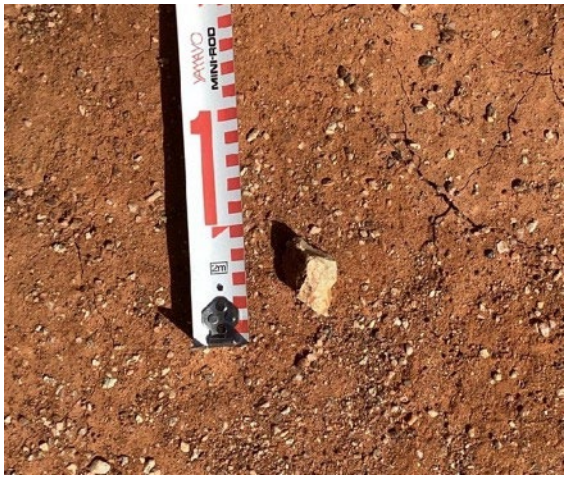
Broken Hill (A-CAES) AFT 13	
	
BH AFT 13, site overview, oriented southeast.	BH AFT 13 example artefact.

Table 29: Artefacts recorded at BH AFT 13 (AHIMS# 23-5-0177)

#	Description/Notes	Length (mm)	Width (mm)	Thickness (mm)
1	A white quartz flake, with plain platform and feather termination	22	14	6
2	A white quartz proximal flake, with plain platform.	24	22	6
3	A grey silcrete core, with multiple platforms, and six scars. Artefact has 20% cortex.	21	22	34

Table 30: BH Site 14 AHIMS # 23-5-0178

Broken Hill (A-CAES) AFT 14					
Site:	BH Site 14	**AHIMS:**	#23-5-0178	**Site Type:**	Artefact scatter
Associated sites:		**Easting:**	548352	**Northing:**	6465730
n/a		**Exposure:**	70%	**Visibility:**	60%
Site Description:	Site BH AFT 14 comprises a scatter of at least ten white quartz and silcrete artefacts located on level landform adjacent to the southern side of an ephemeral 2nd order drainage feature (Figure 21). A sample recording of artefacts is provided below. The site measures 365m (N-S) by 100m and artefact density is estimated at <1 per m^2. Soils at this location comprise unconsolidated orange red sand with large rock inclusions of an estimated 80cm depth. Approximately 30% of the area has been subject to heavy disturbance from erosion and vehicle tracks. Saltbush scrubland covered most of the site area and ground surface visibility was assessed as moderate to high. The subsurface archaeological potential is assessed as high with high potential for *in situ* archaeological deposits.				

Broken Hill (A-CAES) AFT 14	
	A portion of this site is located within the footprint of the proposed transmission line easement and is potential location for monopole and temporary hardstand pad.
	
BH AFT 14, site overview, oriented west.	BH AFT 14, example artefact.

Table 31: Artefacts recorded at BH AFT 14 (AHIMS# 23-5-0178)

#	Description/Notes	Length (mm)	Width (mm)	Thickness (mm)
1	A crystal clear quartz flake with crushed platform and feather termination	40	24	9
2	A crystal clear quartz flake with crushed platform and feather termination	23	14	6
3	A white quartz flake with crushed platform and feather termination	22	12	8
4	A crystal clear quartz flake with plain platform and feather termination	32	13	8
5	A crystal clear quartz flake with crushed platform and feather termination	33	13	6
6	A grey silcrete flake, with plain platform and feather termination	16	14	4
7	A grey quartzite core with multiple platforms, and ten scars	33	31	23
8	A beige silcrete proximal flake, with plain platform	8	33	12
9	A crystal clear quartz flake, with flaked platform and feather termination	28	23	7
10	A crystal clear quartz flake, with plain platform and feather termination	25	14	6

Table 32: BH Site 15 AHIMS 24-5-0179

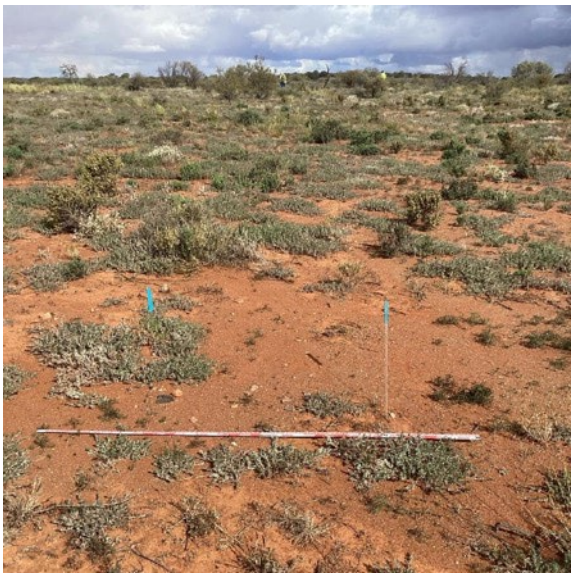
Broken Hill (A-CAES) AFT/HTH 15					
Site:	BH Site 15	**AHIMS:**	#24-5-0179	**Site Type:**	Artefact scatter, hearth and rock mound
Associated sites:		**Easting:**	548218	**Northing:**	6465321
n/a		**Exposure:**	40%	**Visibility:**	60%
Site Description:	Site BH AFT/HTH 15 comprises a possible hearth feature, rock mound and scatter of two quartz and one silcrete artefacts. This site complex measures 180m (n-s) by 100m and artefact density is estimated at <1 per m^2. A sample recording of artefacts is provided below. The hearth is defined by various rock types measuring approximately 15cm in diameter. No artefact or organic material is visible within the hearth, however evidence of baked soil can be seen. In association with this is a mounded rock arrangement measuring approximately 1m in diameter and 30cm in height. The stone arrangement consists of various rock types. The site is located on level east facing basal slope located approximately 200m from an ephemeral 2nd order drainage feature (Figure 21). Soils at this location comprise a soft, silty orange red sand of an estimated 15 – 80cm depth. Approximately 10% of the area has been subject to disturbance from erosion, vegetation clearance and vehicle tracks. Saltbush scrubland covered most of the site area and ground surface visibility was assessed as moderate. The subsurface archaeological potential is assessed to moderate with moderate potential for *in situ* archaeological deposits. A portion of this site is located within the footprint of the proposed transmission line easement and is potential location for monopole and temporary hardstand pad.				
					
BH AFT/HTH 15, site overview, oriented southwest.				BH AFT/HTH 15, hearth feature, oriented southwest.	

Table 33: Artefacts recorded at BH AFT/HTH 15 (AHIMS# 23-5-0179)

#	Description/Notes	Length (mm)	Width (mm)	Thickness (mm)
1	A white quartz flake, with focal platform and feather termination	30	24	7

#	Description/Notes	Length (mm)	Width (mm)	Thickness (mm)
2	A white quartz flake, with crushed platform and feather termination	40	22	14
3	A beige silcrete core, with multiple platforms	39	26	22

Table 34: BH Site 16 AHIMS #23-5-0180

Broken Hill (A-CAES) AFT/HTH 16					
Site:	BH Site 16	**AHIMS:**	#23-5-0180	**Site Type:**	Artefact scatter and hearth site
Associated sites:		**Easting:**	547634	**Northing:**	6463531
n/a		**Exposure:**	20%	**Visibility:**	50%
Site Description:	Site BH AFT/HTH 16 comprises a hearth feature and one quartz artefact. This site measures 15m (E-W) by 10m and artefact density is estimated at <1 per m^2. The hearth measures approximately 90cm by 70cm and contains heat affected, heat retainer material of calcrete, quartz, and schist pieces measuring approximately 3cm in diameter. No artefacts or organic material are visible within the hearth, The site is located on gently sloping basal slope located approximately 350m from an ephemeral 2nd drainage feature (Figure 20). Soils at this location comprise compacted orange red gravelly sand of an estimated 15 – 80cm depth. Approximately 10% of the area has been subject to disturbance from erosion, vegetation clearance and vehicle tracks. Saltbush scrubland covered most of the site area and ground surface visibility was assessed as low. The subsurface archaeological potential is assessed as low to moderate with low to moderate potential for *in situ* archaeological deposits. This site is located within the transmission line easement extending into the proposed 2024 disturbance area. The hearth feature is located outside the proposed 2024 disturbance area.				

BH AFT/HTH 16, site overview, oriented southeast.

BH AFT/HTH 16 hearth feature facing north..

Table 35 BH Site 17 AHIMS 23-5-0181

Broken Hill (A-CAES) AFT 17					
Site:	BH Site 17	**AHIMS:**	#23-5-0181	**Site Type:**	Isolated artefact
Associated sites:		**Easting:**	547555	**Northing:**	6463346
n/a		**Exposure:**	10%	**Visibility:**	10%
Site Description:		Site BH AFT 17 comprises an isolated white quartz core located on a level landform approximately 250m north of an ephemeral 2nd order drainage feature (Figure 20). Soils at this location comprise orange red gravelly sand of an estimated 15 - 80cm depth. The artefact has at least five negative scars and measures 21mm long, 26mm wide and 21mm thick. Approximately <10% of the area has been subject to disturbance as a result of erosion. Native grasses cover most of the site and ground surface visibility was assessed as very low. The subsurface archaeological potential is assessed as moderate with low potential for *in situ* archaeological deposits. This site is located within the transmission line easement, outside the proposed 2024 disturbance area.			
					
BH AFT 17, isolated artefact.		BH AFT 17 landform overview, oriented south			

Table 36: Site 18 AHIMS 23-5-0169

Broken Hill (A-CAES) AFT 18					
Site:	BH Site 18	**AHIMS:**	#23-5-0169	**Site Type:**	Artefact scatter
Associated sites:		**Easting:**	547504	**Northing:**	6463138
n/a		**Exposure:**	20%	**Visibility:**	30%
Site Description:		A scatter of four white and crystal quartz flakes of various sizes located on a level creek flat adjacent to an ephemeral 2nd order drainage feature (Figure 20). A sample recording of artefacts is provided below. The site measures 155m (NE-SW) by 100m and artefact density is estimated at <1 per m^2. Soils			

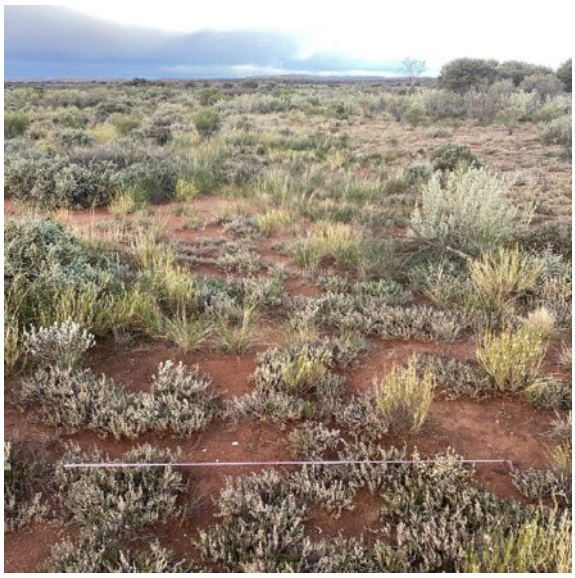
Broken Hill (A-CAES) AFT 18	
	at this location comprise gravelly orange red sand of an estimated >80cm depth. Approximately 10% of the area has been subject to disturbance from erosion. Saltbush scrubland and native grasses covered most of the site area and ground surface visibility was assessed as low. The subsurface archaeological potential is assessed as high with high potential for *in situ* archaeological deposits. A portion of this site is located within the footprint of the proposed transmission line easement.
	
BH AFT 18, site overview, oriented east.	BH AFT 18, landform overview, oriented southwest.

Table 37: Artefacts recorded at BH AFT 18 (AHIMS# 23-5-0169)

#	Description/Notes	Length (mm)	Width (mm)	Thickness (mm)
1	A white quartz proximal flake with plain platform	16	24	6
2	A white quartz distal flake with feather termination	16	17	5
3	A white quartz flake with plain platform and feather termination	28	19	7
4	A white quartz flake with crushed platform and feather termination	25	12	7

Table 38: BH Site 19 AHIMS # 23-5-0168

Broken Hill (A-CAES) AFT/HTH 19					
Site:	BH Site 19	**AHIMS:**	#23-5-0168	**Site Type:**	Artefact and hearth
Associated sites:		**Easting:**	547397	**Northing:**	6462804
n/a		**Exposure:**	10%	**Visibility:**	30%

Broken Hill (A-CAES) AFT/HTH 19	
Site Description:	Site BH/HTH AFT 19 comprises a hearth feature and artefact scatter. Artefacts comprise one fragment of a sandstone grindstone with five quartz and one silcrete flakes. The artefact scatter and hearth features are located in a deep sandy sediment approximately 1m in depth. A sample recording of artefacts is provided below. This site measures 375m (N-S) by 100m and artefact density is estimated at 2 per m^2. The hearth measures approximately 70cm diameter and contains heat affected, heat retainer material and no visible charcoal material. The site is located on gently sloping crest leading into basal slope located approximately 120m from an ephemeral 2nd order drainage feature (Figure 20). Approximately 40% of the area has been subject to disturbance from erosion, transport infrastructure and vehicle tracks. Saltbush scrubland covered most of the site area and ground surface visibility was assessed as moderate. The subsurface archaeological potential is assessed as moderate with moderate potential for *in situ* archaeological deposits. This site is partially located within the footprint of the proposed transmission line easement, proposed 2024 disturbance area and is potential location for monopole and temporary hardstand pad. One hearth feature is located within the transmission line easement and outside the proposed disturbance area.
	
BH AFT/HTH 19, site overview, oriented east.	BH AFT/HTH 19, view of grindstone fragment.

Table 39: Artefacts recorded at BH AFT 19 (AHIMS# 23-5-0168)

#	Description/Notes	Length (mm)	Width (mm)	Thickness (mm)
1	A white quartzite flake with flaked platform and axial termination	31	26	13
2	A white quartz proximal flake with plain platform	17	15	7
3	A white quartzite distal flake, with step termination	19	23	9

#	Description/Notes	Length (mm)	Width (mm)	Thickness (mm)
4	A white quartz core with multiple platforms	15	24	26
5	A brown silcrete flake, with plain platform and feather termination. Flake scars on the dorsal surface suggest core rotation.	32	21	11
6	A crystal clear quartz flake, with crushed platform and feather termination	14	11	3
7	A metamorphosed brown sandstone grinding stone fragment. Artefact is palm sized and appears a good size for holding. The upper surface is very flat and smooth. Possible old flake scars are visible on the surface. The artefact may be fragmentary, or deliberately reduced to its current size.	45	48	34

Table 40: BH Site 40 AHIMS # 23-4-0697

Broken Hill (A-CAES) AFT 20					
Site:	BH Site 20	**AHIMS:**	#23-4-0697	**Site Type:**	Artefact scatter and stone feature
Associated sites:		**Easting:**	546312	**Northing:**	6462113
BH Site 32		**Exposure:**	20%	**Visibility:**	60%
Site Description:	Site BH AFT 20 is a large site comprised of varying densities of almost continues artefact scatters of varying materials across an area measuring 1,400m (ne-sw) by 100m. Within the site boundary are discrete scatters of white quartz artefacts with densities ranging from 2/m^2 to 10/m^2. A sample recording of artefacts is provided below. In addition, an oval shaped stone feature measuring 1.8m by 1.2m and 10cm high was recorded. The feature only contains rock around the perimeter with no rock in the centre. Stone arrangements customarily part of ceremonial activities, however, in this case the purpose of this feature is unknown. Vegetation is predominantly saltbush community and shrubs of varying eight with patches of native grassland. Site BH AFT 20 is located below an east-west oriented ridgeline on a gentle northeast facing basal slope between two minor drainage features (Figure 19). Soils across this site comprise deep orange red gravelly sand of an estimated 15-80cm depth. Visibility varies greatly across the site with exposure and visibility of 10% at the northeastern end of the site. At the southwestern end exposure is 20% with visibility at 60%. Approximately 50% of the area has been subject disturbance from erosion, vehicle tracks, use of area as a weapons range and industrial activity. Site BH 32 was recorded during the 2022 survey to the south of this site and following analysis it was determined that Sites 20 and 32 are actually part of the same landform and same site complex. The recording for Site 32 is incorporated into Site BH AFT 20. The subsurface archaeological potential is assessed to be moderate with moderate potential for *in situ* archaeological deposits. A portion of this site is located within the footprint of the proposed transmission line easement, and within the proposed 2024 disturbance area. Impacts				

Broken Hill (A-CAES) AFT 20	
	include a section of buried cable and is potential location for six monopoles an temporary hardstand pads.
 BH AFT 20, northern extent, oriented north.	 BH AFT 20 example of northern artefact scatter facing southeast.
	

Broken Hill (A-CAES) AFT 20	
BH AFT 20, southern extent, facing south.	BH AFT 20, example of southern extent artefact scatter.
	
BH AFT 20, image showing stones arranged in an oval shape, facing southwest.	BH AFT 20, overview of ordered stone feature, facing south.

Table 41: Artefacts recorded at BH AFT 20 (AHIMS# 23-4-0697)

#	Description/Notes	Length (mm)	Width (mm)	Thickness (mm)
1	A white quartz core artefact, with multiple platforms.	23	27	24
2	A crystal clear quartz flake, with crushed platform and feather termination.	20	13	5
3	A white quartz flake with plain platform and axial termination.	24	23	10
4	A grey quartzite flake, with flaked platform and feather termination	22	28	8
5	A white quartz flake, with crushed platform and feather termination	17	15	4
6	A beige silcrete core, with multiple platforms, and four scars	31	31	22
7	A white quartz flake with a plain platform, and feather termination	27	17	7

Table 42: BH Site 21 AHIMS # 23-4-0682

Broken Hill (A-CAES) South airports regency area isolated artefact					
Site:	South airports regency area isolated artefact	**AHIMS:**	#23-4-0682	**Site Type:**	Artefact scatter and heat retainers

Broken Hill (A-CAES) South airports regency area isolated artefact				
Associated sites:	**Easting:**	544167	**Northing:**	6460023
BH Site 21	**Exposure:**	5%	**Visibility:**	30%
Site Description:	BH AFT/HTH 21 was identified during 2022 survey to the east of a site recorded in 2021: South airports regency area isolated artefact (#23-4-0682). The site is located within a regeneration area on an open plain located approximately 120m from an ephemeral drainage feature (Figure 18). The site comprises a scatter of quartz core and flake artefacts with a circular heat retainer feature with a rock infill. No charcoal or artefacts associated with the feature. Soils at this location comprise gravelly orange red sand of an estimated 15-80cm depth. Less than10% of the area has been subject to disturbance from erosion and revegetation activities. However, the area to the northeast of the site is highly modified due to construction of the airport and associated infrastructure. The area is densely revegetated with low shrubs and 2 to 3m high native bushes. Ground surface visibility was assessed as low. The subsurface archaeological potential is assessed as moderate to high with moderate to high potential for *in situ* archaeological deposits. Based on proximity to AHIMS site #23-4-0682 it is considered that BH Site 21 is part of a larger site complex located on the same plain landform. The revised extent of site #23-4-0682 now measures 320m (e-w) by 100m. A portion of this site is located within the footprint of the proposed transmission line easement, extends into 2024 disturbance area, and is potential location for monopole and temporary hardstand pad.			
				
BH AFT/HTH 21, site overview, oriented west.		BH AFT/HTH 21, example artefact.		

Table 43: BH Site 22 AHIMS # 23-4-0698

Broken Hill (A-CAES) AFT 22					
Site:	BH Site 22	**AHIMS:**	#23-4-0698	**Site Type:**	Artefact scatter
Associated sites:		**Easting:**	543725	**Northing:**	6460017

n/a	**Exposure:**	20%	**Visibility:**	30%
Site Description:	Site BH AFT 22 comprises an extensive scatter of white quartz flake and core artefacts. The site is located on gently sloping creek terrace located approximately 60m from an ephemeral 2nd order drainage feature (Figure 18). This site measures 200m (e-w) by 75m and artefact density is estimated at 2 per m^2. Soils across this site comprise coarse, orange red sand with quartz cobbles of an estimated 15-80cm depth. Approximately 10% of the area has been subject to disturbance from erosion, revegetation activities, pipeline construction and vehicle tracks. Saltbush scrubland covered most of the site area and exposures were assessed as low. The subsurface archaeological potential is assessed as moderate with moderate potential for *in situ* archaeological deposits. A portion of this site is located within the footprint of the proposed transmission line easement and 2024 disturbance area.			
				
BH AFT/HTH 22, site overview, oriented north.		BH AFT/HTH 22, landform overview, oriented west.		

Table 44: BH Site 23 AHIMS # 23-4-0699

Broken Hill (A-CAES) AFT 23					
Site:	BH Site 23	**AHIMS:**	#23-4-0699	**Site Type:**	Artefact scatter
Associated sites:		**Easting:**	543393	**Northing:**	6459907
n/a		**Exposure:**	40%	**Visibility:**	30%
Site Description:	Site BH AFT 23 comprises a large scatter of white quartz flake and core artefacts with occasional silcrete flakes. A sample recording of artefacts is provided below. The site is located on a level northwest facing landform about 400m from an ephemeral 2nd order drainage feature (Figure 18). Site BH AFT 23 measures 135m (n-s) by 60m and artefact density is estimated at 1 per m^2. Soils at this location comprise gravelly orange red sand of an estimated 15 -80cm depth. Approximately 10% of the area has been subject to disturbance from erosion. Saltbush scrubland and small Beulah trees covered most of the site area and ground surface visibility was assessed as low.					

Broken Hill (A-CAES) AFT 23	
	The subsurface archaeological potential is assessed as moderate with moderate potential for *in situ* archaeological deposits. A portion of this site is located within the footprint of the proposed transmission line easement and 2024 disturbance area.
	
BH AFT 23, site overview, oriented southeast.	BH AFT 23, example artefacts.

Table 45: Artefacts recorded at BH AFT 23 (AHIMS# 23-4—0699)

#	Description/Notes	Length (mm)	Width (mm)	Thickness (mm)
1	A crystal clear quartz flake, with crushed platform and axial termination	20	15	4
2	A beige silcrete proximal flake, with plain platform	15	22	9

Table 46: BH Site 25 AHIMS # 23-4-0070

Broken Hill (A-CAES) AFT 25					
Project: Broken Hill A-CAES Facility					
Site:	BH Site 25	**AHIMS:**	#23-4-0700	**Site Type:**	Artefact scatter
Associated sites:		**Easting:**	543260	**Northing:**	6459802
		Exposure:	40%	**Visibility:**	30%
Site Description:	Site BH AFT 25 comprises an extensive scatter of white quartz and quartzite flake and core artefacts. The site is located on a level northwest facing landform about 550m from an ephemeral 2nd order drainage feature (Figure 18). Site BH AFT 25 measures 135m (n-s) by 100m and artefact density is estimated at 1 per m². Soils at this location comprise gravelly orange red sand of an estimated 15 -80cm depth. Approximately 5% of the area has been subject to				

Broken Hill (A-CAES) AFT 25	
	disturbance from erosion. Saltbush scrubland covered most of the site area and ground surface visibility was assessed as low. The subsurface archaeological potential is assessed as moderate with moderate potential for *in situ* archaeological deposits. A portion of this site is located within the footprint of the proposed transmission line easement and proposed 2024 disturbance area.
	
BH AFT 25, site overview, oriented southwest.	BH AFT 25, example artefact.

Table 47: BH Site 26 AHIMS # 31-1-0723

Broken Hill (A-CAES) AFT/HTH 26					
Site:	BH Site 26	**AHIMS:**	#31-1-0723	**Site Type:**	Artefact scatter and hearth
Associated sites:		**Easting:**	543075	**Northing:**	6459632
n/a		**Exposure:**	40%	**Visibility:**	30%
Site Description:		Site BH AFT/HTH 26 comprises a hearth feature and artefact scatter. Artefacts comprise white quartz and quartzite flake and core artefacts. The hearth measures approximately 70cm diameter with a boundary of calcrete nodules, and angular to subangular sandstone blocks. The feature appears to be only partially exposed and relatively intact. This site measures 200m (ne-sw) by 45m and artefact density is estimated at 1 per m^2. Site BH AFT/HTH 26 is located on a level northwest facing landform about 600m from an ephemeral 2nd order drainage feature (Figure 18). Approximately 10% of the area has been subject to disturbance from erosion. Saltbush scrubland covered most of the site area and ground surface visibility was assessed as moderate. Soils across the site comprise orange red coarse sand of an estimated 15-80cm depth. The subsurface archaeological potential is assessed as moderate to high with moderate to high potential for *in situ* archaeological deposits. A portion of this site is located within the footprint of the proposed transmission line easement, extending into 2024 disturbance area, and is potential location for monopole and temporary hardstand pad.			

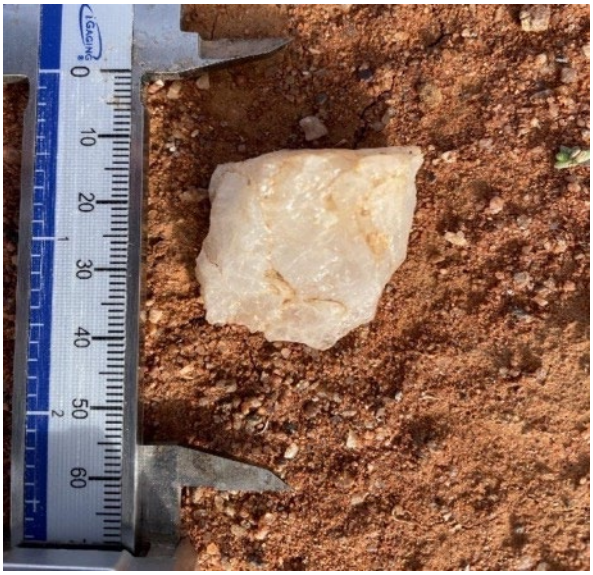
Broken Hill (A-CAES) AFT/HTH 26	
	
BH AFT/HTH 26, site overview, oriented east.	BH AFT/HTH 26, example artefact.

Table 48: BH Site 27 AHIMS # 31-1-0724

Broken Hill (A-CAES) AFT/HTH 27					
Project: Broken Hill A-CAES Facility					
Site:	BH Site 27	**AHIMS:**	#31-1-0724	**Site Type:**	Artefact scatter and hearth
Associated sites:		**Easting:**	541376	**Northing:**	6459634
n/a		**Exposure:**	20%	**Visibility:**	70%
Site Description:	Site BH AFT/HTH 27 comprises a hearth feature and small artefact scatter. Artefacts comprise white quartz flake and core artefacts. The hearth has eroded downslope to the southwest and consists of dispersed angular rock heat retainers measuring 5 to 15cm diameter. The site is located on soft orange red sand of an estimated 15-80cm depth. This site measures 100m (ne-sw) by 60m and artefact density is estimated at 1 per m^2. Site BH AFT/HTH 27 is located on west facing gentle slope about 160m from a minor drainage feature (Figure 17). Approximately 20% of the area has been subject to disturbance from erosion, vegetation clearance and vehicle tracks. Native grassland and shrubs covered most of the site area and ground surface visibility was assessed as moderate. The subsurface archaeological potential is assessed as moderate to high with moderate to high potential for *in situ* archaeological deposits. A portion of this site is located within the footprint of the proposed transmission line easement and 2024 disturbance area. The hearth is outside the 2024 disturbance area.				

Broken Hill (A-CAES) AFT/HTH 27	
	
BH AFT/HTH 27, site overview, oriented north.	BH AFT/HTH 27, example artefact.

Table 49: BH Site 28 AHIMS #23-4-0701

Broken Hill (A-CAES) AFT 28					
Site:	BH Site 28	**AHIMS:**	#23-4-0701	**Site Type:**	Artefact scatter
Associated sites:		**Easting:**	541119	**Northing:**	6459795
n/a		**Exposure:**	50%	**Visibility:**	80%
Site Description:	Site BH AFT 28 comprises a scatter of flake and core artefacts made from a variety of materials. A sample recording of artefacts is provided below. The site gently sloping crest located between two modified water features (Figure 17). The site measures 250m (nw-se) by 100m and artefact density is estimated at 1 per m^2. Soils at this location comprise loose, gravelly orange red sand with large rock inclusions of an estimated 15 - 80cm depth. Approximately 30% of the area has been subject to heavy disturbance from erosion and vehicle tracks. Saltbush scrubland covered most of the site area and ground surface visibility was assessed as moderate to high. The subsurface archaeological potential is assessed as high with high potential for *in situ* archaeological deposits. A portion of this site is located within the footprint of the proposed transmission line easement, extends into 2024 disturbance area, and is potential location for 2 x monopoles and temporary hardstand pads.				

Broken Hill (A-CAES) AFT 28	
	
BH AFT 28, site overview, oriented south.	BH AFT 28, example artefacts.

Table 50: Artefacts recorded at BH AFT 28 (AHIMS# 23-4-0701)

#	Description/Notes	Length (mm)	Width (mm)	Thickness (mm)
1	A white quartz core artefact, with multiple platforms	38	30	18

Table 51: BH Site 29 AHIMS # 23-4-0702

Broken Hill (A-CAES) AFT 29					
Site:	BH Site 29	**AHIMS:**	#23-4-0702	**Site Type:**	Artefact scatter
Associated sites:		**Easting:**	540536	**Northing:**	6460198
n/a		**Exposure:**	10%	**Visibility:**	10%
Site Description:	Site BH AFT 29 comprises a scatter of at least eight white quartz flakes and flaked pieces. The site is located on a plain between two modified water drainage features (Figure 17). A sample recording of artefacts is provided below. Site BH AFT 29 measures 320m (nw-se) by 100m and artefact density is estimated at 1 per m^2. Soils at this location comprise loose orange red sand of an estimated 15 -80cm depth. The site is located within a highly disturbed landscape resulting from vehicle tracks and construction of existing high voltage power lines. Saltbush scrubland covered most of the site area and ground surface visibility was assessed as very low. The subsurface archaeological potential is assessed as moderate with moderate to high potential for *in situ* archaeological deposits. A portion of this site is located within the footprint of the proposed transmission line easement, extends into 2024 disturbance area, and is potential location for monopole and temporary hardstand pad.				

Broken Hill (A-CAES) AFT 29	
	
BH AFT 29, site overview, oriented south.	BH AFT 29, example artefact.

Table 52: Artefacts recorded at BH AFT 29 (AHIMS# 23-4-07020

#	Description/Notes	Length (mm)	Width (mm)	Thickness (mm)
1	A white quartz flake, with crushed platform and feather termination	31	40	12
2	A crystal quartz flaked piece, with feather termination.	17	12	6

Table 53: BH Site 30 AHIMS # 23-4-0703

Broken Hill (A-CAES) AFT 30					
Site:	BH Site 30	**AHIMS:**	#23-4-0703	**Site Type:**	Isolated artefact
Associated sites:		**Easting:**	545035	**Northing:**	6460519
		Exposure:	10%	**Visibility:**	40%
Site Description:	Site BH AFT 30 comprises an isolated white quartz flake located on a steep southwest facing slope approximately 650m from a minor drainage feature (Figure 19). Soils at this location are skeletal and comprise compacted orange red gravelly sand of an estimated 10cm depth. Granitic outcrops dominate this area and there is minimal disturbance. Saltbush scrubland covered most of the site area and ground surface visibility was assessed as low. The subsurface archaeological potential is assessed as low with low potential for *in situ* archaeological deposits. This site is located within the transmission line easement.				

Broken Hill (A-CAES) AFT 30	
	
BH AFT 30, site overview, oriented east.	BH AFT 30 isolated artefact.

Table 54: BH Site 31 AHIMS # 23-4-0704

Broken Hill (A-CAES) AFT 31					
Site:	BH Site 31	**AHIMS:**	#23-4-0704	**Site Type:**	Isolated artefact
Associated sites:		**Easting:**	545516	**Northing:**	6461065
n/a		**Exposure:**	10%	**Visibility:**	40%
Site Description:	Site BH AFT 31 comprises an isolated white quartz flake located on a steep southeast facing slope approximately 550m from the source of a minor drainage feature (Figure 19). A sample recording of artefacts is provided below. Soils at this location are skeletal and comprise compacted orange red gravelly sand of an estimated 10cm depth. Granitic outcrops dominate this area and there is minimal disturbance. Saltbush scrubland covered most of the site area and ground surface visibility was assessed as low. The subsurface archaeological potential is assessed as low with low potential for *in situ* archaeological deposits. This site is located within the transmission line easement.				

Broken Hill (A-CAES) AFT 31	
	
BH AFT 31, site overview, oriented south.	BH AFT 31, recorded artefact.

Table 55: Artefacts recorded at BH AFT 31 (AHIMS# 23-4-0704)

#	Description/Notes	Length (mm)	Width (mm)	Thickness (mm)
1	A white quartz flake, with plain platform and feather termination	22	15	7

Table 56: BH Site 33 AHIMS # 23-4-0641

Broken Hill (A-CAES) Kanandah 1					
Site:	Kanandah 1	**AHIMS:**	#23-4-0640	**Site Type:**	Artefact scatter and hearth
Associated sites:		**Easting:**	540033	**Northing:**	6460551
BH Site 33 and AHIMS #23-4-0641		**Exposure:**	10%	**Visibility:**	60%
Site Description:	BH Site 33 was identified in 2022 between two previously recorded sites: Kanandah 1 (#23-4-0640) and Kanandah 2 (#23-4-0641). The site comprises a scatter of at least five quartz flake artefacts within a 2m radius, and a nearby scatter of another five white quartz flakes in a 3m radius. A sample recording of artefacts is provided below. There are remains of several hearths in varying states of preservation. BH Site 33 is located on an open plain landform about 50m from a minor drainage feature (Figure 17). Soils at this location comprise loose orange red sand of an estimated 15 -80cm depth. The site is located within a highly disturbed landscape resulting from vehicle tracks and construction of existing high voltage power lines. Saltbush scrubland covered most of the site area and ground surface visibility was assessed as moderate. Based on proximity to sites Kanandah 1 (60m to northwest) and Kanandah 2 (30m to southeast) it is considered that BH Site 33 is part of a larger artefact scatter located on the south side of an ephemeral creekline. Both recorded in				

Broken Hill (A-CAES) Kanandah 1	
	2015, Kanandah 1 comprised an isolated silcrete flake, while Kanandah 2 comprised an isolated chert point. Following the 2022 survey, the revised extent of Kanandah 1 (#23-4-0640) now measures 500m (nw-se) by 75m. The subsurface archaeological potential is assessed as high with high potential for *in situ* archaeological deposits. A portion of this site is located within the footprint of the proposed transmission line easement, extending into 2024 disturbance area, and is potential location for 2 x monopoles and temporary hardstand pads. No hearths are located within the proposed Project Area.
	
BH Site 33, site overview, oriented southeast.	BH Site 33, example artefact.

Table 57: Artefacts recorded at BH AFT 33 (AHIMS# 23-4-0640)

#	Description/Notes	Length (mm)	Width (mm)	Thickness (mm)
1	A white quartz core artefact	75	85	90

Table 58: BH Site 34 AHIMS #23-4-0711

Broken Hill (A-CAES) AFT 34					
Site:	BH Site 34	**AHIMS:**	#23-4-0711	**Site Type:**	Isolated artefact
Associated sites:		**Easting:**	540740	**Northing:**	6460059
n/a		**Exposure:**	5%	**Visibility:**	10%
Site Description:	Site BH AFT 34 comprises an isolated white quartz flake located on a plain landform approximately 50m northeast of a modified drainage line (Figure 17). Soils at this location comprise quartz cobbles in coarse, firm, orange red sand of an estimated 15 - 80cm depth. The site is located within a highly disturbed landscape between a road and modified drainage channel. Disturbance at the site is the result of grading, vegetation clearance and erosion Native grasses and saltbush scrub cover most of the site and ground surface visibility was assessed as very low.				

Broken Hill (A-CAES) AFT 34	
	It is assessed that this site is part of a broader site complex comprised of isolated artefact sites: BH AFT 35, BH AFT 36, BH AFT 38 and artefact and hearth site BH AFT/HTH 37. While recorded as individual locations they are considered part of the same landform as shown in the plate below. The subsurface archaeological potential is assessed as low to moderate with low to moderate potential for *in situ* archaeological deposits. This site is located outside the Project Area.
 BH AFT 34 site overview, oriented west.	

Table 59: BH Site 35 AHIMS # 23-4-0710

Broken Hill (A-CAES) AFT 35					
Site:	BH Site 35	**AHIMS:**	#23-4-0710	**Site Type:**	Isolated artefact
Associated sites:		**Easting:**	540781	**Northing:**	6460067
n/a		**Exposure:**	5%	**Visibility:**	10%
Site Description:	Site BH AFT 35 comprises an isolated white quartz flake located on a plain landform approximately 90m northeast of an ephemeral drainage line (Figure 17). A recording of artefacts is provided below. Soils at this location comprise quartz cobbles in coarse, firm, orange red sand of an estimated 15 - 80cm depth. The site is located within a highly disturbed landscape between a road and modified drainage channel. Disturbance at the site is the result of grading, vegetation clearance and erosion Native grasses and saltbush scrub cover most of the site and ground surface visibility was assessed as very low. It is assessed that this site is part of a broader site complex comprised of isolated artefact sites: BH AFT 34, BH AFT 36, BH AFT 38 and artefact and hearth site BH AFT/HTH 37. While recorded as individual locations they are considered part of the same landform as shown in the plate below. The subsurface archaeological potential is assessed as low to moderate with low to moderate potential for *in situ* archaeological deposits. This site is located outside the Project Area.				

Broken Hill (A-CAES) AFT 35	
 BH AFT 35, landform overview, oriented west.	

Table 60: Artefacts recorded at BH AFT 35 (AHIMS# 23-4-0710)

#	Description/Notes	Length (mm)	Width (mm)	Thickness (mm)
1	A white quartz flake, with crushed platform and axial termination	22	10	8

Table 61: BH Site 36 AHIMS # 23-4-0709

Broken Hill (A-CAES) AFT 36					
Site:	BH Site 36	**AHIMS:**	#23-4-0709	**Site Type:**	Isolated artefact
Associated sites:		**Easting:**	540798	**Northing:**	6459995
n/a		**Exposure:**	5%	**Visibility:**	10%
Site Description:	Site BH AFT 36 comprises an isolated white quartz flake located on a plain landform approximately 60m northeast of an ephemeral drainage line (Figure 17). Soils at this location comprise quartz cobbles in coarse, firm, orange red sand of an estimated 15 - 80cm depth. The site is located within a highly disturbed landscape between a road and modified drainage channel. Disturbance at the site is the result of grading, vegetation clearance and erosion. Native grasses and saltbush scrub cover most of the site and ground surface visibility was assessed as very low. It is assessed that this site is part of a broader site complex comprised of isolated artefact sites: BH AFT 34, BH AFT 35, BH AFT 38 and artefact and hearth site BH AFT/HTH 37. While recorded as individual locations they are considered part of the same landform as shown in the plate below. The subsurface archaeological potential is assessed as low to moderate with low to moderate potential for *in situ* archaeological deposits. This site is located outside the Project Area.				

Broken Hill (A-CAES) AFT 36	
 BH AFT 36 landform overview, oriented west.	

Table 62: BH Site 37 AHIMS # 23-4-0708

Broken Hill (A-CAES) AFT/HTH 37					
Site:	BH Site 37	**AHIMS:**	#23-4-0708	**Site Type:**	Artefact scatter and hearth site
Associated sites:		**Easting:**	540875	**Northing:**	6459929
n/a		**Exposure:**	5%	**Visibility:**	10%
Site Description:	Site BH AFT/HTH 37 comprises a scatter of white and smoky quartz flake and core artefacts, and a possible dispersed hearth feature. The possible hearth is eroding out of soft red sand and measures 30 by 60cm with a cluster of large schist fragments. The site is located on a gentle southwest facing slope 100m northeast of an ephemeral drainage line (Figure 17). Soils at this location comprise quartz cobbles in coarse, firm, orange red sand of an estimated 15 - 80cm depth. The site is located within a highly disturbed landscape between roads and a modified drainage channel. Disturbance at the site is the result of grading, vegetation clearance and erosion. Native grasses and saltbush scrub cover most of the site and ground surface visibility was assessed as very low. It is assessed that this site is part of a broader site complex comprised of isolated artefact sites: BH AFT34, BH AFT 35, BH AFT 36 and BH AFT 38. While recorded as individual locations they are considered part of the same landform as shown in the plate below. The subsurface archaeological potential is assessed as moderate with moderate potential for *in situ* archaeological deposits. This site is located within the footprint of the proposed transmission line easement.				

Broken Hill (A-CAES) AFT/HTH 37	
 BH AFT/HTH 37 landform overview, oriented west.	

Table 63: BH Site 38 AHIMS # 23-4-0707

Broken Hill (A-CAES) AFT 38					
Site:	BH Site 38	**AHIMS:**	#23-4-0707	**Site Type:**	Isolated artefact
Associated sites:		**Easting:**	540916	**Northing:**	6459882
n/a		**Exposure:**	40%	**Visibility:**	30%
Site Description:	Site BH AFT 38 comprises an isolated white quartz flake located on a gentle west facing slope approximately 70m northwest of an ephemeral drainage line (Figure 17). Soils at this location comprise quartz cobbles in coarse, compacted, orange red sand of an estimated 10cm depth. The site is located within a highly disturbed landscape between a road and modified drainage channel. Disturbance at the site is the result of grading, vegetation clearance and erosion. Native grasses and saltbush scrub cover most of the site and ground surface visibility was assessed as very low. It is assessed that this site is part of a broader site complex comprised of isolated artefact sites: BH AFT 34, BH AFT 35, BH AFT 36 and artefact and hearth site BH AFT/HTH 37. While recorded as individual locations they are considered part of the same landform as shown in the plate below. The subsurface archaeological potential is assessed as low with low potential for *in situ* archaeological deposits. This site is located within the footprint of the proposed transmission line easement and within close proximity to the proposed 2024 disturbance area.				

Broken Hill (A-CAES) AFT 38	
	
BH AFT 38 landform overview, oriented west.	

Table 64: BH Site 39 AHIMS #31-1-0727

Broken Hill (A-CAES) HTH 39					
Site:	BH Site 39	**AHIMS:**	#31-1-0727	**Site Type:**	Hearth site
Associated sites:		**Easting:**	541536	**Northing:**	6459487
n/a		**Exposure:**	20%	**Visibility:**	70%
Site Description:	Site BH HTH 39 comprises a partially intact hearth measuring 50 by 30cm and defined by sandstone and calcrete rocks. Larger pieces of rock are dispersed over a 2m^2 area. The site is located on a gentle west facing slope approximately 370m southeast of a minor drainage feature (Figure 17). Soils at this location comprise quartz cobbles in coarse, compacted, orange red sand of an estimated 15-80cm depth. Approximately 20% of the area has been subject to disturbance from erosion and vehicle tracks. Native grasses and saltbush scrub cover most of the site and ground surface visibility was assessed as moderate. The subsurface archaeological potential is assessed as low with low potential for *in situ* archaeological deposits. A portion of this site extends into the proposed transmission line easement. Three hearth features as located within close proximity to the proposed transmission line easement footprint.				

Broken Hill (A-CAES) HTH 39	
	
BH HTH 39, site overview, oriented south.	BH HTH 39, site feature, heat retainers.

Table 65: BH Site 40 AHIMS#31-1-0726

Broken Hill (A-CAES) AFT 40					
Project: Broken Hill A-CAES Facility					
Site:	BH Site 40	**AHIMS:**	#31-1-0726	**Site Type:**	Isolated artefact
Associated sites:		**Easting:**	541585	**Northing:**	6459507
n/a		**Exposure:**	20%	**Visibility:**	70%
Site Description:	Site BH AFT 40 comprises an isolated white quartz flake artefact. The site is located on a gentle west facing slope approximately 400m southeast of a minor drainage feature (Figure 17). A sample recording of artefacts is provided below. Soils at this location comprise quartz cobbles in coarse, compacted, orange red sand of an estimated 15-80cm depth. Approximately 20% of the area has been subject to disturbance from erosion and vehicle tracks. Native grasses and saltbush scrub cover most of the site and ground surface visibility was assessed as moderate. The subsurface archaeological potential is assessed as low with low potential for *in situ* archaeological deposits. This site is located within the footprint of the proposed transmission line easement.				

Broken Hill (A-CAES) AFT 40	
	
BH AFT 40, site overview, oriented west.	

Table 66: Artefacts recorded at BH AFT 40 (AHIMS# 31-1-0726)

#	Description/Notes	Length (mm)	Width (mm)	Thickness (mm)
1	A white quartz flake	23	13	4

Table 67: BH Site 41 AHIMS #31-1-0725

Broken Hill (A-CAES) AFT 41					
Site:	BH Site 41	**AHIMS:**	#31-1-0725	**Site Type:**	Isolated artefact
Associated sites:		**Easting:**	541656	**Northing:**	6459453
		Exposure:	80%	**Visibility:**	80%
Site Description:	Site BH AFT 41 comprises an isolated white quartz core artefact. The site is located on a gentle west facing slope on the western verge of the highway leading to Broken Hill (Figure 17). Soils at this location comprise quartz cobbles in coarse, compacted, orange red sand of less than 10cm depth. The site is located within a highly disturbed landscape between along the highway. Disturbance at the site is the result of road construction, vegetation clearance. Saltbush scrubland covered most of the site area and ground surface visibility was assessed as high. The subsurface archaeological potential is assessed as low with low potential for *in situ* archaeological deposits. This site is located within the footprint of the transmission line easement with a portion of this site extending into the proposed 2024 disturbance area.				

Broken Hill (A-CAES) AFT 41	
	
BH AFT 41, landform overview, oriented west.	

Table 68: BH Site 42 AHIMS #23-4-0706

Broken Hill (A-CAES) AFT 42					
Site:	BH Site 42	**AHIMS:**	#23-4-0706	**Site Type:**	Artefact scatter
Associated sites:		**Easting:**	545491	**Northing:**	6461139
n/a		**Exposure:**	10%	**Visibility:**	40%
Site Description:	Site BH AFT 42 comprises a scatter of white quartz flake and core artefacts located on a steep south facing slope approximately 450m from the source of a minor drainage feature (Figure 17). Soils at this location are skeletal and comprise loose orange red sand of an estimated 10cm depth. Granitic outcrops dominate this area and there is minimal disturbance. Sparse saltbush scrubland covered most of the site area and ground surface visibility was assessed as very low. The subsurface archaeological potential is assessed as low with low potential for *in situ* archaeological deposits. This site is located outside the Project Area.				

Broken Hill (A-CAES) AFT 42	
	
BH AFT 42, site overview, oriented southeast.	Sample artefact recorded at BH AFT 42.

Table 69: BH Site 43 AHIMS # 23-4-0705

Broken Hill (A-CAES) AFT 43					
Site:	BH Site 43	**AHIMS:**	#23-4-0705	**Site Type:**	Isolated artefact
Associated sites:		**Easting:**	545488	**Northing:**	6461181
n/a		**Exposure:**	10%	**Visibility:**	40%
Site Description:	Site BH AFT 43 comprises an isolated quartz artefact located on a steep south facing slope about 45m from BH AFT 42. The site is located approximately 500m from the source of a minor drainage feature (Figure 17). Soils at this location are skeletal and comprise loose orange red sand of an estimated 10cm depth. Bedrock outcrops dominate this area and there is minimal disturbance. Saltbush scrubland covered most of the site area and ground surface visibility was assessed as very low. The subsurface archaeological potential is assessed as low with low potential for *in situ* archaeological deposits. This site is located outside the Project Area.				
					

Broken Hill (A-CAES) AFT 43	
BH AFT 43, site overview, oriented northwest.	BH AFT 43, example artefact.

Table 70: BH Site 44 AHIMS # 23-5-0183

Broken Hill (A-CAES) AFT 44					
Site:	BH Site 44	**AHIMS:**	#23-5-0183	**Site Type:**	Isolated artefact
Associated sites:		**Easting:**	549111	**Northing:**	6467285
n/a		**Exposure:**	50%	**Visibility:**	60%
Site Description:	Site BH AFT 44 comprises an isolated crystal quartz flake located on a saddle in a ridge between the source of two minor drainage features (Figure 22). A sample recording of artefacts is provided below. Soils at this location are skeletal and comprise pebbly, compacted orange red sand of an estimated 10cm depth. There is minimal disturbance across the site. Sparse saltbush scrubland covered most of the site area and ground surface visibility was assessed as high. The subsurface archaeological potential is assessed as low with low potential for *in situ* archaeological deposits. This site is located within the footprint of proposed above ground waterpipe easement.				
					
BH AFT 44, site overview, oriented southeast.		BH AFT 44, landform overview, oriented northwest.			

Table 71: Artefacts recorded at BH AFT 44 (AHIMS# 23-5-0183)

#	Description/Notes	Length (mm)	Width (mm)	Thickness (mm)
1	A crystal clear quartz flake with a plain platform and feather termination	22	17	7

Table 72: BH Site 45 AHIMS # 23-5-0182

Broken Hill (A-CAES) AFT 45					
Site:	BH Site 45	**AHIMS:**	#23-5-0182	**Site Type:**	Isolated artefact
Associated sites:		**Easting:**	549136	**Northing:**	6466973
n/a		**Exposure:**	30%	**Visibility:**	80%
Site Description:		Site BH AFT 45 comprises an isolated white quartz flake located on a steep, rocky northeast facing slope about 100m south of the source of a minor drainage feature (Figure 22). Soils at this location are skeletal and comprise pebbly, compacted orange red sand of an estimated 10cm depth. There is minimal disturbance across the site. Sparse saltbush scrubland covered most of the site area and ground surface visibility was assessed as high. The subsurface archaeological potential is assessed as low with low potential for *in situ* archaeological deposits. This site is located within the footprint of proposed above ground waterpipe easement.			
					
BH AFT 45, site overview, oriented northwest.			BH AFT 45, landform overview, oriented southwest.		

Table 73: Artefacts recorded at BH AFT 45 (AHIMS# 34-5-0182)

#	Description/Notes	Length (mm)	Width (mm)	Thickness (mm)
1	A white quartz flake with plain platform and feather termination. One negative scar visible	39	22	12

6.4 Sites not relocated during Phase 1 Survey

6.4.1 FD-IF19 - AHIMS #23-5-0146

This site was originally recorded as a small artefact scatter. This site was not relocated during the survey. (GDA Zone 54 548014 E, 6467080 N)

6.4.2 FD-IF18 - AHIMS #23-5-0152

This site was originally recorded as a small artefact scatter. This site was not relocated during the survey. GDA Zone 54 548509 E, 6467665 N

This site is located within the footprint of the proposed transmission line easement.

6.5 Site Descriptions – Phase 2 survey

Twelve previously recorded AHIMS sites were registered in the Phase 2 survey area, including seven (7) artefact sites, three (3) stone quarry sites, and two (2) hearth sites.

BH Site 9, associated with AHIMS 23-5-0153, was recorded adjacent to the Phase 2 survey area in the initial survey for this assessment, additional artefacts associated with this site were located in the Phase 2 survey area during the survey. Artefact sites, AHIMS 23-5-0141 and 23-5-0154, and stone quarry sites, AHIMS 23-5-0120, 23-5-0123 and 23-5-0127, were also relocated during the survey.

Hearth sites, AHIMS #23-5-0125 and #23-5-0126, and artefact scatter sites, AHIMS #23-5-0138, #23-5-0139, #23-5-0140 and #23-5-0156, were not relocated during the survey.

AHIMS #23-5-0120, #23-5-0123, #23-5-0125, #23-5-0126 and #23-5-0127 were recorded on AHIMS with the incorrect datum, their locations were corrected for this assessment.

Table 74: Site PM-Q3 AHIMS # 23-5-0120

Broken Hill (A-CAES) PM-Q3					
Site:	PM-Q3	**AHIMS:**	#23-5-0120	**Site Type:**	Stone Quarry
Associated sites:		**Easting:**	549095	**Northing:**	6468270
n/a		**Exposure:**	70-80%	**Visibility:**	60%
Site Description:	AHIMS 23-5-0120 was recorded as a quartz stone quarry site on a mid-slope comprising a quartz outcrop, including a boulder with evidence of being struck, and broken fragments surrounding the outcrop (Figure 22). This site was relocated during the survey; however, minimal evidence of quarrying was observed. The 3m by 1m outcrop had evidence of natural fractures, including recent fractures, with only one negative scar observed, possibly associated with quarrying activity. A boulder with a flat surface had a ring crack which may be evidence of use of the boulder as an anvil. One quartz block with a negative scar was located in the scatter of fragmented quartz around the outcrop. The exposed quartz material at this outcrop is granular and poor quality for knapping. The area around the quartz outcrop has been modified in the past, possibly for use as a track. The slope has been flattened directly adjacent upslope of the outcrop, it is possible that the outcrop was subject to machine damage. Visibility was moderate to good, with 60% exposures and 70-80% visibility. It is unlikely that intact archaeological deposits are extant at this location as much of the soil is eroded to bedrock. This site is located outside the Project Area.				

AHIMS 23-5-0120 looking southeast.

Boulder with natural fractures, ring crack and one negative scar.

Ring crack on flat surface of boulder, possible evidence of use as an anvil.

Quartz block with one negative flake scar located at AHIMS 23-5-0210.

Table 75: Site PM-Q6 AHIMS # 23-5-0123

Broken Hill (A-CAES) PM-Q6					
Site:	PM-Q6	**AHIMS:**	#23-5-0123	**Site Type:**	Stone Quarry
Associated sites:		**Easting:**	549017	**Northing:**	6467994
n/a		**Exposure:**	70%	**Visibility:**	80%

Site Description:	AHIMS 23-5-0123 was recorded as a quartz stone quarry site comprising extensive scattered outcropping and boulderized quartz extending either side of a vehicle track over a 50m by 30m area. The site card records physical evidence of quarrying as well as possible historic raw material extraction. This site was relocated during the survey; however, no evidence of quarrying was observed. The outcrop had evidence of natural weathering and fractures. The exposed quartz material at this outcrop is granular and poor quality for knapping. However, a low density of silcrete and quartz flakes were observed over the 70 by 35m site area (centre point GDA 94 zone 54 549022 E, 6467970N). The area around the quartz outcrop has evidence of heavy erosion and colluvial and alluvial wash activity. The site is located within ephemeral wash zone between a gentle rise and lower slope of a hill with a rocky outcrop (Figure 22). Visibility was moderate to good (80-90%) with low grass cover, and established saltbush and broom bush. It is unlikely that intact archaeological deposits are extant at this location as much of the soil is eroded to bedrock and the area has been disturbed. This site is located within the proposed creek diversion easement/SCES facility disturbance area.

AHIMS 23-5-0123 site location, looking southeast showing quartz outcrop and scattered fractured quartz.

AHIMS 23-5-0123 site location, looking north showing erosion and artefact locations.

Table 76: Site PM-G02 AHIMS #23-5-0125

Broken Hill (A-CAES) PM-G02					
Site:	PM-G02	**AHIMS:**	#23-5-0125	**Site Type:**	Hearth
Associated sites:		**Easting:**	548984	**Northing:**	6468112

Broken Hill (A-CAES) PM-G02				
n/a	**Exposure:**	50%	**Visibility:**	60%
Site Description:	This site is registered on AHIMS as an artefact scatter, but was recorded on the site card as an oven eroding out of a drainage line to Willa Willyong Creek comprising charcoal and oven stones (Figure 22). This site was recorded in 2008 and was not relocated during the survey, most likely due to erosion of the creek bank over the last 15 years. Visibility was moderate (approximately 60%) at the recorded site location, however vegetation on the bank may have obscured the site, or more likely, the bank in which the site was located may have been eroded in flood activity (see below). Exposure was 50% in the creek bank and showed deep deposits over 1.5m depth. This site is located within the proposed SCES facility disturbance area..			
 AHIMS 23-5-0125 site location, looking southeast at steeply incised bank, showing erosion disturbance and vegetation coverage.				

Table 77: Site PM-G03 AHIMS #23-5-0126

Broken Hill (A-CAES) PM-G03					
Site:	PM-G03	**AHIMS:**	#23-5-0126	**Site Type:**	Hearth
Associated sites:		**Easting:**	549204	**Northing:**	6468185
n/a		**Exposure:**	50%	**Visibility:**	60%

Broken Hill (A-CAES) PM-GO3	
Site Description:	This site is registered on AHIMS as an artefact scatter, but was recorded on the site card as a ground oven near a fence (Figure 22). Stones were relocated at this site location, but were determined to be of European origin, rather than an Aboriginal hearth site, likely associated with a European feature. This site is located outside the Project Area
 AHIMS 23-5-0126 site location, looking north at stones, likely a European feature.	

Table 78: Site PM-Q7 AHIMS # 2-5-0127

Broken Hill (A-CAES) PM-Q7					
Site:	PM-Q7	**AHIMS:**	#23-5-0127	**Site Type:**	Stone Quarry
Associated sites:		**Easting:**	548943	**Northing:**	6468326
n/a		**Exposure:**	50%	**Visibility:**	70%
Site Description:	AHIMS 23-5-0127 is recorded as a stone quarry site, described as a low-density knapping site with few hertzian cones visible. This site was relocated during the survey. The site comprised a quartz outcrop, boulders and scatter of broken quartz over a 20m by 10m area on the ridge crest (Figure 22). Minimal evidence of quarrying was observed and the material was not ideal for knapping, one boulder with five (5) negative scars was observed. Visibility was moderate to good, with 50% exposures and 70% visibility. It is unlikely that intact archaeological deposits are extant at this location as much of the soil is eroded to bedrock. This site is located outside the Project Area.				

Broken Hill (A-CAES) PM-Q7	
	
AHIMS 23-5-0127 site location, looking north showing quartz outcrop.	Quartz boulder at AHIMS 23-5-0127 with five negative flake scars

Table 79: Site FD-08 AHIMS # 23-5-0141

Broken Hill (A-CAES) FD-08					
Site:	FD-08	**AHIMS:**	#23-5-0141	**Site Type:**	Artefact scatter
Associated sites:		**Easting:**	549142	**Northing:**	6468433
n/a		**Exposure:**	40%	**Visibility:**	60%
Site Description:	This site was originally recorded as an artefact scatter, the site card was not available for this site. This site is located outside the proposed impact area. This site was relocated during the survey. The site comprised a discrete, medium density scatter of more than 100 white and smoky quartz artefacts in a 10m by 5m area on a flat on the upper slope (Figure 22). The site is a workshop/knapping event with the full range of knapping debris present. A sample of 10 artefacts were recorded. Visibility was moderate to good, with 40% exposures and 60% visibility. It is unlikely that archaeological deposits are extant at this location as much of the soil is eroded to bedrock, however due to the location of the site on a flat in the upper slope, despite some A horizon soil loss, it is likely that the objects are horizontally spatially intact. This site is located outside the Project Area.				

Broken Hill (A-CAES) FD-08

AHIMS 23-5-0141 site location, looking east showing artefact 1 location.

Medium density scatter of quartz artefacts at AHIMS 23-5-0141.

Quartz core (artefact 1) at AHIMS 23-5-0141.

Table 80: AHIMS 23-5-0141 Sample Artefact Recording

#	Description/Notes	Length (mm)	Width (mm)	Thickness (mm)	Maximum Dimension (mm)
1	Core, white quartz, no cortex, multi-platform, 4 platforms. Longest core scar 22mm.	56	66	76	76
2	Proximal flake, white quartz, no cortex, crushed platform.	25	32	16	42
3	Broken flake, Smokey quartz, no cortex.	20	14	8	24
4	Complete flake, Smokey quartz, no cortex, plane platform, feather termination	27	14	8	27
5	Proximal flake, white quartz, no cortex, plane platform	15	10	4	18

#	Description/Notes	Length (mm)	Width (mm)	Thickness (mm)	Maximum Dimension (mm)
6	Proximal flake, Smokey quartz, no cortex, crushed platform	23	31	20	52
7	Complete flake, Smokey quartz, no cortex, plane platform, axial termination	37	32	12	44
8	Right split, white quartz, no cortex	19	17	9	26
9	Complete flake, Smokey quartz, 25% cortex (water rolled), bipolar, crushed platform, crushed termination	31	15	9	31
10	Proximal flake, white quartz, no cortex, crushed platform	48	22	10	48

Table 81: Site FD-IF16 AHIMS #23-5-0154

Broken Hill (A-CAES) FD-IF16					
Site:	FD-IF16	**AHIMS:**	#23-5-0154	**Site Type:**	Isolated artefact
Associated sites:		**Easting:**	548882	**Northing:**	6467867
n/a		**Exposure:**	40%	**Visibility:**	60%
Site Description:	This site was originally recorded as an isolated find, comprising a quartz complete flake with feather termination. This site was relocated during the survey, an artefact scatter associated with this site was located over a 75 by 33m area (centre point GDA 94 zone 54 548882E, 6467867N). The site comprised a discrete, low density artefact scatter of 15-20 artefacts on the midslope of low rise, 20-25m east of a drainage channel (Figure 22). A sample of six artefacts were recorded. Visibility was moderate to good (90%), vegetation comprised salt bush and broom bush, outcropping schist and white quartz was observed across the entirety of the site (see below). It is unlikely that archaeological deposits are extant at this location as most of the soil is eroded to bedrock. Where deposits occur, there is moderate potential for subsurface objects to occur. This site is located within the creek diversion easement/ SCES facility disturbance area.				

AHIMS 23-5-0154 site location, looking southwest showing quartz outcrop, outcropping schist and artefact locations.

AHIMS 23-5-01454 artefacts 2 and 3.

Table 82: AHIMS 23-5-0154 Sample Artefact Recording

#	Description/Notes	Length (mm)	Width (mm)	Thickness (mm)	Maximum Dimension (mm)
1	Proximal flake, white quartz, no cortex, plane platform, platform width 13mm, platform thickness 8mm.	34	30	8	43
2	Complete flake, white quartz, no cortex, plane platform, feather termination, platform width 26mm, platform thickness 14mm.	49	33	21	56
3	Complete flake, white quartz, no cortex, plane platform, blunt termination, platform width 13mm, platform thickness 9mm.	31	21	8	35
4	Complete flake, white quartz, no cortex, plane platform, feather termination, platform width 14mm, platform thickness 6mm.	34	15	6	35
5	Right split, white quartz, no cortex, blunt termination.	29	23	10	32
6	Complete flake, white quartz, no cortex, crushed platform, blunt termination, platform width 0mm, platform thickness 4mm.	27	16	10	27

6.6 Sites not relocated during Phase Survey

FD-IF03 - AHIMS #23-5-0138

This site was originally recorded as an isolated artefact. This site was not relocated during the survey.

This site is located outside the Project Area. (GDA Zone 54 549242 E, 6468433 N()

FD-IF03 - #AHIMS 23-5-0139

This site was originally recorded as an isolated artefact located in an area with outcropping schist and quartz and natural quartz fragments. The site comprises a quartz proximal flake fragment with flaked platform. This site was not relocated during the survey. (GDA Zone 54 549015 E, 6468286 N).

This site is located within the proposed SCES facility disturbance area.

FD-IF01 - #AHIMS 23-5-0140 Artefact scatter

This site was originally recorded as an isolated artefact located in an area with outcropping schist and quartz and natural quartz fragments. The site comprises a complete quartz flake. This site was not relocated during the survey. (GDA Zone 54 549072 E, 6468376 N).

This site is located outside the Project Area.

FD-IF14 - #Artefact Scatter AHIMS 23-5-0156

This site was originally recorded as an isolated artefact on the south phase 2 survey area boundary, next to an access track on the base of a low hill with evidence of mining activities in the vicinity. The site comprises a quartz proximal flake fragment with a flaked platform This site was not relocated during the survey. (GDA Zone 54 549198 E, 6468003 N).

This site is located within the proposed SCES facility site.

6.7 Newly recorded Aboriginal sites – Phase 2

Table 83: Site BH AFT/HTH 46 AHIMS # 23-5-0192

Broken Hill (A-CAES) AFT/HTH 46					
Site:	BH AFT/ HTH 46	**AHIMS:**	#23-5-0192	**Site Type:**	Artefact scatter and hearth
Associated sites:		**Easting:**	548817	**Northing:**	6468452
n/a		**Exposure:**	60%	**Visibility:**	80%
Site Description:	This site is an artefact scatter and hearth on an alluvial plain associated with an unnamed drainage line running north east to Willa Willyong Creek in the north of the survey area (Figure 22). The site is gently undulating with evidence of braided drainage lines and two established, deeper incised drainage arms which split and re-join over a 200m length and are 30m apart at the furthest. The artefact scatters and hearth are located east and west of the drainage line within 2-70m of the drainage channel. Eight (8) discrete artefact scatters and one hearth were located across the landform over a 400m by 115m area. A sample of artefacts were recorded at four (4) scatter locations. The deposit at the site is estimated to be up to 50cm depth based on observations of deposit in the drainage line cutting. Disturbance associated with aeolian, sheetwash and gullying erosion was observed. Vegetation comprised grass and groundcover and occasional shrubs. Visibility at the site was moderate, exposures across the site were approximately 60% with 80% visibility within them. The artefact scatters are located on a lag surface, but where visible in the creek section, the soil deposit is comprised of 50cm of red loam with gravel inclusions. There is low to moderate potential for subsurface Aboriginal objects to be located on this landform due to the presence of surface artefacts and depth of deposit observed. There is a low potential for intact cultural deposits due to the dynamic nature of the landform which is subject to erosional and depositional activity associated with alluvial, colluvial and aeolian processes. This site is located outside the Project Area.				

Broken Hill (A-CAES) AFT/HTH 46

Site BH AFT/HTH 46Looking south in gully cutting adjacent to scatter 1, showing depth of deposit.

Looking north at scatter 3 location, showing sheet wash erosion scour

Looking southwest towards the drainage line, showing artefacts location at scatter 7.

Hearth 1 schist cobble potential heat retainers.

Table 84: BH AFT/HTH 46 site features

Feature	Grid Reference	Description/Notes
Scatter 1	548730E ,6468375 N	Low density scatter of 7 quartz artefacts across 50 by 20m on a lag surface cut by an erosion gully 15-35 metres west of the west arm of the drainage line.
Scatter 2	548769E, 6468459N	Four (4) quartz artefacts over a 20m by 10 m area 25m west of the west arm of the drainage line.
Scatter 3	548816E, 6468427N	Scatter of over ten (10) quartz artefacts over a 20m by 10m area in a sheetwash erosion scour, 4m east of the east arm of the drainage line.
Scatter 4	548843E ,6468401N	Two (2) quartz artefacts in a 10m by 5m area, 30m east of the east arm of the drainage line.
Scatter 5	548721E ,6468281N	Low density scatter of seven (7) artefacts over a 40m by 30m area, 30m west of the west arm of the drainage line.
Scatter 6	548781E, 6468501N	Three (3) quartz artefacts over a 10m by 10m area, 20m west of the west arm of the drainage line.
Scatter 7	548857E,6468536N	Ten (10) quartz artefacts over a 20 by 10m area, 30m east of the west arm of the drainage line.
Scatter 8	548912E, 6468532N	Scatter of fourteen (14) artefacts, including one silcrete core, over a 50m by 100m area in sheetwash erosion scours, 20-70m east of the drainage line to the north of the site.
Hearth 1	548844E, 6468507N	30cm diameter potential hearth of schist cobbles, possible heat retainers, and one quartz cobble, located 12m south southeast of scatter 7 and 30m east of the drainage line. Hearth has been washed out with no evidence of charcoal observed.

Table 85: BH AFT/HTH 46 Sample Artefact Recording

Scatter Number	#	Description/Notes	Length (mm)	Width (mm)	Thickness (mm)	Maximum Dimension (mm)
1	1	Left split, white quartz, no cortex.	27	22	19	32
	2	Proximal flake, crystal quartz, crushed platform, no cortex.	9	11	4	14
	3	Complete flake, white quartz, no cortex, crushed platform, feather termination	12	10	3	12
	4	Complete flake, white quartz, no cortex, crushed platform, axial termination	15	20	5	20
	5	Proximal flake, white quartz, no cortex, plane platform	17	28	4	28
	6	Proximal flake, white quartz, no cortex, crushed platform	14	24	5	30
	7	Proximal flake, white quartz, no cortex, crushed platform	19	18	9	19

Scatter Number	#	Description/Notes	Length (mm)	Width (mm)	Thickness (mm)	Maximum Dimension (mm)
5	1	Proximal flake, white quartz, no cortex, crushed platform	18	19	4	21
	2	Proximal flake, white quartz, no cortex, plane platform	20	16	3	23
	3	Complete flake, white quartz, no cortex, plane platform, axial termination	28	19	8	32
	4	Distal flake, white quartz, no cortex, axial termination	28	19	7	30
	5	Complete flake, white quartz, no cortex, plane platform, plunge termination	17	14	3	19
	6	Broken flake, white quartz, no cortex	16	31	5	31
	7	Complete flake, white quartz, no cortex, crushed platform, plunge termination	15	22	4	22
7	1	Broken flake, white quartz, no cortex	15	11	4	19
	2	Distal flake, white quartz, no cortex, feather termination	15	11	4	15
	3	Distal flake, white quartz, no cortex, feather termination	9	18	4	19
	4	Complete flake, white quartz, no cortex, plane platform, axial termination	20	17	16	23
	5	Complete flake, white quartz, no cortex, crushed platform, axial termination	16	16	4	23
	6	Complete flake, white quartz, no cortex, plane platform, feather termination	26	17	6	27
	7	Core, white quartz, no cortex, single platform, longest core scar 15mm	14	23	18	23
	8	Complete flake, white quartz, no cortex, plane platform, feather termination	31	32	11	37
	9	Proximal flake, white quartz, no cortex, plane platform	25	21	5	29
	10	Complete flake, white quartz, no cortex, plane platform, feather termination	20	16	5	21
8	1	Proximal flake, white quartz, no cortex, plane platform	19	14	5	23
	2	Complete flake, white quartz, no cortex, plane platform, axial termination	24	19	11	33
	3	Complete tool (notch), white quartz, no cortex, plane platform, feather termination	25	32	8	36
	4	Core, grey silcrete, no cortex, multi-platform, 3 platforms, longest core scar 24mm	31	25	25	36

Scatter Number	#	Description/Notes	Length (mm)	Width (mm)	Thickness (mm)	Maximum Dimension (mm)
	5	Proximal flake, white quartz, no cortex, crushed platform	20	24	8	27
	6	Proximal flake, white quartz, no cortex, crushed platform	26	16	6	26
	7	Broken flake, white quartz, no cortex	37	22	15	37
	8	Core, white quartz, no cortex, multi-platform, 2 platforms, longest core scar 26mm	44	62	55	69
	9	Right split, white quartz, no cortex	33	17	9	38
	10	Left split, white quartz, no cortex	22	14	6	22

Table 86: Site BH AFT/HTH 46 AHIMS # 23-5-0192 Detail

BH AFT/HTH 46 scatter 1: artefact 3, complete quartz flake.

BH AFT/HTH 46 scatter 7: artefacts 1 and 2, white quartz broken flake and distal flake.

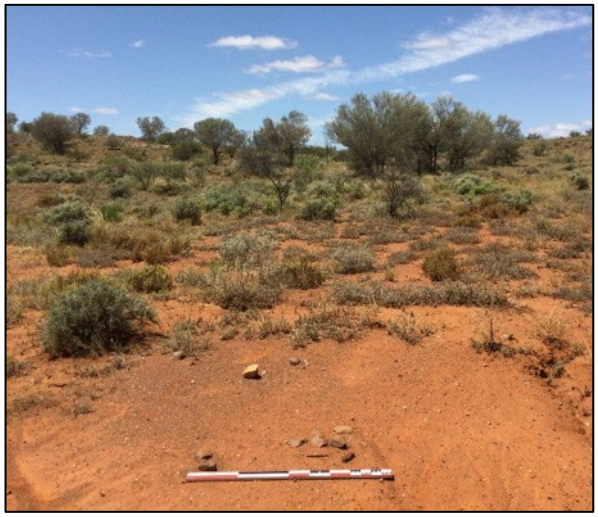
BH AFT/HTH 46 scatter 8: artefact 4, grey silcrete core.

BH AFT/HTH 46 scatter 8: artefact 8, white quartz core.

Table 87: Site BH HTH 47 AHIMS #23-5-0191

Broken Hill (A-CAES) HTH 47					
Site:	BH HTH 47	**AHIMS:**	#23-5-0191	**Site Type:**	Hearth
Associated sites:		**Easting:**	549054	**Northing:**	6468634
n/a		**Exposure:**	80%	**Visibility:**	80%
Site Description:	This site is a potential hearth comprising schist cobble heat-retainers, some rounded and weathered, others angular, in 40cm diameter cluster and 2 scattered cobbles in a 1m by 50cm area. This site is located on an alluvial plain associated with an unnamed drainage line running north east to Willa Willyong Creek in the north of the survey area (Figure 22). Exposure was high 80% and visibility good 80% at the site, vegetation around the site was sparse grasses and groundcover with occasional shrubs and small trees. The site is located in an exposure in an erosion scour.				

Broken Hill (A-CAES) HTH 47	
	Disturbance associated with aeolian, and alluvial activity, sheetwash and gullying erosion was observed at the site location, as well as mining activity, vehicle tracks and historic and modern rubbish in the vicinity of the site. There is low to moderate potential for subsurface Aboriginal objects to be located on this landform due to the presence of the potential hearth and depth of deposit observed on this landform. There is a lower potential for intact cultural deposits due to the dynamic nature of the landform which is subject to erosional and depositional activity associated with alluvial, colluvial and aeolian processes. This site is located outside the Project Area.



Looking east at BH HTH 47, showing erosion scour.

BH HTH 47 potential hearth

Table 88: Site BH AFT 48 AHIMS # 23-5-0190

Broken Hill (A-CAES) AFT 48					
Site:	BH AFT 48	**AHIMS:**	#23-5-0190	**Site Type:**	Artefact scatter
Associated sites:		**Easting:**	549191	**Northing:**	6468562
n/a		**Exposure:**	70%	**Visibility:**	80%
Site Description:	The site comprised five (5) quartz and one (1) quartzite artefacts over a 15m by 10m area on an upper slope (Figure 22). Soils are thin sandy silts, generally eroded to exposed bedrock. Visibility was moderate to good, with 70% exposures and 80% visibility. It is unlikely that subsurface Aboriginal objects, or intact archaeological deposits are extant at this location as much of the soil is eroded to bedrock. Any deposits are likely to be very shallow and disturbed due to erosional activity associated with colluvial and aeolian processes. This site is located outside the Project Area.				

Broken Hill (A-CAES) AFT 48	
 Looking south at BH AFT 48 showing artefact locations.	

Table 89: BH AFT 48 Artefact Recording

#	Description/Notes	Length (mm)	Width (mm)	Thickness (mm)	Maximum Dimension (mm)
1	Proximal flake, white quartz, no cortex, crushed platform	21	13	6	21
2	Core, white quartz, no cortex, single platform, longest core scar 16mm	23	43	49	43
3	Proximal flake, white quartz, no cortex, plane platform	40	28	10	44
4	Complete flake, white quartz, no cortex, plane platform, axial termination	19	13	8	21
5	Left split, white quartz, no cortex	22	10	6	24
6	Complete flake, grey quartzite, 90% cortex, weathered, cortical platform, axial termination, recent damage	30	26	9	34

Table 90: Site BH AFT 49 #23-5-0189

Broken Hill (A-CAES) AFT 49					
Site:	BH AFT 49	**AHIMS:**	#23-5-0189	**Site Type:**	Isolated artefact
Associated sites:		**Easting:**	549078	**Northing:**	6468233
n/a		**Exposure:**	80%	**Visibility:**	60%
Site Description:		This site is an isolated artefact on a lower southeast facing slope transitioning to the alluvial plain (Figure 22). The artefact is a left split, white quartz flake			

Broken Hill (A-CAES) AFT 49	
	with no cortex, 22mm length, 14 mm width, 5 mm thickness and 23mm maximum dimensions. Visibility was good (60%) in frequent exposure (80%) in the site location. Disturbance associated with aeolian and colluvial activity and sheetwash was observed as well as mining activity, exploration drilling, machine earthworks and vehicle tracks adjacent to this site. Soils were sandy silt deposits, often exposed to bedrock, with surface quartz and schist gravels. There is moderate potential for subsurface deposits to occur on the gentle lower slope at the transition to the alluvial plain landform, however this location was highly disturbed by machine activity, vehicle tracks and mining activity. This site is located outside the Project Area.

Looking west at BH AFT 49, showing erosion scour.

BH AFT 49 artefact.

Table 91: Site BH AFT 50 AHIMS #23-5-0188

Broken Hill (A-CAES) AFT 50					
Site:	BH AFT 50	**AHIMS:**	#23-5-0188	**Site Type:**	Artefact scatter
Associated sites:		**Easting:**	549192	**Northing:**	6468394
n/a		**Exposure:**	80%	**Visibility:**	60%
Site Description:		This site is a scatter of 20 white and smoky quartz artefacts over a 12m by 10m area on a lower southeast facing slope transitioning to the alluvial plain (Figure 22). A sample recording of 10 artefacts is provided below. Exposure was high (80%) and visibility was moderate, due to frequent gravels and occasional ground cover vegetation (60%) at this site. Disturbance associated with aeolian and colluvial activity and sheetwash was observed as well as mining activity, exploration drilling, machine earthworks and vehicle tracks adjacent to this site. Soils were sandy silt deposits, often exposed to bedrock, with surface quartz and schist gravels. There is low to moderate potential for subsurface Aboriginal objects to be located on this landform due to the presence of surface artefacts. However,		

Broken Hill (A-CAES) AFT 50	
	deposits are likely to be very shallow, and there is a low potential for intact cultural deposits due to the dynamic nature of the landform which is subject to erosional activity associated with colluvial and aeolian processes, as well as anthropogenic disturbance associated with drilling activity in the vicinity. This site is located outside the Project Area.

Looking west at BH AFT 50, showing ground surface visibilty.

View of BH AFT 50 artefact 6 and gravel ground surface.

Table 92: BH AFT 50 Artefact Recording

#	Description/Notes	Length (mm)	Width (mm)	Thickness (mm)	Maximum Dimension (mm)
1	Left split, white quartz, no cortex, bipolar, crushed platform, crushed termination.	26	10	6	26
2	Broken flake, white quartz, no cortex	63	28	26	65
3	Complete flake, Smokey quartz, no cortex, plane platform, axial termination	19	14	6	20
4	Proximal flake, white quartz, no cortex, plane platform	18	22	9	25
5	Complete flake, white quartz, no cortex, plane platform, axial termination	35	24	10	37
6	Complete flake, Smokey quartz, 25% cortex, weathered, plane platform, cortical termination.	53	36	19	53
7	Proximal flake, Smokey quartz, no cortex, plane platform	27	21	9	35
8	Complete flake, Smokey quartz, no cortex, plane platform, axial termination	25	29	9	32
9	Broken flake, Smokey quartz, no cortex.	25	33	11	43

#	Description/Notes	Length (mm)	Width (mm)	Thickness (mm)	Maximum Dimension (mm)
10	Complete flake, white quartz, no cortex, bipolar, crushed platform, crushed termination	31	15	10	31

Table 93: Site BH AFT/HTH 51 AHIMS #23-5-0187

Broken Hill (A-CAES) AFT/HTH 51					
Site:	BH AFT/ HTH 51	**AHIMS:**	#23-5-0187	**Site Type:**	Artefact scatter and hearth
Associated sites:		**Easting:**	549273	**Northing:**	6468308
n/a		**Exposure:**	60%	**Visibility:**	50%
Ste Description:	This site is an artefact scatter and hearth comprising a low density scatter of five (5) artefacts over a 2m area and two hearths located over a 20m by 15m site area. This site is located on an undulating alluvial plain 45m north of the unnamed drainage line to Willa Willyong Creek, and 15m east of a vehicle track (Figure 22). Site features and artefacts are recorded below. Disturbance associated with aeolian, sheetwash and gullying erosion was observed, as well as machine activity for vehicle track and mining activity, including drilling, in the area. Vegetation comprised grass and groundcover and occasional shrubs. Visibility at the site was moderate, exposures across the site were approximately 60% with 50% visibility within them. There is low to moderate potential for subsurface Aboriginal objects to be located on this landform due to the presence of surface artefacts and depth of deposit observed in the adjacent drainage line. There is a low potential for intact cultural deposits due to the previous mining disturbance dynamic nature of the landform which is subject to erosional and depositional activity associated with alluvial, colluvial and aeolian processes, as evidenced by the disturbed hearth stones at this site. This site is located outside the Project Area.				

BH AFT/HTH 51 potential hearth 1

Looking south at BH AFT/HTH 51 potential disturbed hearth 2.

Table 94: BH site 51 site features

Feature	Grid Reference	Description/Notes
Scatter 1	549272E 6468314N	Scatter of 5 quartz artefacts over a 2m area.
Hearth 1	549274E 6468306N	Potential hearth with possible heat retainer cobbles of schist and quartz over a 1.5m by 1.5m area. This hearth has been washed out with no evidence of charcoal observed.
Hearth 2	549266E 6468307N	Disturbed schist cobble potential heat retainers over 2m by 50cm. Hearth has been washed out with no evidence of charcoal observed.

Table 95: BH site 51 Artefact Recording

#	Description/Notes	Length (mm)	Width (mm)	Thickness (mm)	Maximum Dimension (mm)
1	Proximal tool, white quartz, no cortex, plane platform, denticulate	47	62	17	62
2	Complete flake, white quartz, no cortex, plane platform, axial termination	36	24	10	39
3	Complete flake, white quartz, no cortex, plane platform, axial termination,	34	28	9	39
4	Distal flake, white quartz, no cortex, feather termination	18	15	7	25
5	Complete flake, white quartz, no cortex, bipolar, crushed platform, crushed termination	19	10	5	19

Table 96: Site BH HTH 52 AHIMS #23-5-0186

Broken Hill (A-CAES) HTH 52					
Site:	BH HTH 52	**AHIMS:**	#23-5-0186	**Site Type:**	Hearth
Associated sites:		**Easting:**	549232	**Northing:**	6468269
n/a		**Exposure:**	60%	**Visibility:**	50%
Site Description:	This site comprises disturbed schist and ironstone cobble potential heat retainers over 1m by 1m area on an undulating alluvial plain 30m north of the unnamed drainage line to Willa Willyong Creek, and 25m south of a vehicle track (Figure 22). Disturbance associated with aeolian, sheetwash and gullying erosion was observed, as well as machine activity for vehicle track and mining activity, including drilling, in the area. Vegetation comprised grass and groundcover and occasional shrubs. Visibility at the site was moderate, exposures across the site were approximately 60% with 50% visibility within them. There is low to moderate potential for subsurface Aboriginal objects to be located on this landform due depth of deposit observed in the adjacent drainage line. There is a low potential for intact cultural deposits due to the previous mining disturbance dynamic nature of the landform which is subject to erosional and depositional activity associated with alluvial,				

	colluvial and aeolian processes, as evidenced by the disturbed hearth stones at this site. This site is located inside the proposed creek diversion easement.
 Looking south at BH HTH 52 potential disturbed hearth.	

Table 97: Site BH AFT 53 AHIMS # 23-5-0185

Broken Hill (A-CAES) AFT 53					
Site:	BH AFT 53	**AHIMS:**	#23-5-0185	**Site Type:**	Artefact scatter
Associated sites:		**Easting:**	549039	**Northing:**	6468057
n/a		**Exposure:**	50%	**Visibility:**	50%
Site Description:	This site is a scatter of two artefacts located over a 2m area on an undulating alluvial plain 45m southeast of the unnamed drainage line to Willa Willyong Creek (Figure 22). Artefacts are described in the table below. Exposures were 50% and visibility 50%, vegetation was sparse grasses and groundcover with occasional shrubs. Exposures in erosion scours and drainage lines showed frequent surface quartz and schist gravels. Disturbance associated with aeolian, and alluvial activity, sheetwash erosion was observed as well as, mining activity, exploration drilling, vehicle tracks and historic and modern rubbish scattered in this site vicinity. There is low to moderate potential for subsurface Aboriginal objects to be located on this landform due to the presence of surface artefacts and depth of deposit observed. There is a low potential for intact cultural deposits due to the dynamic nature of the landform which is subject to erosional and depositional activity associated with alluvial, colluvial and aeolian processes. This site is located within the SCES facility disturbance area.				

Broken Hill (A-CAES) AFT 53

Looking east at BH AFT 53 scatter location.

BH AFT 53 artefact 1, quartz core.

Table 98: BH site 53 Artefact Recording

#	Description/Notes	Length (mm)	Width (mm)	Thickness (mm)	Maximum Dimension (mm)
1	Core, white quartz, no cortex, multiplatform, 3 platforms, longest core scar 34mm	38	24	27	38
2	Split flake, white quartz, no cortex	26	21	8	31

Table 99: Site BH AFT 54 AHIMS # 23-5-0184

Broken Hill (A-CAES) AFT 54					
Site:	BH AFT 54	**AHIMS:**	#23-5-0184	**Site Type:**	Artefact scatter
Associated sites:		**Easting:**	549317	**Northing:**	6468187
n/a		**Exposure:**	80%	**Visibility:**	70%
Site Description:	This site is a scatter of ten artefacts located in an erosion scour in a modified u-shaped bank on an undulating alluvial plain 45m southeast of the unnamed drainage line to Willa Willyong Creek (Figure 22). Exposures were 80% and visibility 70%, disturbance associated with machinery, drilling and alluvial activity, sheetwash erosion was observed as well as, industrial debris and rubbish scattered in this site vicinity. There is low to moderate potential for subsurface Aboriginal objects to be located on this landform due to the presence of surface artefacts. There is a very low potential for intact cultural deposits due to the highly disturbed nature of the site. This site is located outside the Project Area.				

Broken Hill (A-CAES) AFT 54

Looking southwest at BH AFT 54, showing exposure.

Looking southwest at BH AFT 54, showing modified bank and artefact locations.

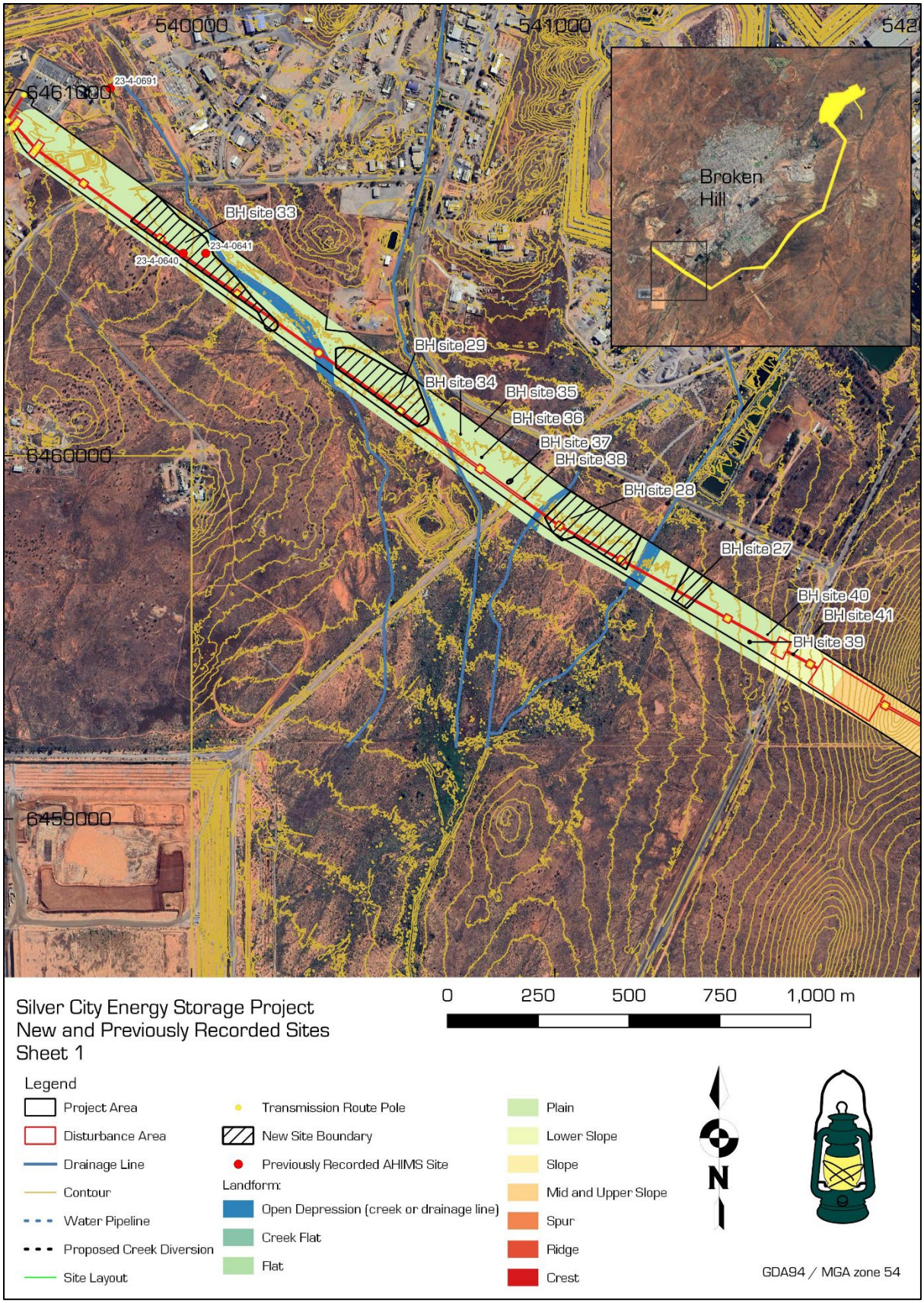


Figure 21: Map 1 of 6 Location of new and previously recorded Aboriginal sites in the Project Area

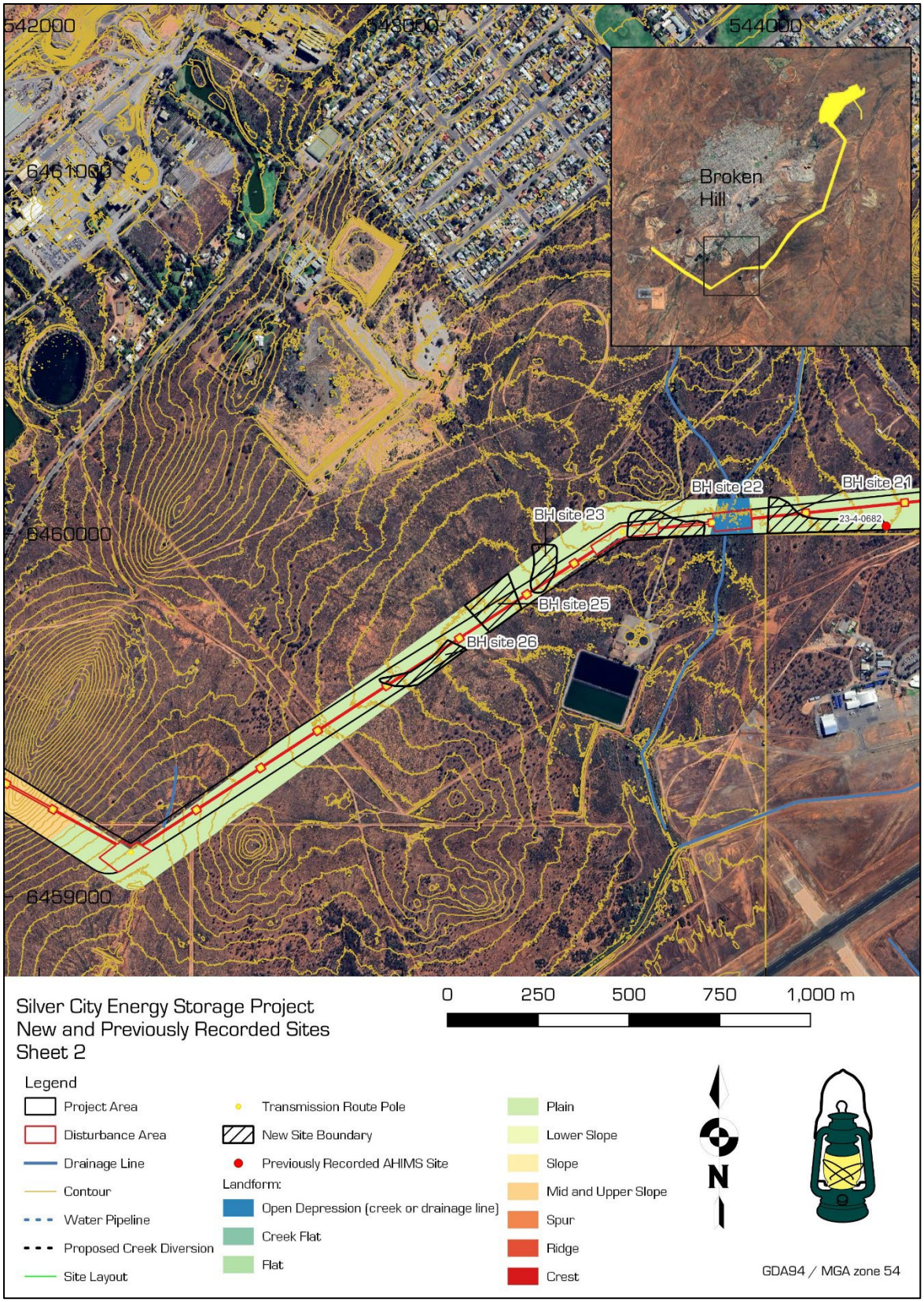


Figure 22: Map 2 of 6 Location of new and previously recorded Aboriginal sites in the Project Area

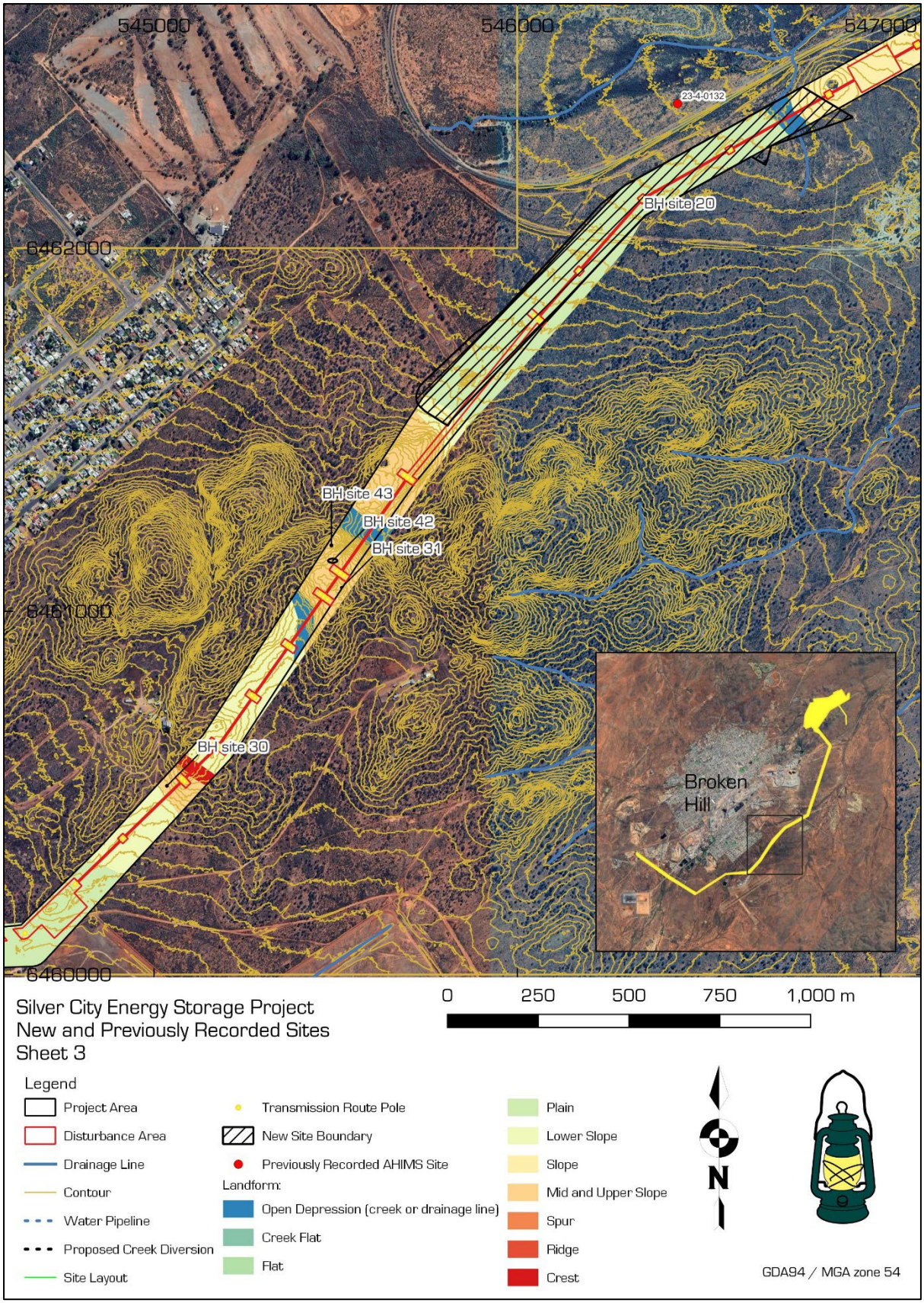


Figure 23: Map 3 of 6 Location of new and previously recorded Aboriginal sites in the Project Area

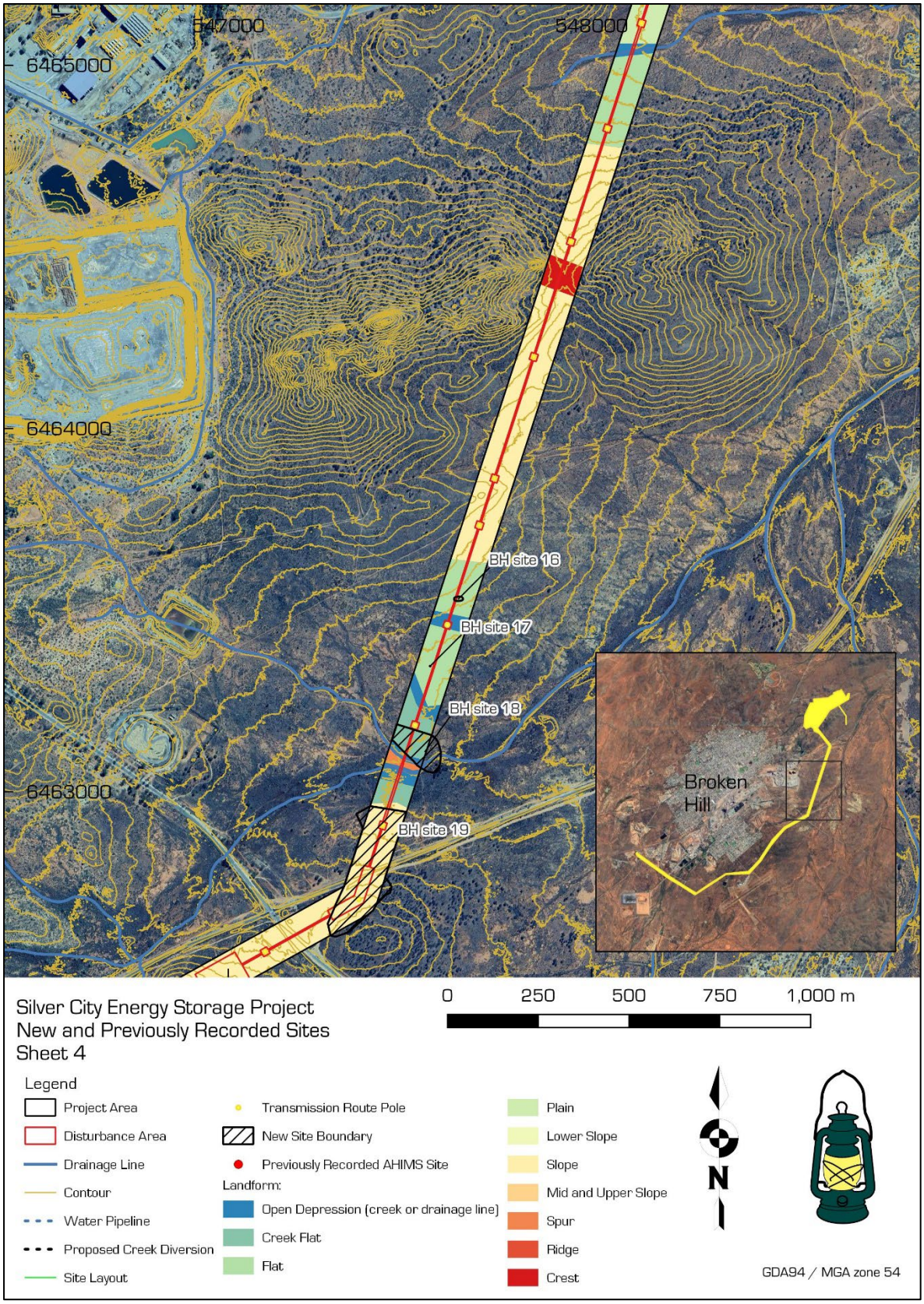


Figure 24: Map 4 of 6 Location of new and previously recorded Aboriginal sites in the Project Area

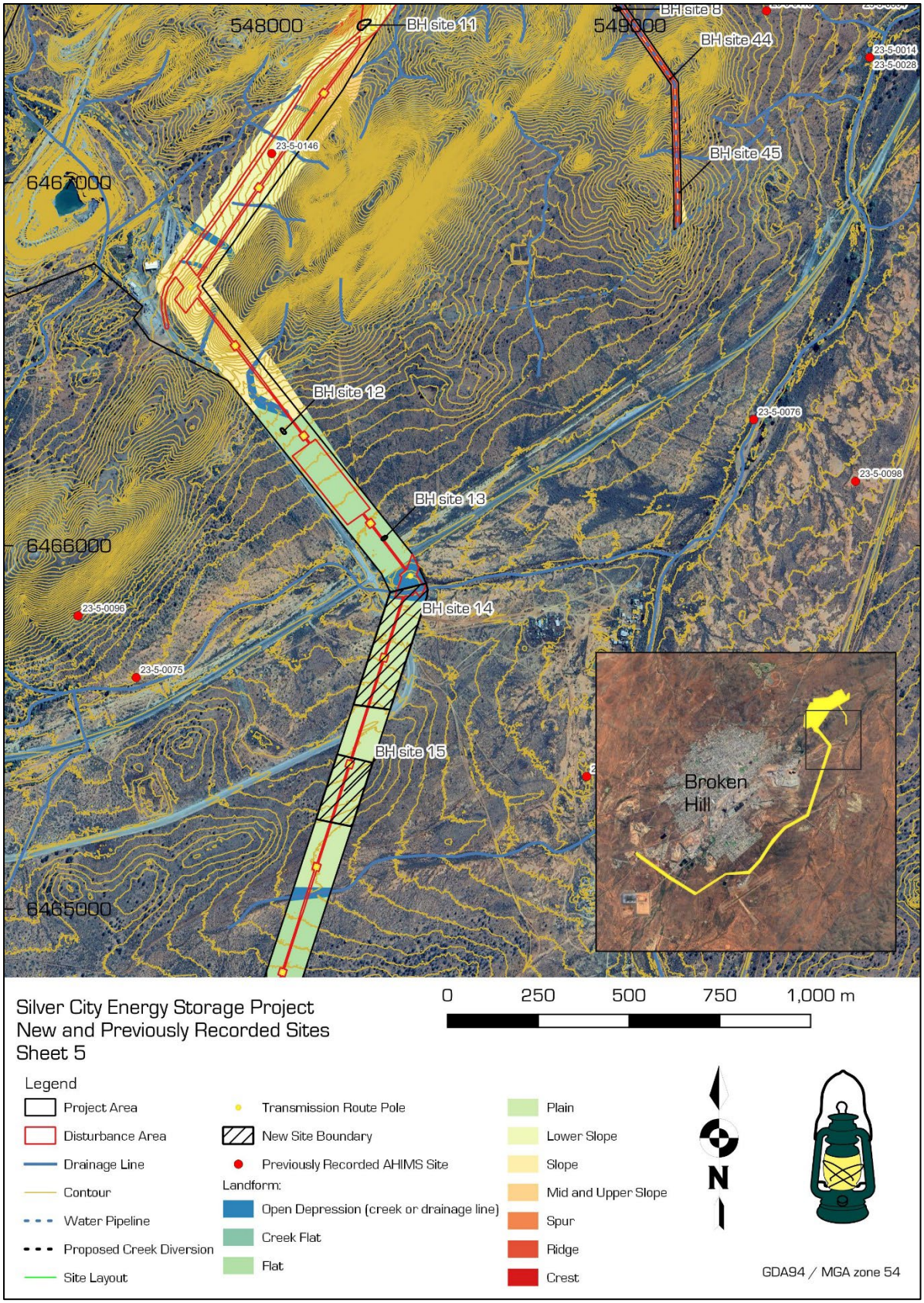


Figure 25:Map 5 of 6 Location of new and previously recorded Aboriginal sites in the Project Area

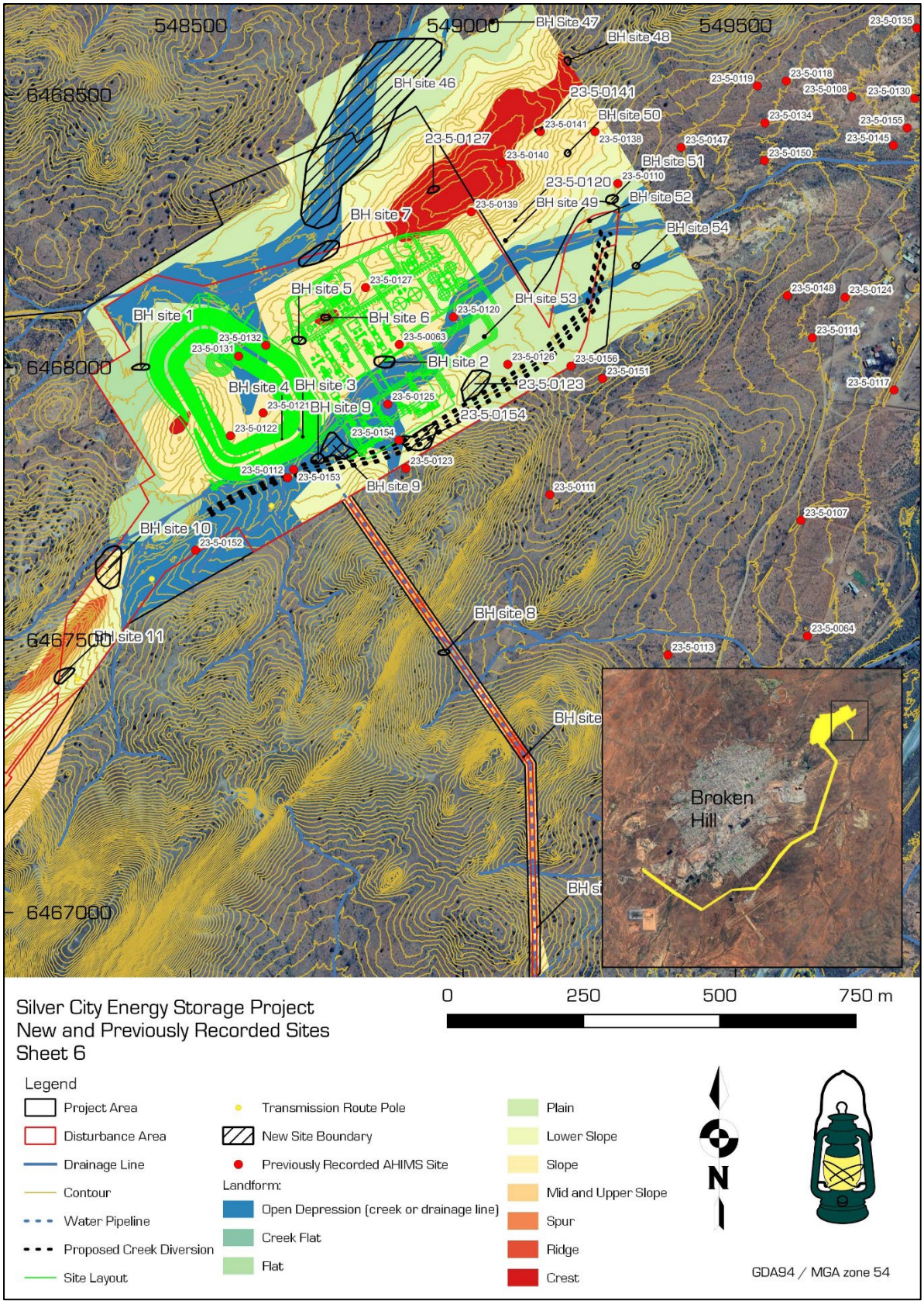


Figure 26: Map 6 of 6 Location of new and previously recorded Aboriginal sites in the Project Area

6.8 Summary of survey field results

Forty four (44) Aboriginal sites were identified during the Phase 1 survey with a further twenty-one (21) sites identified during the Phase 2 survey. The total of sixty-five (65) sites recorded in both phases includes previously recorded and newly recorded sites. As shown on the Figures in Appendix 6, site features identified within the disturbance area include stone artefact scatters, heat retainer hearths, stone quarries and potential archaeological deposits (PAD). While no human burials were identified within the Project Area during the investigations thus far, the presence of such site types cannot be discounted.

In the AHIMS search area a number of AHIMS sites with incorrect datums were discovered. During field survey and desktop research for this project the corrected locations for 26 of these sites was determined. These corrected AHIMS site locations and datums are shown in Figure 10 and in AHIMS result map in Appendix 1.

Of the previously recorded sites located within the Project Area two hearth features and six artefact scatters could not be relocated during either Phase 1 or Phase 2 survey.

The presence of Aboriginal objects was confirmed across most landform types within the Project Area, however only a small number of Aboriginal sites were recorded on crest and upper slope landforms. This is likely due to the terrain and exposure to harsh environmental conditions in these areas resulting in unappealing conditions for people to spend extended periods of time. When and if these landforms were accessed, it is likely to have been for a specific purpose such as accessing quartz outcrops for the manufacture of stone tools.

By contrast there was a much larger number of Aboriginal sites recorded near to water sources, and at the interface of lower slopes and plains. In addition, a large percentage of sites were also recorded on landforms associated with sheltered hillsides and perennial freshwater environments such as tributaries to Willa Willyong Creek. These field survey results support the predictive model, which indicates there is a high likelihood of finding cultural material in landforms easily accessible to resources.

The Project Area traverses sections of highly disturbed lands such as the local rifle range, formal and informal vehicle tracks and previous mine test sites. Although artefacts were observed in areas of high-disturbance during survey, the potential for *in situ* subsurface artefacts in these previously impacted areas is negligible. Subsurface archaeological potential is the likelihood of an area containing contextualized Aboriginal archaeological sites of significant density. The archaeological potential of sites recorded within the Project Area varied from very low in areas of rocky terrain and high disturbance to high in areas with deep soil deposits.

As a result of the Phase 1 field survey, Lantern Heritage recommended a program of test excavation across landforms considered to have high archaeological sensitivity, with the exception of test zone 2, that is located within an area of moderate archaeological sensitivity.

6.9 Summary of test excavation results

As detailed in Appendix 6, Lantern Heritage undertook an archaeological test excavation program in February 2023. The test excavation methods followed the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010b). Lantern were assisted in the field by representatives from BHLALC (Raymond O'Donnell (Jnr), Abishai White, Ricky Menz and Regan O'Donnell).

The overall objectives of the testing program were to:

- collect information about the nature, extent, and integrity of subsurface archaeological deposit in order to assess the significance of the deposits and develop appropriate mitigation methods,
- test validity of the predictive model through excavation of areas of moderate PAD (zone 2); and
- determine whether additional salvage excavation may be required prior to construction.

The proposed seven test zones were determined to have the highest archaeological potential for each landform type within the Project Area. Test zone 2 is the exception as it has moderate archaeological potential. As such this zone was included in excavation to test the validity of predictive model. Please note that Test zone 6 also contains the location of proposed underground cable. The test zones have arbitrary numbers based on recordings made during field survey.

A total of seventy (70) test pits were excavated across seven test zones within four high archaeologically sensitive landforms as shown in Figure 23 and table below.

Landform	Test Zone	Tested sites
plains, leading to/from shallow, ephemeral creeks	2, 9 and 11	#23-5-0131, #23-5-0640 and BH (ACAES) AFT 28 (#23-4-0701)
plains leading to/from undulating terrain with rocky, granitic outcrops	6 – underground cable	BH AFT 20 (#23-4-0697)
plains leading to/from deeply incised, second order ephemeral creek lines	4 and 5	BH AFT 14 (#23-5-0178) and BH AFT 18 (#23-5-0169)
open depression, deeply incised, third order creek line	10	#23-5-0153

The presence of subsurface artefacts was confirmed at four test zones – Zones 4, 5, 6 and 11 – and within three of the four landforms identified for testing, including:

- plains, leading to/from shallow, ephemeral creeks;
- plains leading to/from undulating terrain with rocky, granitic outcrops; and
- plains leading to/from deeply incised, second order ephemeral creek lines.

Fifteen of the seventy pits contained artefacts, and 69 artefactual specimens were recovered. Sixty-two (62) of these objects (89.9%) were recovered from eleven pits within a 40m by 5m area in the southern end of testing zone 6 (see Appendix 6). The highest density of artefacts was eighteen (18) artefacts in pit 13 in zone 6.

Subsurface artefacts were not located in the test pits excavated in plains leading to/from shallow ephemeral creeks at test zones 2 and 9, nor at the open depression, deeply incised, third order creek line landform in test zone 10.

Despite the small size of the assemblage recovered during the test excavations, it was possible to draw some inferences regarding raw material use, reduction methods and techniques, and post depositional processes from the artefact analysis. The dominant proportion of artefacts recovered were quartz, a local, easily accessible material for knapping.

The artefacts show low to medium evidence of damage as a result of post-depositional site disturbance, but no evidence of movement down through the soil profile, which suggests that enough site disturbance has occurred that the artefacts are now mixed through the top 300mm of the deposit. While the results of the artefact analysis largely conform with the results of previous archaeological investigations in the region, the lack of retouched implements and diversity of raw material types within the assemblage means that it is difficult to draw any conclusions about how the archaeology in the Project Area fits within its regional context.

6.10 Test excavation conclusion

Results of the test excavation program indicate that the archaeological sensitivity model used to target particular landforms for investigation was reasonably effective. Excavation showed that there are various levels of disturbance throughout the Project Area and that subsurface integrity was

highly variable within each test zone. The subsurface potential of all test zones was revised to low with the exception of zones 4 (moderate) and zone 6 (moderate-high at southwest end). The revised subsurface potential of these zones as shown in Table 40 is factored into the landform sensitivity mapping (section 6.9).

Table 100: Archaeological potential of sites following test excavation.

Site name/Site	Landform	Test Zone	# of artefacts from testing	Initial Archaeological Potential	Revised Archaeological Potential
PM-IF6/AHIMS #23-5-0131	plains, leading to/from shallow, ephemeral creeks	2	0	Moderate-high	Low
Broken Hill (ACAES) AFT 14/AHIMS #23-4-0178	plains leading to/from deeply incised, second order ephemeral creek lines	4	5	High	Moderate
Broken Hill (ACAES) AFT 18/AHIMS #23-5-0169	plains leading to/from deeply incised, second order ephemeral creek lines	5	1	High	Low
Broken Hill (ACAES) AFT 20/AHIMS #23-4-0697	Plains leading/to from undulating terrain	6	62	Moderate	Moderate-high at SW end
Kanandah 1/ AHIMS #23-4-0640	plains, leading to/from shallow, ephemeral creeks	9	0	Moderate-high	Low
FD-IF7/AHIMS #23-5-0153	open depression, deeply incised, third order creek line	10	0	Moderate	Low
Broken Hill (ACAES) AFT 28/AHIMS #23-4-0701	plains, leading to/from shallow, ephemeral creeks	11	1	Moderate	Low

6.11 Landform Sensitivity Mapping

Based on the synthesis of the evidence collected during field survey and test excavation, a subsurface archaeological sensitivity model has been developed for the Project (Figures 29 to 41 in the ACHA). This model uses site patterning and site location predictions to create a visual image of predicted subsurface archaeological deposits.

To determine this potential, the sensitivity model considers the following:

- Landforms with recorded subsurface artefacts from test excavation;
- Areas representing transition of plain/drainage landforms to a lower slope landform;
- Landforms with potential for deeper deposits (such as an open depression),
- Landforms within 900m of water
- Landforms associated with alluvial deposits (see Figure 13);

The model then discounts:

- Landforms with recorded shallow or zero soil deposits based on field survey and test excavation.
- Landforms with recorded absence of subsurface artefacts and highly disturbed subsurface deposits based on test excavation.

- Landforms located on a heavily disturbed Anthropogenic area (ie mine, road, dam, transmission line or railway).

The sensitivity of different areas within the Project Area is defined based on the combination of each of these characteristics.

The model identifies 19 landforms within the Project Area of predicted higher sensitivity for subsurface Aboriginal objects. These areas are shown by blue hatching on Figures 29 to 41 in section 10 of the ACHAR.

These high sensitivity areas are associated with variations in landform and relief that indicate likely areas of sediment accumulation and open depressions which may indicate areas where provisional water could be found. As such, these landforms have a higher potential to contain subsurface archaeological deposit.

The results of the test excavation site discovery rates simulations indicate that the likelihood of discovering any sites with the pits excavated was extremely low. As discussed in the Test Excavation Report (Appendix 6), the fact that some sites were discovered implies that the predictive model used to target particular landforms for investigation was reasonably effective.

As such, the subsurface archaeological sensitivity model indicates both known and predicted subsurface archaeological sensitivity based on the background research and the results of the test excavation to date. As discussed above, the subsurface potential of five of the seven test zones with revised to low following text excavation.

It is recommended that landforms with predicted high archaeological sensitivity and sites with moderate-high, or greater, archaeological potential are investigated further as part of a staged salvage program.

6.11.1 Limitations of sensitivity map model

The model is based on an interpretation of test excavation results, geological and topographic mapping, and field observations, and has not been verified. The model is for subsurface archaeological sensitivity only, as surface sites are already known areas of sensitivity already recorded across the Project Area. The model may be improved by further archaeological investigations.

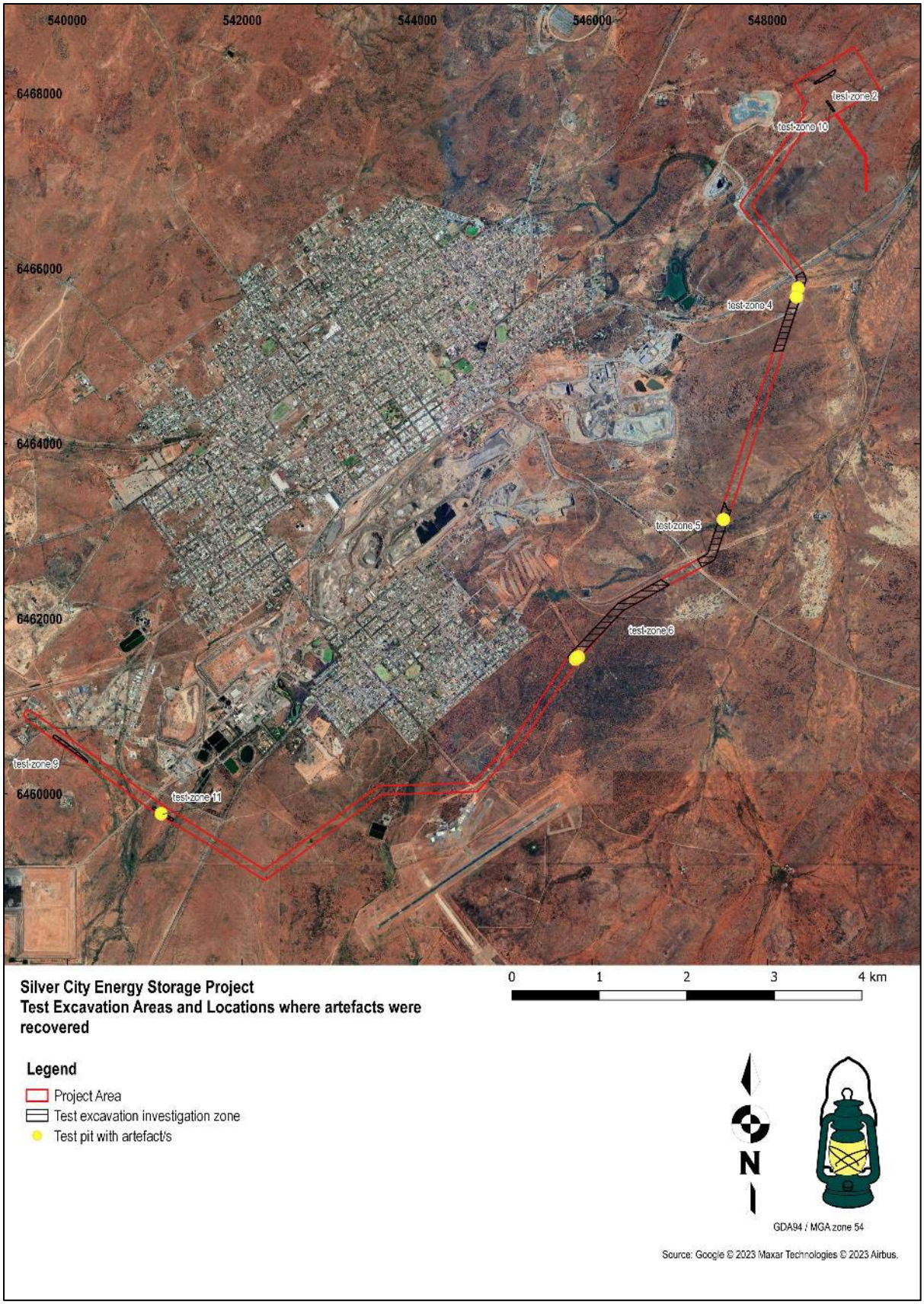


Figure 27: Test excavation locations and locations where artefacts were recovered in the Project Area

7 ANALYSIS AND DISCUSSION

7.1 Regional context

The ethnohistorical accounts and histories for the Broken Hill region (section 3 of the ACHAR) indicate that the Project Area has been utilised by Aboriginal people right through to the twenty-first century. This area is recognised as a place of continued importance to Aboriginal people today and provides tangible links to Dreamtime stories.

Within the Project Area, evidence of Aboriginal occupation primarily comprises flaked stone artefacts made from white quartz, and hearth remains. The knapped stone artefacts recovered from the test excavations are consistent with their local context in terms of raw materials and site types. The Project Area and its immediate vicinity contain many low-density artefact scatters and isolated finds similar to those found during excavation. The majority of artefacts recovered were quartz suggesting that Indigenous people were utilising local, easily accessible material for most of their knapping, such as the quartz outcrop quarries recorded at AHIMS sites #23-5-0122 and #23-5-0123.

While the AHIMS database shows that artefacts in the region have been found made from silcrete and chert, it is unlikely that the lack of these materials in the test excavation artefact assemblage is archaeologically significant. Rather it is more likely that the sample of artefacts recovered was too small to adequately reflect the diversity of the subsurface assemblages in terms of materials used or presence of retouched implements. It is also likely that the diversity of artefacts has been reduced within the Project Area by the impact of private citizens collecting artefacts from surface lag deposits. This lack of diversity is also evident in the distinct lack of edge ground and ground surface tools recorded in the Project Area when compared to artefact assemblages reported in nearby archaeological surveys.

The lack of retouched implements and diversity of raw material types within the assemblage means that it is difficult to draw any conclusions about how the archaeology in the Project Area fits within its regional context.

7.2 Predictive model review

Based on the results of previous investigations and the survey and excavation conducted by Lantern, it is predicted that the location and size of sites tends to reflect the nature of nearby water resources. That is, landforms within the Project Area closer to drainage features are likely to be characterised by more diverse and extensive artefact scatters and hearth features than those at a greater distance to water.

The uplands within the Project Area comprised rocky low relief hills and slopes, many with reef and boulder outcrops of white quartz. A number of these higher quality quartz outcrops showed signs of raw material extraction and were recorded as Aboriginal quarry sites. No cultural information in relation to specific Dreamtime stories has been provided by RAPs, however, this does not mean it doesn't exist as there are various reasons and restrictions regarding passing on of cultural knowledge.

The predictive statement presented in Section 4.7 suggests that Aboriginal burial sites in western NSW are most likely found in lake and alluvial environments and in association with features such as midden, lunettes and other soft or sandy sedimentary soils and will be rare in rangeland environments such as the Barrier Ranges. The Project Area has a combination of aggrading and eroding soils which result in removal and burial of past ground surfaces. The results of this study's subsurface archaeological testing found that high numbers of visible surface artefacts did not always indicate the presence of subsurface archaeological deposits. Although no burial sites were located during this investigation, due to the presence of soft, sandy alluvial deposits across the Project Area (Figure 13), the potential for burials is considered low.

8 SCIENTIFIC VALUES AND SIGNIFICANCE ASSESSMENT

This report is primarily concerned with assessing the archaeology of the Project Area and the associated scientific significance of Aboriginal objects and sites that are present. As such the following section details assessments of the identified sites in terms of their scientific values. A full assessment of all values, in accordance with the processes outlined in the Burra Charter (AICOMOS 2013), is provided in the Aboriginal Cultural Heritage Assessment Report (ACHAR) which this report is appended to.

Within the Burra Charter Practice Note on *Understanding and Assessing Cultural Significance* (AICOMOS 2013b: 3-4) Scientific Value is defined as follows:

> ***Scientific value*** *refers to the information content of a place and its ability to reveal more about an aspect of the past through examination or investigation of the place, including the use of archaeological techniques. The relative scientific value of a place is likely to depend on the importance of the information or data involved, on its rarity, quality or representativeness, and its potential to contribute further important information about the place itself or a type or class of place or to address important research questions. To establish potential, it may be necessary to carry out some form of testing or sampling. For example in the case of an archaeological site, this could be established by a test excavation.*

The assessed scientific values for the identified sites within the Project Area have been determined on the basis of the sites' rarity, representativeness, and archaeological potential. Table 41 contains a summary of scientific significance for sites located within the Project Area.

Forty-nine (49) sites located within the Project Area are assessed as having low scientific value at a local level. These sites have demonstrated low potential to inform the broader understanding of Aboriginal occupation of the semi-arid region east of Broken Hill. These sites retain limited research potential and are comprised of low to very low artefact density or scatter hearth retainers. These sites are representative of the most common site types found in the local area and there are likely to be many other similar examples within the region.

Six sites have low-moderate scientific values. Within the Project Area these sites are low density artefact scatters, that form part of a broader complex of sites within the immediate area. Each of these sites is assessed as having moderate integrity (subsurface potential) and is considered a typical example of the most common site types found within far western NSW. These sites have low-moderate potential to add to our knowledge of Aboriginal occupation of the local area. These sites have a relatively higher rarity and representative value than sites of low-moderate significance.

Four sites are assessed as having moderate scientific significance. Within the Project Area these sites contain artefact scatters, quarry and hearth features with low to moderate site integrity (subsurface potential). These sites may contribute to our understanding of Aboriginal occupation in the local area through their association with other archaeological sites, landscape features or other areas of heritage value. In addition, features such as a relatively large and diverse stone artefact assemblage mean that these sites have a relatively higher rarity and representative value than sites of low-moderate significance.

Seven sites are assessed as having moderate-high scientific values. These sites contain artefact scatters with hearths and elements such as stone features and have varying degrees of moderate to moderate-high site integrity (subsurface potential). These sites are part of a broader complex of sites within the immediate area and have relatively higher representative and rarity value than sites of moderate significance. Further investigation of these sites may contribute to our understanding of Aboriginal occupation within the Broken Hill region, in particular through their relationship with other sites, landscape features or other areas of heritage value.

Table 101: Summary of Scientific Significance for sites located within the Project area.

Scientific Significance	# of sites	Name of sites (AHIMS #)
Low	49	FD-IF19 (#23-5-0146), BH AFT/HTH 1(#23-5-0170), PM-Q4 (#23-5-0121), FD-IF16 (#23-5-0154), PM-G02 (#23-5-0125), BH AFT 3 (#23-5-0171), BH AFT 4 (#23-5-0172), PM-G03 (#23-5-0126), BH AFT 11 (#23-5-0175), BH AFT 12 (#23-5-0176), BH AFT 13 (#23-5-0177), BH AFT/HTH 16 (#23-5-0180), BH AFT 17 (#23-5-0181), PM-Q3 (#23-5-0120), PM-Q7 (#23-5-0127), BH AFT 30 (#23-4-0703), BH AFT 31 (#23-4-0704), BH AFT 34 (#23-4-0711), BH AFT 35 (#23-4-0710), BH AFT 36 (#23-4-0709), BH AFT/HTH 37 (#23-4-0709), BH AFT 38 (#23-4-0707), BH HTH 39 (#31-1-0727), BH AFT 40 (#31-1-0726), BH AFT 41 (#31-1-0725), BH AFT 42 (#23-4-0706), BH AFT 43 (#23-4-0705), BH AFT 44 (#23-5-0183), BH AFT 45 (#23-5-0182), BH HTH 47 (#23-5-0191), BH AFT 48 (#23-5-0190), BH AFT 49 (#23-5-0189), BH AFT 50 (#23-5-0188), BH HTH 52 (#23-5-0186), BH AFT 53 (#23-5-0185), BH AFT 54 (#23-5-0184), BH AFT 23 (#23-4-0699), FD-IF01 (#23-5-0140), FD-IF03 (#23-5-0138), FD-IF18 (#23-5-0152), PM-Q5 (#23-5-0122), FD-IF14 (#23-5-0156), FD-IF02 (#23-5-0139), PM-IF6 (#23-5-0131); FD-IF7 (#23-5-0153) BH AFT 18 (#23-5-0169), BH AFT 28 (#23-4-0701), Kanandah 1 (#23-4-0640), PM-Q6 (#23-5-0123)
Low-Moderate	6	BH AFT 8 (#23-5-0173), BH AFT/HTH 15 (#23-5-0179), BH AFT/HTH 16 (#23-5-0180),BH AFT 25 (#23-4-0700), BH AFT 29 (#23-4-0702), BH AFT/HTH 51 (#23-5-0187)
Moderate	4	BH AFT 22 (#23-4-0698), BH HTH 27 (#31-1-0724), BH AFT 14 (#23-4-0178); BH AFT/HTH 19 (#23-5-0168)
Moderate-High	7	BH AFT/HTH 10 (#23-5-0174), BH HTH 26 (#31-1-0723), FD08 (#23-5-0141), BH AFT 46 (#23-5-0192); BH1-48 (#23-5-0063), South airports regency area isolated artefacts (#23-4-0682), BH AFT 20 (#23-4-0697) ,

9 IMPACT ASSESSMENT

As outlined in Section 2, various aspects of the Project have the potential to result in direct and indirect harm to Aboriginal objects. The Project involves the construction of the SCES facility, inground power line, overhead transmission lines and associated access tracks. The Proponent plans to use low impact construction methods to limit ground disturbance activities throughout the proposed disturbance area where possible.

While direct impacts are anticipated at many of the of sites within the Project Area, the degree of harm to the majority of these sites will be partial only and will result in partial losses of value. The areas of direct or indirect impact are largely restricted to the existing Willyama Common areas that have already been disturbed through long term recreational use, pastoral use and mining activities. Outside of the proposed disturbance area (i.e. the Project's activities), the archaeological resource of this section of the Willyama Common will not be impacted by the Project.

Thirty-four (34) sites are located within the proposed Disturbance Area and will be directly harmed by the proposed activities. The range of harm will result in either partial loss of value (19 sites) or total loss of value (15 sites). The remaining sites recorded during survey are located outside the Disturbance Area and impact can be avoided.

The proposed impacts and degree of harm to each site within the Project Area is summarised in Table 42.

Table 102: Proposed impacts to Aboriginal archaeological sites based on the the Project Area - 2024 plan modifications.

Site Name	AHIMS site	Proposed Impacts	Type/Degree of harm	Consequences
Broken Hill (ACAES) AFT 1	23-5-0170	SCES facility disturbance area	direct/partial	partial loss of value
Broken Hill (ACAES) AFT 8	23-5-0173	Outside Project Area	indirect/none proposed	no loss of value
Broken Hill (ACAES) AFT/HTH 10	23—5-0174	Outside Project Area	none	no loss of value
Broken Hill (ACAES) AFT 11	23-5-0175	Transmission Line easement	indirect/none proposed	no loss of value
Broken Hill (ACAES) AFT 13	23-5-0177	Transmission Line easement	direct/partial	partial loss of value
Broken Hill (ACAES) AFT 14	23-5-0178	Transmission Line easement; 1 x monopole and temporary hardstand pad	direct/partial	partial loss of value
Broken Hill (ACAES) AFT 15	23-5-0179	Transmission Line easement; 1 x monopole and temporary hardstand pad	direct/partial	partial loss of value
Broken Hill (ACAES) AFT/HTH 16	23-5-0180	Transmission Line easement	direct/partial	partial loss of value
Broken Hill (ACAES) AFT 18	23-5-0169	Transmission Line easement	direct/partial	partial loss of value

Site Name	AHIMS site	Proposed Impacts	Type/Degree of harm	Consequences
Broken Hill (ACAES) AFT 19	23-5-0168	Transmission Line easement; 2 x monopoles; and temporary hardstand pads	direct/partial	partial loss of value
Broken Hill (ACAES) AFT 20	23-4-0697	Transmission Line easement; 6 x monopoles, and temporary hardstand pads; inground power line section with 20m easement, buried cable	direct/partial	partial loss of value
South airports regency area isolated artefacts	23-4-0682	Transmission Line easement	direct/partial	partial loss of value
Broken Hill (ACAES) AFT 22	23-4-0698	Transmission Line easement and temporary hardstand pad	direct/partial	partial loss of value
Broken Hill (ACAES) AFT 23	23-4-0699	Transmission Line easement	direct/partial	partial loss of value
Broken Hill (ACAES) AFT 25	23-4-0700	Transmission Line easement	direct/partial	partial loss of value
Broken Hill (ACAES) AFT/HTH 26	31-1-0723	Transmission Line easement, 1 x monopole and temporary hardstand pad	direct/partial	partial loss of value
Broken Hill (ACAES) AFT/HTH 27	31-1-0724	Transmission Line easement	indirect/none proposed	no loss of value
Broken Hill (ACAES) AFT 28	23-4-0701	Transmission Line easement; 2 x monopoles and temporary hardstand pads	direct/partial	partial loss of value
Broken Hill (ACAES) AFT 29	23-4-0702	Transmission Line route/1 x monopole and temporary hardstand pad	direct/partial	partial loss of value
Kanandah 1	23-4-0640 (duplicate of Kanandah 2 23-4-0641)	Transmission Line easement; 2 x monopoles and temporary hardstand pads	direct/partial	partial loss of value
Broken Hill (ACAES) AFT /HTH 37	23-4-0708	Transmission Line easement	indirect/none proposed	no loss of value
Broken Hill (ACAES) HTH 39	31-1-0727	Transmission Line easement	indirect/none proposed	no loss of value
FD-IF16	23-5-0154	Creek diversion easement/SCES facility disturbance area	direct/whole	total loss of value

Site Name	AHIMS site	Proposed Impacts	Type/Degree of harm	Consequences
PM-Q6	23-5-0123	Creek diversion easement/SCES facility disturbance area	direct/whole	total loss of value
FD-IF18	23-5-0152	Transmission Line easement	direct/partial	partial loss of value
FD-IF19	23-5-0146	Transmission Line easement	indirect/none proposed	no loss of value
Broken Hill (ACAES) AFT 44	23-5-0183	Above Ground waterpipe easement	direct/partial	partial loss of value
Broken Hill (ACAES) AFT 45	23-5-0182	Outside Project Area	indirect/none proposed	no loss of value
PM-Q5	23-5-0122	SCES facility disturbance area	direct/whole	total loss of value
PM-Q4	23-5-0121	SCES facility disturbance area	direct/whole	total loss of value
BH1-48	23-5-0063	SCES facility disturbance area	direct/whole	total loss of value
FD-G001	23-5-0112	SCES facility site	direct/whole	total loss of value
FD-IF7	23-5-0153	Creek diversion easement/ SCES facility disturbance area	direct/whole	total loss of value
FD-IF14	23-5-0156	SCES facility disturbance area	direct/whole	total loss of value
PM-G02	23-5-0125	SCES facility disturbance area	direct/whole	total loss of value
FD-IF02	23-5-0139	SCES facility disturbance area	direct/whole	total loss of value
PM-IF6	23-5-0131 (duplicate of PM-G04 23-5-0132)	SCES facility disturbance area	direct/partial	partial loss of value
Broken Hill (ACAES) AFT 3	23-5-0171	SCES facility disturbance area	direct/whole	total loss of value
Broken Hill (ACAES) AFT 4	23-5-0172	SCES facility disturbance area	direct/whole	total loss of value
Broken Hill (ACAES) AFT 31	23-4-0704	Transmission Line easement	indirect/none proposed	no loss of value
Broken Hill (ACAES) AFT 34	23-4-0711	Outside Project Area	none	no loss of value
Broken Hill (ACAES) AFT 36	23-4-0709	Outside Project Area	none	no loss of value

Site Name	AHIMS site	Proposed Impacts	Type/Degree of harm	Consequences
Broken Hill (ACAES) AFT 38	23-4-0707	Outside Project Area	indirect/none proposed	no loss of value
Broken Hill (ACAES) AFT 41	31-1-0725	Transmission Line easement	direct/whole	total loss of value
Broken Hill (ACAES) AFT 53	23-5-0185	SCES facility disturbance area	direct/whole	total loss of value
PM-G03	23-5-0126	Outside Project Area	indirect/none proposed	no loss of value
PM-Q3	23-5-0120	Outside Project Area	none	no loss of value
PM-Q7	23-5-0127	Outside Project Area	none	no loss of value
FD-IF01	23-5-0140	Outside Project Area	none	no loss of value
FD-IF03	23-5-0138	Outside Project Area	none	no loss of value
FD08	23-5-0141	Outside Project Area	none	no loss of value
Broken Hill (ACAES) AFT 42	23-4-0706	Outside Project Area	none	no loss of value
Broken Hill (ACAES) AFT12	23-5-0176	Outside Project Area	none	no loss of value
Broken Hill (ACAES) AFT 17	23-5-0181	Transmission Line easement	indirect/none proposed	no loss of value
Broken Hill (ACAES) AFT 30	23-4-0703	Transmission Line easement	indirect/none proposed	no loss of value
Broken Hill (ACAES) AFT 35	23-4-0710	Outside Project Area	none	no loss of value
Broken Hill (ACAES) AFT 40	31-1-0726	Transmission Line easement	indirect/none proposed	no loss of value
Broken Hill (ACAES) AFT 43	23-4-0705	Outside Project Area	none	no loss of value
Broken Hill (ACAES) AFT 46	23-5-0192	Outside Project Area	none	no loss of value
Broken Hill (ACAES) AFT 47	23-5-0191	Outside Project Area	none	no loss of value
Broken Hill (ACAES) AFT 48	23-5-0190	Outside Project Area	none	no loss of value
Broken Hill (ACAES) AFT 49	23-5-0189	Outside Project Area	none	no loss of value

Site Name	AHIMS site	Proposed Impacts	Type/Degree of harm	Consequences
Broken Hill (ACAES) AFT 50	23-5-0188	Outside Project Area	none	no loss of value
Broken Hill (ACAES) AFT 51	23-5-0187	Outside Project Area	none	no loss of value
Broken Hill (ACAES) HTH 52	23-5-0186	Creek diversion easement	direct/whole	total loss of value
Broken Hill (ACAES) AFT 54	23-5-0184	Outside Project Area	none	no loss of value

9.1 General impact mitigation and management strategies

The proposed management and mitigation measures are detailed in Section 10 of the ACHAR. A summary of the proposed strategies is provided below:

A number of general impact mitigation and management strategies can be employed during the construction of the Project to minimise the harm to the area's cultural heritage. While installation of fencing around site boundaries is often used to prevent inadvertent impacts to sites during construction this is not considered practical for this project. This is based on the location of the disturbance area within the Willyama Common which is open to the public. It is possible that if sites are fenced off they will attract attention of artefact collectors and/or fences may become a hazard for recreational vehicles. The general impact mitigation strategies recommended comprise:

1. Avoiding and conserving known sites wherever possible through inclusion of site boundaries on construction maps. However, if impacts cannot be avoided, then surface artefacts should be moved to a location outside the disturbance area in collaboration with Broken Hill LALC and/or Wilyakali recognised RAPs.
2. Where disturbance is unavoidable, ensure that a program of staged archaeological surface and subsurface salvage is completed with an aim to save a representative sample of information for future generations of the Aboriginal Community.
3. Construction vehicles will be restricted to the proposed disturbance corridor to avoid impacting known sites or areas of high archaeological sensitivity outside this area;
4. All parties involved in construction must be provided with detailed maps of site boundaries; and
5. The construction workforce must undergo a cultural heritage induction facilitated by the Wilyakali Aboriginal corporation to communicate the importance of protecting cultural heritage, and the legal, ethical, social and practical issues involved.

10 SUMMARY AND RECOMMENDATIONS

The archaeological assessment of the Project Area comprised background research, two phases of field survey and a program of subsurface sampling across four archaeologically sensitive landforms.

Direct impacts will result from the proposed works to following 34 sites located within the Disturbance Area:

AHIMS #	Site Name	AHIMS #	Site Name
23-5-0170	Broken Hill (ACAES) AFT 1	23-5-0183	Broken Hill (ACAES) AFT 44
23-5-0177	Broken Hill (ACAES) AFT 13	23-5-0154	FD-IF16
23-5-0178	Broken Hill (ACAES) AFT 14	23-5-0123	PM-Q6
23-5-0179	Broken Hill (ACAES) AFT 15	23-5-0122	PM-Q5
23-5-0180	Broken Hill (ACAES) AFT/HTH 16	23-5-0121	PM-Q4
23-5-0169	Broken Hill (ACAES) AFT 18	23-5-0063	BH1-48
23-5-0168	Broken Hill (ACAES) AFT 19	23-5-0112	FD-G001
23-4-0697	Broken Hill (ACAES) AFT 20	23-5-0153	FD-IF7
23-4-0682	South airports regency area isolated artefacts	23-5-0156	FD-IF14
23-4-0698	Broken Hill (ACAES) AFT 22	23-5-0125	PM-G02
23-4-0699	Broken Hill (ACAES) AFT 23	23-5-0139	FD-IF02
23-4-0700	Broken Hill (ACAES) AFT 25	23-5-0171	Broken Hill (ACAES) AFT 3
31-1-0723	Broken Hill (ACAES) AFT/HTH 26	23-5-0172	Broken Hill (ACAES) AFT 4
23-4-0701	Broken Hill (ACAES) AFT 28	31-1-0725	Broken Hill (ACAES) AFT 41
23-4-0702	Broken Hill (ACAES) AFT 29	23-5-0185	Broken Hill (ACAES) AFT 53
23-4-0640 (duplicate of Kanandah 2 23-4-0641)	Kanandah 1	23-5-0131 (duplicate of PM-G04 23-5-0132)	PM-IF6
23-5-0152	FD-IF18	23-5-0186	Broken Hill (ACAES) HTH 52

While avoidance of impacts to sites is the preferred mitigation measure, this is not possible in all cases. Where impacts to sites are unavoidable surface collection of artefacts and movement away from harm is the preferred strategy. A phased salvage approach as outlined in Section 10 of the ACHAR is recommended at four sites with moderate-high or greater scientific value and in 19 landforms with high archaeological sensitivity. This targeted salvage approach is based on the results of test excavation and the extensive disturbance to the Project Area's sediment deposits from a range of previous activities.

The location for salvage excavations will be targeted using a geoarchaeological approach to archaeological prospection, based on borehole survey and deposit modelling. This approach provides a rapid and scientifically rigorous means of understanding site formation processes and the distribution of archaeologically sensitive sediments across large areas such as the present Project Area (Goldberg and Macphail, 2006; Historic England, 2015; Carey et al., 2017).

Results of the borehole survey will allow a more accurate assessment of the archaeological potential across the entirety of the Project Area and will inform further stages of salvage excavation as detailed in Section 10 of the ACHAR.

On the basis of the investigations undertaken for the Project the following recommendations are made:

1. Preparation and implementation of a Cultural Heritage Management Plan (CHMP) in consultation with the Wilyakali Aboriginal Corporation and BHLALC RAPs, Heritage NSW and the Department of Planning and Environment.

2. That a program of staged salvage (surface and subsurface), following the stages outlined in Section 10.3 of the ACHAR is completed with participation of RAPs recognised by the BHLALC and the Wilyakali Aboriginal Corporation prior to construction. The salvage program comprises surface salvage of artefacts across the Disturbance Area and subsurface salvage within sites of moderate- high or greater scientific value and landforms with high archaeological sensitivity.

3. The final location of collected artefacts must be determined through consultation with RAPs recognised by BHLALC and the Wilyakali Aboriginal Corporation and Requirement 26 of the Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW (DECWW 2010b).

4. That prior to construction commencing, all contractors associated with the Project receive cultural heritage inductions delivered by a representative of BHLALC or Wilyakali Aboriginal Corporation.

5. In the event that Ancestral remains, or suspected Ancestral remains, are encountered during any of the proposed construction activities or salvage actions, all work must stop and the procedures outlined in the Salvage Methodology be implemented (Section 10).

11 GLOSSARY AND ACRONYMS

Acronym	Meaning
ACHAR	Aboriginal Cultural Heritage Assessment Report
AHIP	Aboriginal Heritage Impact Permit
AHIMS	Aboriginal Heritage Information Management System
AR	Archaeological Report (Survey and Excavation)
BP	Before Present
CMT	Culturally Modified Tree
DDR	Due Diligence Report
GSV	Ground surface visibility
OSL / TSL	Optically Stimulated Luminescence dating / Thermally Stimulated Luminescence dating
PAD	Potential Archaeological Deposit
C14 dating	Radiocarbon dating
Code of Practice	NSW Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales (DECCW 2010a)
ICOMOS	International Council on Monuments and Sites
LALC	Local Aboriginal Land Council
RAP	Registered Aboriginal Party
EPBC Act 1999	*Environment Protection and Biodiversity Conservation Act* 1999 (Commonwealth)
NPW Act	*National Parks and Wildlife Act 1974* (as amended) (NSW)
EP&A Act 1979	*Environmental Planning and Assessment Act* 1979 (NSW)
EP&A Regulation 2000	*Environmental Planning and Assessment Regulation* 2000 (NSW)
SEPP	State Environmental Planning Policies
LEP	Local Environmental Plans
DCP	Development Control Plan
SHI	State Heritage Inventory
The Guide	Guide to investigating assessing and reporting Aboriginal cultural heritage in NSW (NSW Office of Environment & Heritage (OEH), 2011)
Consultation requirements	*Aboriginal cultural heritage consultation requirements for proponents* (DECCW 2010c)

Term	Definition
Aboriginal Cultural Heritage Assessment Report (ACHAR)	Distinct from the technical nature of an AR, the ACHAR focusses on collating and integrating Aboriginal community cultural values into the scientific assessment of an identified Aboriginal site, and to reaching consensus for future management of it.
Aboriginal Heritage Impact Permit (AHIP)	Once archaeological and cultural values of an Aboriginal site have been defined through an AR and ACHAR, a proponent may apply for an AHIP under Section 90 of The Parks and Wildlife Act (1974) to allow impacts to that site under proscribed terms and conditions.
Aboriginal Heritage Information Management System (AHIMS)	A government database for the registration of locations and detail of Aboriginal sites in NSW. Access to detailed results is restricted to registered Aboriginal parties and heritage professionals.
Aboriginal Place	These are locations of special significance to Aboriginal people including areas of cultural and spiritual importance. They may or may not have physical expression. These places are proclaimed on the NSW Government Gazette and are legally protected from harm.
Archaeological deposit	A location containing archaeological artefacts beneath the ground surface.
Archaeological Report (Survey and Excavation) (AR)	This is a technical report, the purpose of which is to investigate and define the scientific archaeological values of a location. Characteristically a survey is first undertaken, depending on the results of which an ACHAR and / test excavation may be required.
Archaeological site	The location of any recorded or unrecorded physical Aboriginal objects including stone tools, culturally modified trees, middens, burials, rock arrangements, engravings and art. These sites are to be registered on the Aboriginal Heritage Management System and are protected by law from any form of interference or harm without permit.
Artefact	Any object that has been modified through human impact. Although in principle this can refer to landscapes and environmental processes, in Australia the term is most often used to refer to lithic artefacts, being stone tools made by Aboriginal people.
Before Present (BP)	This is an arbitrary date (1950 CE), with which radiocarbon (C14) values are expressed, e.g. 3,000BP is 3,000 years before 1950 CE.
Contact archaeology	Archaeological remains dating from first encounters between Aboriginal people and European invaders. This may refer to features such as Aboriginal adaptation of glass or telegraph insulators to make traditional style tools.
Culturally Modified Tree (CMT)	This includes any tree, living, dead, standing or fallen, that has been modified by any Aboriginal person past or present in order that the tree or substance removed from the tree can serve a cultural purpose (not including for modern resale).
Due Diligence Report	A Due Diligence Report is not a formal archaeological assessment. If competently undertaken, it provides defence against prosecution if Aboriginal heritage is unwittingly damaged by the proposed activity.

Term	Definition
Exposure	Exposure relates to landforms or locations where processes have resulted in soils being revealed. Creek banks and erosion channels are examples of exposure.
Geomorphology	From the Latin "Geo" as in geology, and "morph" for body or shape. It refers to the way that geology and other factors such as soils and water combine to produce distinct landforms and environs.
Ground surface visibility (GSV)	The amount of soil surface that could be viewed during survey. This is an important factor in calculating likely artefact presence as a few artefacts identified in an area with low GSV may represent a higher real artefact presence than in other locations where slightly more artefacts have been found under better GSV. Low GSV may also indicate that visual survey has not been sufficient to establish archaeological potential and that test excavation is therefore required.
Holocene	The period 11,600BP-current during which present warmer and wetter climatic conditions have prevailed.
Lithic	Stone
Lithic analysis	The examination of lithic artefacts to derive information including methods of production, local trends and preferences, change in this over time, evidence for trade or interaction, and for disturbance to the site over time.
Lithic artefact	A stone implement for purposes including piercing, cutting, scraping, grinding or pounding. These may be shaped through knapping (chipping) or grinding.
Luminescence dating (OSL / TSL)	Methods to calculate the length of time since a grain of quartz was last exposed to sunlight. These methods provide far longer dating span and often more precise dating than C14.
Manuport	From the Latin "manus" for hand and "port" for move. It refers to any item that is unlikely to have reached its current location without human intervention.
Midden	An accumulation of generally dietary waste sometimes built over hundreds or thousands of years often mainly comprised of shellfish. These are primarily located near marine or fresh water sources, often in sands, and may include human burials.
Munsell	A system of defining colours to ensure uniform description.
Pleistocene	A period from approximately 2.6 million -11,600BP during which climatic conditions were far colder and drier than present.
Potential Archaeological Deposit (PAD)	A location that fits archaeological modelling as likely to contain archaeological deposits, but which has no visible archaeological expression. PAD often result from low GSV during survey.
Radiocarbon dating (C14)	A technique which calculates the extent to which C14, an unstable carbon isotope, has degraded since the object containing it died. C14 dating only operates to approximately 60,000 years ago.

Term	Definition
Residue analysis	The examination of edges or faces of stone tools for traces of the materials they were once used to process, thus informing on daily life activities of their users.
Soil disturbance	Generally used to denote that disturbance to soils has removed the archaeological potential of a location through removal of artefacts, or through greatly destroying the site stratigraphy.
Spit	In order to maintain control over test excavation and to ensure that artefacts can be related to the location they derived, archaeologists often excavate in pre-determined "spits" of set depths, generally 50mm or 100mm.
Stratigraphic layer / unit	A distinct layer within a stratigraphy. Such a layer denotes that some change has occurred in the history of the site formation relative to the soils above or below it.
Stratigraphy	The way in which sub-surface deposits are layered, demonstrating the manner and timing in which changes to soils and deposition of artefacts in them has taken place.
Superposition	The underlying law of stratigraphy – that more recent deposits will overly older deposits.
Section	A cross-section through stratigraphy. Usually a wall in an archaeological test pit that shows the stratigraphic layers exposed.
Survey	The planned process of inspecting land to determine archaeological potential within it. Survey can take place in a variety of methods, explained below under Survey units.
Survey units	Survey units are the parts into which a single survey is divided in order that survey results can be meaningfully analysed to determine archaeological potential. Depending on questions to be addressed, survey units may be randomly placed, may correspond to discrete landform units, to locations containing different soil or vegetation types, among other variables.
Use wear analysis	This examines the edges of archaeological implements to determine the uses that these artefacts may have been employed in.

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APPENDIX 1 – AHIMS & HERITAGE DATABASE SEARCHES

Due to the large number of site cards associated with this project, they are saved as a separate attachment to the Broken Hill Silver City Energy Storage SCES Project AR.

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : Broken Hill #174

Client Service ID : 688761

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
23-5-0121	PM-Q4	GDA	54	548633	6467917	Open site	Valid	Stone Quarry : -		
	Contact	Recorders	Doctor.Jodie Benton					Permits		
23-5-0153	FD-IF17	GDA	54	548689	6467813	Open site	Valid	Artefact : -		
	Contact	Recorders	Biosis Pty Ltd - Wollongong,Mrs.Samantha Keats					Permits		
23-5-0063	BH1-48;	AGD	54	548762	6467865	Open site	Valid	Artefact : -	Isolated Find	
	Contact	Recorders	Mr.John Appleton					Permits		
23-5-0014	Royal Flying Doc. Mast;	AGD	54	549539	6467167	Open site	Valid	Artefact : -	Open Camp Site	58,59
	Contact	Recorders	ASRSYS					Permits		
23-5-0030	Roy. Fly. Doc. Mast 19;	AGD	54	549539	6467167	Open site	Valid	Artefact : -	Open Camp Site	58,59
	Contact	Recorders	ASRSYS					Permits		
23-5-0136	FD-IF05	GDA	54	550035	6468502	Open site	Valid	Artefact : -		
	Contact	Recorders	Biosis Pty Ltd - Wollongong,Mrs.Samantha Keats					Permits		
23-4-0637	Mawsons Quarry Isolated Find 1	GDA	54	545117	6463700	Open site	Valid	Artefact : 1		102982
	Contact	Recorders	Doctor.Jodie Benton					Permits		
23-4-0132	South Broken Hill	AGD	54	546320	6462220	Open site	Valid	Artefact : 2		
	Contact	Recorders	Mr.John Appleton					Permits		
23-5-0122	PM-Q5	GDA	54	548573	6467875	Open site	Valid	Stone Quarry : -		
	Contact	Recorders	Doctor.Jodie Benton					Permits		
23-5-0131	PM-IF6	GDA	54	548588	6468021	Open site	Valid	Artefact : 1		
	Contact	Recorders	Doctor.Jodie Benton					Permits		
23-5-0157	Access track to railway artefact scatter	GDA	54	548881	6465365	Open site	Valid	Artefact : -		
	Contact	Recorders	Miss.Lucy Blackam					Permits		
23-5-0134	FD-IF08	GDA	54	549554	6468449	Open site	Valid	Artefact : -		
	Contact	Recorders	Biosis Pty Ltd - Wollongong,Mrs.Samantha Keats					Permits		
23-5-0148	FD-IF09	GDA	54	549595	6468132	Open site	Valid	Artefact : -		
	Contact	Recorders	Biosis Pty Ltd - Wollongong,Mrs.Samantha Keats					Permits		
23-5-0064	BH1-49;	AGD	54	549511	6467330	Open site	Valid	Artefact : -	Open Camp Site	
	Contact	Recorders	Mr.John Appleton					Permits		
23-5-0024	Roy. Fly. Doc. Mast 13;	AGD	54	549539	6467167	Open site	Valid	Artefact : -	Open Camp Site	58,59
	Contact	Recorders	ASRSYS					Permits		
23-5-0025	Roy. Fly. Doc. Mast 12;	AGD	54	549539	6467167	Open site	Valid	Artefact : -	Open Camp Site	58,59
	Contact	Recorders	ASRSYS					Permits		
23-5-0029	Roy. Fly. Doc. Mast 17;	AGD	54	549539	6467167	Open site	Valid	Artefact : -	Open Camp Site	58,59
	Contact	Recorders	ASRSYS					Permits		
23-5-0028	Roy. Fly. Doc. Mast 16;	AGD	54	549539	6467167	Open site	Valid	Artefact : -	Open Camp Site	58,59
	Contact	Recorders	ASRSYS					Permits		

Report generated by AHIMS Web Service on 06/06/2022 for Rebecca Parkes for the following area at Search using shape-file AHIMS Seacrh Area with a buffer of 0 meters. Additional Info : Archaeological Assessment. Number of Aboriginal sites and Aboriginal objects found is 106

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : Broken Hill #174

Client Service ID : 688761

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
23-5-0143	FD05	GDA	54	549887	6468609	Open site	Valid	Artefact : -		
	Contact	Recorders	Biosis Pty Ltd - Wollongong,Mrs.Samantha Keats					Permits		
23-5-0066	BH1-54;	AGD	54	549832	6464970	Open site	Valid	Artefact : -	Open Camp Site	
	Contact	Recorders	Mr.John Appleton					Permits		
23-4-0626	Broken Hill Solar - Site #11	GDA	54	537986	6461608	Open site	Valid	Artefact : 1		102961
	Contact	Recorders	OzArk Environmental and Heritage Management - Dubbo					Permits		
23-4-0088	AS9	AGD	54	538341	6460729	Open site	Destroyed	Artefact : -		98177,99659,102768,102793
	Contact	Recorders	Ms.Louise Gay					Permits	1782,1783	
23-4-0089	AS10	AGD	54	538433	6460600	Open site	Destroyed	Artefact : -		98177,99660,101767,102768,102793
	Contact	Recorders	Ms.Louise Gay					Permits	1782,1783	
23-4-0085	AS6	AGD	54	538930	6460150	Open site	Valid	Artefact : -		98177,102768,102793
	Contact	Recorders	Ms.Louise Gay					Permits		
23-4-0112	AS2	AGD	54	539100	6460160	Open site	Valid	Stone Quarry : -		98177,102768,102793
	Contact	Recorders	Ms.Louise Gay					Permits		
23-5-0132	PM-G04	GDA	54	548638	6468041	Open site	Valid	Artefact : -		
	Contact	Recorders	Doctor.Jodie Benton					Permits		
23-5-0123	PM-Q6	GDA	54	548895	6467815	Open site	Valid	Stone Quarry : -		
	Contact	Recorders	Doctor.Jodie Benton					Permits		
23-5-0119	PM-Q2	GDA	54	549540	6468517	Open site	Valid	Artefact : -		
	Contact	Recorders	Doctor.Jodie Benton					Permits		
23-5-0150	FD-IF13	GDA	54	549553	6468380	Open site	Valid	Artefact : -		
	Contact	Recorders	Biosis Pty Ltd - Wollongong,Mrs.Samantha Keats					Permits		
23-5-0114	PM-IF1	GDA	54	549641	6468055	Open site	Valid	Artefact : -		
	Contact	Recorders	Doctor.Jodie Benton					Permits		
23-5-0015	Royal Flying Doc. Mast;	AGD	54	549539	6467167	Open site	Valid	Artefact : -	Open Camp Site	58,59
	Contact	Recorders	ASRSYS					Permits		
23-5-0145	FD-IF07	GDA	54	549790	6468408	Open site	Valid	Artefact : -		
	Contact	Recorders	Biosis Pty Ltd - Wollongong,Mrs.Samantha Keats					Permits		
23-5-0128	FD01	GDA	54	550188	6468472	Open site	Valid	Potential Archaeological Deposit (PAD) : -, Artefact : -		
	Contact	Recorders	Doctor.Jodie Benton,Biosis Pty Ltd - Wollongong,Mrs.Samantha Keats					Permits		

Report generated by AHIMS Web Service on 06/06/2022 for Rebecca Parkes for the following area at Search using shape-file AHIMS Seacrh Area with a buffer of 0 meters. Additional Info : Archaeological Assessment. Number of Aboriginal sites and Aboriginal objects found is 106

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : Broken Hill #174

Client Service ID : 688761

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
23-4-0636	Mawsons Quarry Ab. Quarry 1	GDA	54	545632	6463133	Open site	Valid	Artefact : 1, Stone Quarry : 1		102982
	Contact	Recorders	Doctor.Jodie Benton					Permits		
23-5-0141	FD08	GDA	54	549142	6468433	Open site	Valid	Artefact : -		
	Contact	Recorders	Biosis Pty Ltd - Wollongong,Mrs.Samantha Keats					Permits		
23-5-0110	FD07	GDA	54	549284	6468338	Open site	Valid	Artefact : -		
	Contact	Recorders	Doctor.Jodie Benton,Biosis Pty Ltd - Wollongong,Mrs.Samantha Keats					Permits		
23-5-0146	FD-IF19	GDA	54	548014	6467080	Open site	Valid	Artefact : -		
	Contact	Recorders	Biosis Pty Ltd - Wollongong,Mrs.Samantha Keats					Permits		
23-5-0127	PM-Q7	GDA	54	548821	6468147	Open site	Valid	Stone Quarry : -		
	Contact	Recorders	Doctor.Jodie Benton					Permits		
23-5-0125	PM-GO2	GDA	54	548862	6467933	Open site	Valid	Artefact : -		
	Contact	Recorders	Doctor.Jodie Benton					Permits		
23-5-0062	BH1-47;	AGD	54	548816	6469084	Open site	Valid	Artefact : -	Open Camp Site	
	Contact	Recorders	Mr.John Appleton					Permits		
23-5-0147	FD-IF10	GDA	54	549400	6468404	Open site	Valid	Artefact : -		
	Contact	Recorders	Biosis Pty Ltd - Wollongong,Mrs.Samantha Keats					Permits		
23-5-0018	Royal Flying Doc. Mast;	AGD	54	549539	6467167	Open site	Valid	Artefact : -	Open Camp Site	58,59
	Contact	Recorders	ASRSYS					Permits		
23-5-0019	Royal Flying Doc. Mast;	AGD	54	549539	6467167	Open site	Valid	Artefact : -	Open Camp Site	58,59
	Contact	Recorders	ASRSYS					Permits		
23-5-0130	PM-SC10	GDA	54	549829	6468494	Open site	Valid	Artefact : -		
	Contact	Recorders	Doctor.Jodie Benton					Permits		
23-5-0135	FD-IF06	GDA	54	549833	6468623	Open site	Valid	Artefact : -		
	Contact	Recorders	Biosis Pty Ltd - Wollongong,Mrs.Samantha Keats					Permits		
23-5-0137	FD-IF04	GDA	54	549851	6468727	Open site	Valid	Artefact : -		
	Contact	Recorders	Biosis Pty Ltd - Wollongong,Mrs.Samantha Keats					Permits		
23-5-0065	BH1-51/53;	AGD	54	549750	6466830	Open site	Valid	Artefact : -	Open Camp Site	
	Contact	Recorders	Mr.John Appleton					Permits		
23-5-0115	PM-IF3	GDA	54	549882	6467796	Open site	Valid	Artefact : -		
	Contact	Recorders	Doctor.Jodie Benton					Permits		
23-5-0144	FD02	GDA	54	549979	6468657	Open site	Valid	Aboriginal Ceremony and Dreaming : -, Artefact : -, Potential Archaeological Deposit (PAD) : -		
	Contact	Recorders	Biosis Pty Ltd - Wollongong,Mrs.Samantha Keats					Permits		

Report generated by AHIMS Web Service on 06/06/2022 for Rebecca Parkes for the following area at Search using shape-file AHIMS Seacrh Area with a buffer of 0 meters. Additional Info : Archaeological Assessment. Number of Aboriginal sites and Aboriginal objects found is 106

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : Broken Hill #174

Client Service ID : 688761

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
23-4-0639	Mawsons Quarry Open Site 1	GDA	54	545273	6463704	Open site	Valid	Artefact : 1		102982
	Contact	Recorders	Doctor.Jodie Benton					Permits		
23-4-0641	Kanandah 2	GDA	54	540039	6460557	Open site	Valid	Artefact : -		
	Contact	Recorders	Doctor.Matt Cupper,LandSkape - Natural & Cultural Heritage Management					Permits		
23-4-0090	AS12	AGD	54	538540	6460660	Open site	Destroyed	Stone Quarry : -, Artefact : -		98177,99660,101767,102768,102793
	Contact	Recorders	Ms.Louise Gay					Permits	1782,1783	
23-4-0084	AS5	AGD	54	538860	6460460	Open site	Destroyed	Artefact : -		98177,99660,101767,102768,102793
	Contact	Recorders	Ms.Louise Gay					Permits	1782,1783	
23-5-0120	PM-Q3	GDA	54	548982	6468093	Open site	Valid	Stone Quarry : -		
	Contact	Recorders	Doctor.Jodie Benton					Permits		
23-5-0140	FD-IF01	GDA	54	549072	6468376	Open site	Valid	Artefact : -		
	Contact	Recorders	Biosis Pty Ltd - Wollongong,Mrs.Samantha Keats					Permits		
23-5-0126	PM-GO3	GDA	54	549082	6468006	Open site	Valid	Artefact : -		
	Contact	Recorders	Doctor.Jodie Benton					Permits		
23-5-0113	PM-SC7	GDA	54	549376	6467473	Open site	Valid	Artefact : -		
	Contact	Recorders	Doctor.Jodie Benton					Permits		
23-5-0017	Royal Flying Doc Mast;	AGD	54	549539	6467167	Open site	Valid	Artefact : -	Open Camp Site	58,59
	Contact	Recorders	ASRSYS					Permits		
23-5-0020	Royal Flying Doc. Mast;	AGD	54	549539	6467167	Open site	Valid	Artefact : -	Open Camp Site	58,59
	Contact	Recorders	ASRSYS					Permits		
23-5-0013	Royal Flying Doc. Mast;	AGD	54	549539	6467167	Open site	Valid	Artefact : -	Open Camp Site	58,59
	Contact	Recorders	ASRSYS					Permits		
23-5-0108	FD06	GDA	54	549713	6468497	Open site	Valid	Potential Archaeological Deposit (PAD) : -, Artefact : -		
	Contact	Recorders	Doctor.Jodie Benton,Biosis Pty Ltd - Wollongong,Mrs.Samantha Keats					Permits		
23-5-0142	FD03	GDA	54	549863	6468752	Open site	Valid	Artefact : -, Potential Archaeological Deposit (PAD) : -		
	Contact	Recorders	Biosis Pty Ltd - Wollongong,Mrs.Samantha Keats					Permits		
23-5-0116	PM-IF4	GDA	54	549909	6467758	Open site	Valid	Artefact : -		
	Contact	Recorders	Doctor.Jodie Benton					Permits		

Report generated by AHIMS Web Service on 06/06/2022 for Rebecca Parkes for the following area at Search using shape-file AHIMS Seacrh Area with a buffer of 0 meters. Additional Info : Archaeological Assessment. Number of Aboriginal sites and Aboriginal objects found is 106

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : Broken Hill #174

Client Service ID : 688761

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
23-4-0093	AS14	AGD	54	538213	6460566	Open site	Destroyed	Stone Quarry : -, Artefact : -		98177,99660,101767,102768,102793
	Contact	Recorders	Ms.Louise Gay					Permits	1782,1783	
23-4-0111	AS11	AGD	54	538500	6460630	Open site	Destroyed	Artefact : -		98177,99660,101767,102768,102793
	Contact	Recorders	Ms.Louise Gay					Permits	1782,1783	
23-4-0691	BESS-AS1-21	GDA	54	539776	6461011	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Geordie Oakes,AECOM Australia Pty Ltd - Sydney					Permits		
23-5-0139	FD-IF02	GDA	54	549015	6468286	Open site	Valid	Artefact : -		
	Contact	Recorders	Biosis Pty Ltd - Wollongong,Mrs.Samantha Keats					Permits		
23-5-0111	PM-SC5	GDA	54	549159	6467767	Open site	Valid	Artefact : -		
	Contact	Recorders	Doctor.Jodie Benton					Permits		
23-5-0151	FD-IF15	GDA	54	549256	6467980	Open site	Valid	Artefact : -		
	Contact	Recorders	Biosis Pty Ltd - Wollongong,Mrs.Samantha Keats					Permits		
23-5-0152	FD-IF18	GDA	54	548509	6467665	Open site	Valid	Artefact : -		
	Contact	Recorders	Biosis Pty Ltd - Wollongong,Mrs.Samantha Keats					Permits		
23-5-0107	PM-SC1	GDA	54	549620	6467720	Open site	Valid	Artefact : -		
	Contact	Recorders	Doctor.Jodie Benton					Permits		
23-5-0021	Royal Flying Doc. Mast;	AGD	54	549539	6467167	Open site	Valid	Artefact : -	Open Camp Site	58,59
	Contact	Recorders	ASRSYS					Permits		
23-5-0149	FD-IF11	GDA	54	549867	6468447	Open site	Valid	Artefact : -		
	Contact	Recorders	Biosis Pty Ltd - Wollongong,Mrs.Samantha Keats					Permits		
23-5-0097	Taltingan	AGD	54	550340	6467620	Open site	Valid	Artefact : 3		
	Contact	Recorders	Mr.John Appleton					Permits		
23-4-0638	Mawsons Quarry Open Site 2	GDA	54	545468	6463718	Open site	Valid	Artefact : 1		102982
	Contact	Recorders	Doctor.Jodie Benton					Permits		
23-4-0107	AS13	AGD	54	538240	6460510	Open site	Destroyed	Stone Quarry : -		98177,99660,101767,102768,102793
	Contact	Recorders	Ms.Louise Gay					Permits	1782,1783	
23-4-0092	AS15	AGD	54	538325	6460180	Open site	Destroyed	Artefact : -		98177,99660,101767,102768,102793
	Contact	Recorders	Ms.Louise Gay					Permits	1782,1783	
23-4-0087	AS8	AGD	54	538610	6460140	Open site	Destroyed	Artefact : -		98177,99660,101767,102768,102793

Report generated by AHIMS Web Service on 06/06/2022 for Rebecca Parkes for the following area at Search using shape-file AHIMS Seacrh Area with a buffer of 0 meters. Additional Info : Archaeological Assessment. Number of Aboriginal sites and Aboriginal objects found is 106

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : Broken Hill #174

Client Service ID : 688761

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
	Contact	Recorders	Ms.Louise Gay					Permits	1782,1783	
23-4-0086	AS7	AGD	54	538650	6460280	Open site	Destroyed	Artefact : -		98177,99660,101767,102768,102793
	Contact	Recorders	Ms.Louise Gay					Permits	1782,1783	
23-4-0082	AS3	AGD	54	539012	6460300	Open site	Valid	Aboriginal Resource and Gathering : -		98177,102768,102793
	Contact	Recorders	Ms.Louise Gay					Permits		
23-4-0081	AS1	AGD	54	539110	6460112	Open site	Valid	Stone Quarry : -, Artefact : -		98177,102768,102793
	Contact	Recorders	Ms.Louise Gay					Permits		
23-5-0156	FD-IF14	GDA	54	549198	6468003	Open site	Valid	Artefact : -		
	Contact	Recorders	Biosis Pty Ltd - Wollongong,Mrs.Samantha Keats					Permits		
23-5-0118	PM-Q1	GDA	54	549593	6468526	Open site	Valid	Artefact : -		
	Contact	Recorders	Doctor.Jodie Benton					Permits		
23-5-0022	Royal Flying Doc. Mast;	AGD	54	549539	6467167	Open site	Valid	Artefact : -	Open Camp Site	58,59
	Contact	Recorders	ASRSYS					Permits		
23-5-0023	Roy. Fly. Doc . Mast 11;	AGD	54	549539	6467167	Open site	Valid	Artefact : -	Open Camp Site	58,59
	Contact	Recorders	ASRSYS					Permits		
23-5-0026	Roy.Fly.Doc. Mast 14;	AGD	54	549539	6467167	Open site	Valid	Artefact : -	Open Camp Site	58,59
	Contact	Recorders	ASRSYS					Permits		
23-5-0129	PM-SC9	GDA	54	549881	6468545	Open site	Valid	Artefact : -		
	Contact	Recorders	Doctor.Jodie Benton					Permits		
23-5-0109	FD04	GDA	54	549951	6468823	Open site	Valid	Artefact : 4		
	Contact	Recorders	Doctor.Jodie Benton,Biosis Pty Ltd - Wollongong,Mrs.Samantha Keats					Permits		
23-4-0640	Kanandah 1	GDA	54	539977	6460557	Open site	Valid	Artefact : -		
	Contact	Recorders	Doctor.Matt Cupper,LandSkape - Natural & Cultural Heritage Management					Permits		
23-4-0091	AS16	AGD	54	538220	6460730	Open site	Valid	Stone Quarry : -, Artefact : -		98177,102768,102793
	Contact	Recorders	Ms.Louise Gay					Permits		
23-4-0078	PML.23	AGD	54	546890	6468880	Open site	Valid	Artefact : -		97984
	Contact	Recorders	Mr.John Appleton					Permits		
23-5-0096	BM 259	AGD	54	547360	6465630	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.John Appleton					Permits		
23-5-0075	PML20	AGD	54	547520	6465460	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.John Appleton					Permits		
23-5-0112	FD-GO01	GDA	54	548678	6467798	Open site	Valid	Hearth : -, Artefact : -		
	Contact	Recorders	Doctor.Jodie Benton,Biosis Pty Ltd - Wollongong,Biosis Pty Ltd - Wollongong,Mrs.S					Permits		

Report generated by AHIMS Web Service on 06/06/2022 for Rebecca Parkes for the following area at Search using shape-file AHIMS Seacrh Area with a buffer of 0 meters. Additional Info : Archaeological Assessment. Number of Aboriginal sites and Aboriginal objects found is 106

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : Broken Hill #174

Client Service ID : 688761

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
23-5-0061	BH1-45/46;	AGD	54	548710	6469470	Open site	Valid	Artefact : -	Open Camp Site	
	Contact	Recorders	Mr.John Appleton					Permits		
23-5-0154	FD-IF16	GDA	54	548882	6467867	Open site	Valid	Artefact : -		
	Contact	Recorders	Biosis Pty Ltd - Wollongong,Mrs.Samantha Keats					Permits		
23-5-0098	Willa Willyong Creek	AGD	54	549500	6466000	Open site	Valid	Artefact : 72		
	Contact	Recorders	Mr.John Appleton					Permits		
23-5-0016	Royal Flying Doc. Mast;	AGD	54	549539	6467167	Open site	Valid	Artefact : -	Open Camp Site	58,59
	Contact	Recorders	ASRSYS					Permits		
23-5-0027	Roy. Fly. Doc. Mast 15;	AGD	54	549539	6467167	Open site	Valid	Artefact : -	Open Camp Site	58,59
	Contact	Recorders	ASRSYS					Permits		
23-5-0124	PM-GO1	GDA	54	549701	6468129	Open site	Valid	Artefact : -		
	Contact	Recorders	Doctor.Jodie Benton					Permits		
23-5-0117	PM-IF5	GDA	54	549791	6467959	Open site	Valid	Artefact : -		
	Contact Orange LALC	Recorders	Doctor.Jodie Benton					Permits		
23-5-0155	FD-IF12	GDA	54	549815	6468440	Open site	Valid	Artefact : -		
	Contact	Recorders	Biosis Pty Ltd - Wollongong,Mrs.Samantha Keats					Permits		
23-4-0682	South airports regency area isolated artefacts	GDA	54	544332	6460022	Open site	Valid	Artefact : -		
	Contact	Recorders	Miss.Lucy Blackam					Permits		
23-4-0083	AS4	AGD	54	539106	6460350	Open site	Valid	Stone Quarry : -, Artefact : -		98177,102768, 102793
	Contact	Recorders	Ms.Louise Gay					Permits		
23-5-0138	FD-IF03	GDA	54	549242	6468433	Open site	Valid	Artefact : -		
	Contact	Recorders	Biosis Pty Ltd - Wollongong,Mrs.Samantha Keats					Permits		
23-5-0076	PML13	AGD	54	549220	6466170	Open site	Valid	Artefact : -		97984
	Contact	Recorders	Mr.John Appleton					Permits		

**** Site Status**

Valid - The site has been recorded and accepted onto the system as valid

Destroyed - The site has been completely impacted or harmed usually as consequence of permit activity but sometimes also after natural events. There is nothing left of the site on the ground but proponents should proceed with caution.

Partially Destroyed - The site has been only partially impacted or harmed usually as consequence of permit activity but sometimes also after natural events. There might be parts or sections of the original site still present on the ground

Not a site - The site has been originally entered and accepted onto AHIMS as a valid site but after further investigations it was decided it is NOT an aboriginal site. Impact of this type of site does not require permit but Heritage NSW should be notified

Report generated by AHIMS Web Service on 06/06/2022 for Rebecca Parkes for the following area at Search using shape-file AHIMS Seacrh Area with a buffer of 0 meters. Additional Info : Archaeological Assessment. Number of Aboriginal sites and Aboriginal objects found is 106

Item Details

Name
The Pinnacles
SHR/LEP/S170
The Pinnacles
Address
BROKEN HILL NSW 2880
Local Govt Area
Unincorporated
Local Aboriginal Land Council
Broken Hill

Item Type	Group/Collection	Category
Complex / Group	Aboriginal	Place of significance

All Addresses

Addresses

Records Retrieved: 1

Street No	Street Name	Suburb/Town/Postcode	Local Govt. Area	LALC	Parish	County	Electorate	Address Type
		BROKEN HILL/NSW/2880	Unincorporated	Broken Hill			BARWON	Primary Address

Significance

Statement Of Significance

Why is it an Aboriginal Place?
The Pinnacles is part of the Dreaming track of the Marnbi (bronze winged pigeon).

Why is it important to Aboriginal people?
The story of the Marnbi is important to Aboriginal people from many regions as it is a story that extends across three different states. The Dreaming track of the Marnbi begins in the Flinders Ranges in South Australia, travels through Broken Hill, The Pinnacles and north-western New South Wales before ending at Mt Isa in Queensland. The Marnbi's path can be recognised from scatters and outcrops of white quartz and black rocks.

The Marnbi flew from South Australia into New South Wales leaving droppings and feathers along the way; these are the white quartz and black rocks that are scattered along the Marnbi's route and which make the path recognisable to Aboriginal people. The Marnbi was injured and very sick so it sat down three times at The Pinnacles thus creating the three peaks. Despite being sick, the Marnbi continued on its journey, but lost blood along the way, and created the mineral deposits that are found at various places along the path. It died at a secret sacred location, and its spirit resides at Mt Isa. The Marnbi story is also associated with water, and has helped generations of Aboriginal people remember where they can find water in the dry environment.

All three pinnacles are sacred, but the Middle Pinnacle is most important to Aboriginal people. Mrs Bugmy remembers that when she was a child (in the early twentieth century) Aboriginal people from all around New South Wales, Queensland and South Australia gathered to dance together for the Marnbi at the Pinnacles. They danced at the Middle Pinnacle.

Aboriginal people traditionally camped along the creeks near the South and North Pinnacles. They set up camp so that they had access to water, but also so that they had a clear view of the Middle Pinnacle. Aboriginal people did not camp at the Middle Pinnacle, but always liked to have it in their sights because of its cultural importance.

Owners

Records Retrieved: 0

Organisation	Stakeholder Category	Date Ownership Updated
No Results Found		

Description

Designer **Builder/Maker**

Physical Description **Updated**

What's on the ground?
Artefact scatters, stone fire places and hearths indicate the presence of Aboriginal campsites near the North and South Pinnacles.

Nature of the environment
The Pinnacles are three distinctive rocky peaks located approximately 15 kilometres from Broken Hill. The Middle Pinnacle is the highest peak. Pine Creek runs between the South and Middle Pinnacles and Stirling Vale Creek runs past the northern side of the North Pinnacle.

Physical Condition **Updated**

Modifications And Dates

Further Comments

Current Use
Mining has taken place in the area around the South Pinnacle.

Former Use

Listings

Listings

Records Retrieved: 1

Heritage Listing	Listing Title	Listing Number	Gazette Date	Gazzette Number	Gazzette Page
NPW Act - Aboriginal Place			7/5/1996 12:00:00 AM	81	3947

Procedures/Exemptions

Records Retrieved: 0

Section of Act	Description	Title	Comments	Action Date	Outcome

No Results Found

History

Historical Notes or Provenance **Updated**

Historic Themes

Records Retrieved: 2

National Theme	State Theme	Local Theme
2. Peopling	Aboriginal cultures and interactions with other cultures	Aboriginal Culture
Peopling the continent	Aboriginal post-contact	Aboriginal Culture

Recommended Management

Management Summary

Management

Records Retrieved: 0

Management Category	Management Name	Date Updated

No Results Found

Report/Study

Heritage Studies

Records Retrieved: 0

Report/Study Name	Report/Study Code	Report/Study Type	Report/Study Year	Organisation	Author
No Results Found					

Reference & Internet Links

References

Records Retrieved: 4

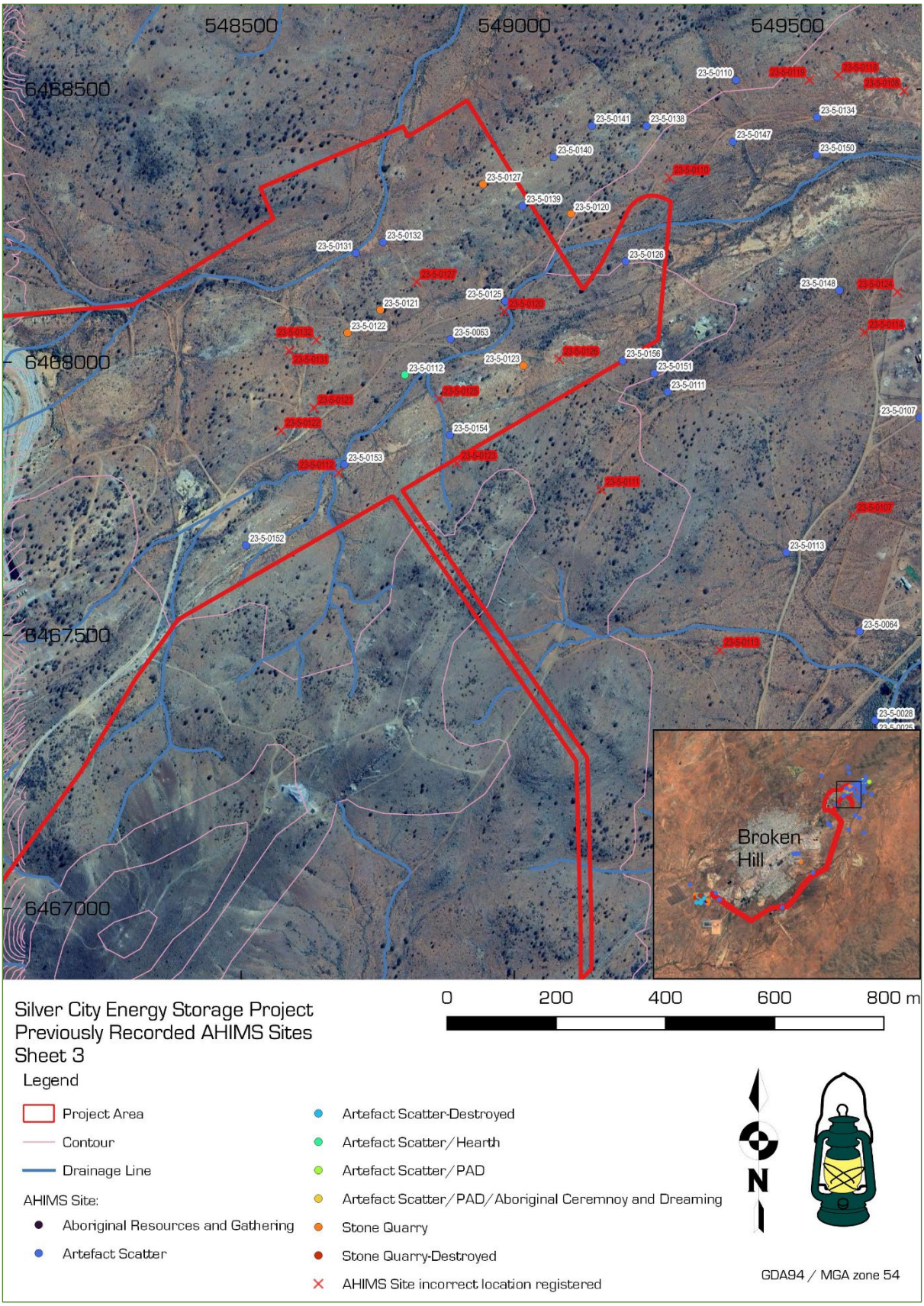
Type	Author	Year	Title	Link
Electronic	NSW Government	1996	Government Gazette of the State of New South Wales	http://www.environment.nsw.gov.au/resources/cultureheritage/gazette/The_Pinnacles.pdf
Written	Warell, Lindy	1995	Three Pointy Little Hills: The story of Marnbi at the Pinnacles, Report prepared for National Parks and Wildlife Service, Sydney. [AHIMS Report No. 3329]	
Written	Beckett, Jeremy	1978	George Dutton's country: portrait of an Aboriginal drover. Aboriginal History 2(1):3-31.	
Written	Community Operations Branch, Far West Region: (02) 6969 0700		The Pinnacles	

Data Source

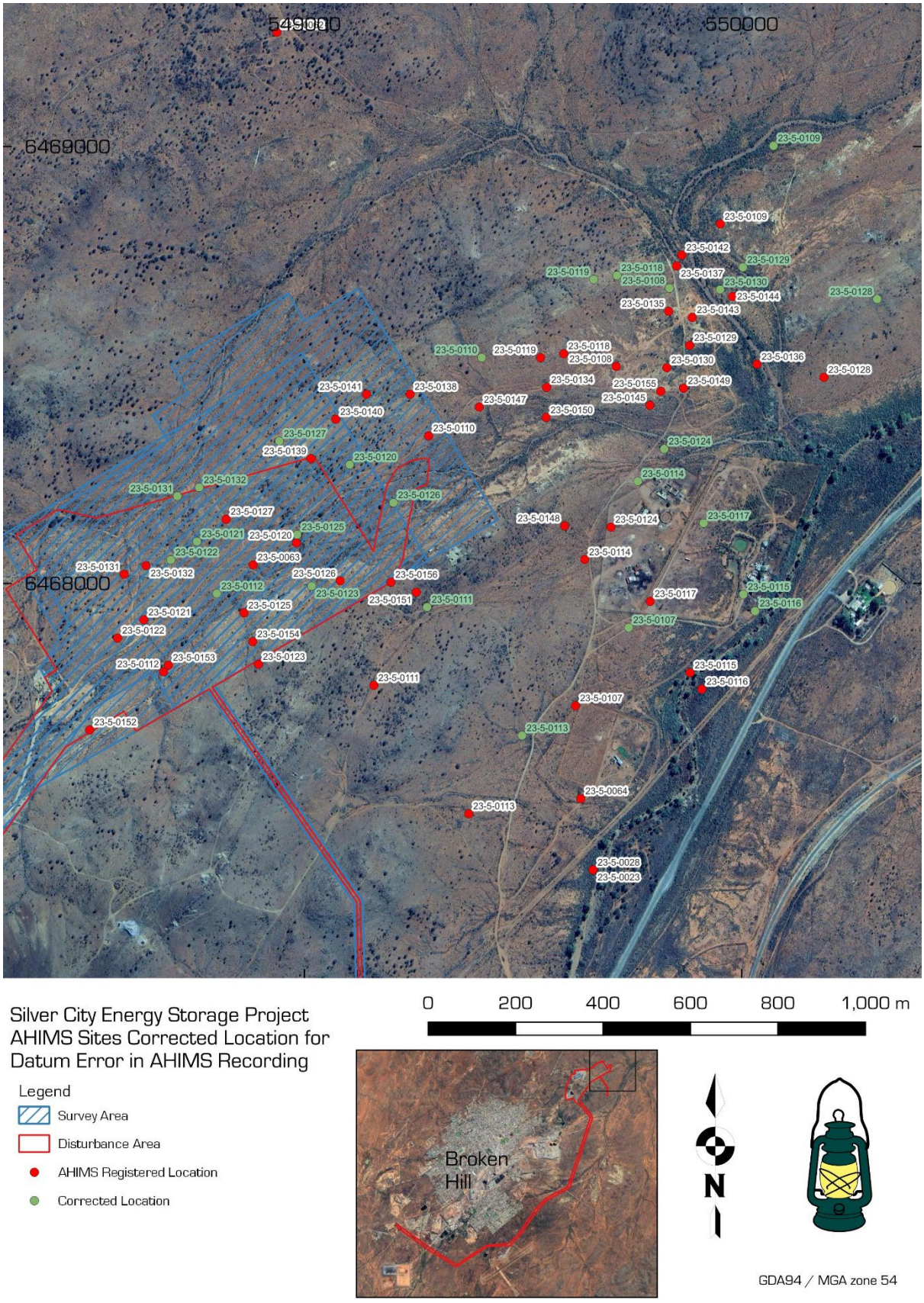
The information for this entry comes from the following source:

Data Source	Record Owner	Heritage Item ID
Heritage NSW	Heritage NSW	5062971

Every effort has been made to ensure that information contained in the State Heritage Inventory is correct. If you find any errors or omissions please send your comments to **heritagemailbox@environment.nsw.gov.au**

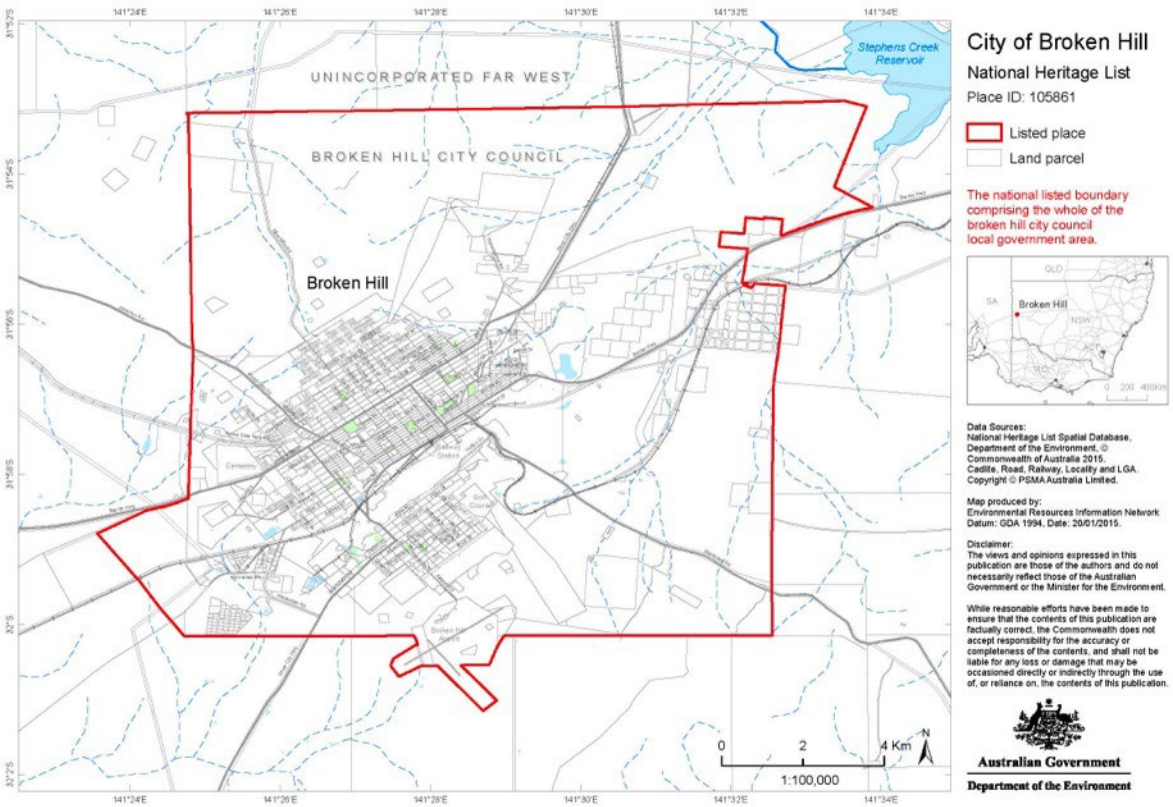


Near image showing drainage features, contours and previously recorded site types relative to the far northern section of the Project area.



Map above showing corrected AHIMS site locations.

AHD: NHL 105861 Listed Place City of Broken Hill:



SHI/LEP/S170 : The Pinnacles: An Aboriginal Place

APPENDIX 2 – PHASE 1 SURVEY UNIT DESCRIPTIONS

Summary of Phase 1 survey units, landforms and associated Aboriginal sites recoreded during current investigation.

Survey Unit (SU)	Landform Element Type	Description	Photos	Sites Located Within SU
SU1	Flat	Low gradient to flat, open aspect landscape. Exposures at approximately 60% and visibility at 30%. Vegetation is predominantly Chenopod scrubland. Ground surface consists of quartz and gneiss gravel in fine, unconsolidated, orangey red, silty sand matrix. Subjected to vegetation clearance, erosion and vehicle disturbance.	 Survey Unit 1, landform overview, oriented east.	Broken Hill (ACAES) AFT 1

Survey Unit (SU)	Landform Element Type	Description	Photos	Sites Located Within SU
SU2	Open Depression - Creek Line	North western facing basal slope extending to a second order ephemeral creek line transecting in a southwest/northeast direction. Exposures at approximately 50% and visibility at 20%. Vegetation is predominantly Chenopod scrubland with occasional shoulder high shrubs. Ground surface consists of quartz and gneiss gravel in fine, unconsolidated, orangey red, silty sand matrix. Exposed poor quality quarte outcrops evident. Pockets of PAD in areas of higher relief on the southeast margin of the survey unit. Subjected to vegetation clearance, erosion and significant vehicle disturbance.	 Survey Unit 2, landform overview, oriented north.	PM-IF6/AHIMS #23-5-0131; AHIMS #23-5-0132

Survey Unit (SU)	Landform Element Type	Description	Photos	Sites Located Within SU
SU3	Simple Slope	A gentle slope encircling a rocky knoll. Exposures at approximately 30% and visibility at 20%. Vegetation is predominantly Chenopod scrubland. Ground surface consists of quartz and gneiss gravel in fine, consolidated, orange red, silty sand matrix trending to more exposed gravelly and pebble rock on the upper regions of the SU toward the slope crest. The SU contains one large, exposed quartz veins previously identified as AHIMS 23-5-0122. Subjected to vegetation clearance, erosion and significant vehicle disturbance.	 Survey Unit 3, landform overview, oriented southwest.	AHIMS #23-5-0122

Survey Unit (SU)	Landform Element Type	Description	Photos	Sites Located Within SU
SU4	Open Depression	An open depression ephemeral water course transecting north/south. Exposures at approximately 60% and visibility at 30%. Vegetation is predominantly Chenopod scrubland. Ground surface consists of quartz and gneiss gravel in fine, unconsolidated, orange red, silty sand matrix. Subjected to vegetation clearance, erosion and significant vehicle disturbance.	 Survey Unit 4, landform overview, oriented southwest	None recorded

Survey Unit (SU)	Landform Element Type	Description	Photos	Sites Located Within SU
SU5	Simple Slope	The gentle slope encircling a hill crest. Exposures at approximately 50% and visibility at 70%. Vegetation is predominantly Chenopod scrubland with occasional shrub of approximately 2-3m height. Ground surface consists of quartz and gneiss gravel in fine, unconsolidated, orange red, silty sand matrix trending to more exposed gravelly and pebble rock on the upper regions of the SU toward the slope crest. Subjected to vegetation clearance, erosion and extensive vehicle disturbance.	 Survey Unit 5, landform overview, oriented east.	BH Site 4

Survey Unit (SU)	Landform Element Type	Description	Photos	Sites Located Within SU
SU6	Open Depression - Creek Line	An approximately 1m deep incised depression, ephemeral, third order water course / creek flat transecting northwest/southeast. Two locations of confluence with first and second order water course. The water course has been altered in the southwest extent of the SCES facility location by spoil deposited into the original creek line. Exposures at approximately 10% and visibility at 20%. Vegetation is predominantly Chenopod scrubland. Ground surface consists of quartz and gneiss gravel in fine, unconsolidated, orangy red, silty sand matrix. Occasional wide area deposits of broken quartz pebble. Pockets of PAD along the creek line, some upto approximately 1m deep as evidenced by the stratigraphic profile along the creek bank. Subjected to vegetation clearance, erosion and minor vehicle disturbance.	 Survey Unit 6, landform overview, oriented west-southwest.	Broken Hill (ACAES) AFT 3; AHIMS #23-5-0153; AHIMS #23-5-0063; AHIMS # 23-5-0112
SU7	Crest	A low hill crest. Exposures at approximately 30% and visibility at 30%. Vegetation is predominantly Chenopod scrubland and occasional 2-3m high shrubs. Ground surface consists of quartz and gneiss gravel in compacted, orange red, coarse sand matrix. A large, exposed quartz vein is located on the western side of the crest. Location is previously identified as AHIMS 23-5-0121. Subjected to vegetation clearance and erosion.		AHIMS #23-5-0122

Survey Unit (SU)	Landform Element Type	Description	Photos	Sites Located Within SU
SU8	Crest	A low hill crest. Exposures at approximately 30% and visibility at 30%. Vegetation is predominantly Chenopod scrubland and occasional 2-3m high shrubs. Ground surface consists of quartz and gneiss gravel in compacted, orange red, silty sand matrix. Subjected to vegetation clearance and erosion.		None recorded
SU9	Slope - Lower (Gentle)	A gentle, northwest facing slope. Exposures at approximately 20% and visibility at 30%. Vegetation is predominantly Chenopod scrubland and occasional 2-3m high shrubs. Ground surface consists of quartz and gneiss gravel in compacted, orangy red, coarse sand matrix. Subjected to vegetation clearance and erosion.	 Survey Unit 9, landform overview, oriented west.	None recorded

Survey Unit (SU)	Landform Element Type	Description	Photos	Sites Located Within SU
SU10	Slope - Mid- and Upper- (Steep)	A steep, northwest facing slope. Exposures at approximately 40% and visibility at 30%. Vegetation is predominantly Chenopod scrubland and occasional 2m high shrubs. Ground surface consists of quartz and gneiss gravel amongst large rocks (approx 40 - 80cm diameter) with compacted, orangy red, coarse sand matrix in pockets amongst the rock. Subjected to vegetation clearance, erosion and minor vehicle track damage.	 Survey Unit 10, landform overview, oriented northwest.	None recorded

Survey Unit (SU)	Landform Element Type	Description	Photos	Sites Located Within SU
SU11	Ridge	An exposed, steep ridge oriented in a southwest / northeast direction. Exposures at approximately 20% and visibility at 20%. Vegetation is predominantly Chenopod scrubland and occasional 2m high shrubs. Ground surface consists of quartz and gneiss gravel amongst large rocks (approx. 40 - 80cm diameter) with compacted, orange red, coarse sand matrix in pockets amongst the rock. Subjected to erosion.	 Survey Unit 11, landform overview, oriented southwest.	None recorded
SU12	Open Depression - Creek Line	An open depression, ephemeral water course transecting west/east. Exposures at approximately 20% and visibility at 30%. Vegetation is predominantly Chenopod scrubland. Ground surface consists of quartz and gneiss gravel in fine, unconsolidated, orange red, silty sand matrix. Subjected to vegetation clearance and erosion.		None recorded

Survey Unit (SU)	Landform Element Type	Description	Photos	Sites Located Within SU
SU13	Slope - Mid- and Upper (Steep)	A steep, southeast facing slope. Exposures at approximately 10% and visibility at 30%. Vegetation is predominantly Chenopod scrubland. Ground surface consists of quartz and gneiss gravel amongst large rocks (approx 40cm diameter) within compacted, orangy red, coarse sand matrix. Rocky outcrops along the upper slope. Subjected to vegetation clearance and erosion.		None recorded
SU14	Open Depression - Creek Line	An open depression, ephemeral water course transecting southwest/northeast. Exposures at approximately 20% and visibility at 20%. Vegetation is predominantly Chenopod scrubland and waist height shrubs. Ground surface consists of quartz and gneiss gravel in fine, unconsolidated, orange red, coarse sand matrix. Subjected to vegetation clearance and erosion.	 Survey Unit 14, landform overview, oriented north-northwest.	None recorded

Survey Unit (SU)	Landform Element Type	Description	Photos	Sites Located Within SU
SU15	Creek Flat	An open creek flat associated with ephemeral water course. Exposures at approximately 20% and visibility at 20%. Vegetation is predominantly Chenopod scrubland and shoulder height shrubs with occasional 2m high shrubs. Ground surface consists of quartz and gneiss gravel in fine, somewhat compacted, orange red, coarse sand matrix. Subjected to vegetation clearance, erosion and minor vehicle track disturbance.	 Survey Unit 15, landform overview, oriented northwest.	Broken Hill (ACAES) AFT 8

Survey Unit (SU)	Landform Element Type	Description	Photos	Sites Located Within SU
SU16	Saddle	A saddle in a ridge line oriented southwest/northeast. Exposures at approximately 50% and visibility at 60%. Very clear visibility. Vegetation is predominantly Chenopod scrubland. Ground surface consists of small quartz and gneiss pebbles in coarse, compacted, orange red, sand matrix. Subjected to vegetation clearance and erosion.	 Survey Unit 16, landform overview, oriented northwest.	Broken Hill (ACAES) AFT 44
SU17	Slope - Lower (Gentle)	A gentle, northwest facing slope. Exposures at approximately 20% and visibility at 30%. Vegetation is predominantly Chenopod scrubland and occasional 2m high shrubs. Ground surface consists of quartz and gneiss gravel in compacted, orange red, coarse sand matrix. Subjected to vegetation clearance, erosion and minor vehicle track damage.		None recorded

Survey Unit (SU)	Landform Element Type	Description	Photos	Sites Located Within SU
SU18	Slope - Mid- and Upper- (Steep)	Northwest facing steep slope leading up to a saddle (SU16). Exposures at approximately 20% and visibility at 30%. Vegetation is predominantly Chenopod scrubland and occasional low shrubs. Ground surface consists of quartz and gneiss pebbles in compacted, orange red, coarse sand matrix with pockets of rocky exposures and boulder walls. Subjected to vegetation clearance and erosion.		None recorded
SU19	Open Depression - Creek Line	A first order ephemeral creek line transecting in a west/east direction at approximately 40m wide. Exposures at approximately 30% and visibility at 20%. Vegetation is predominantly Chenopod scrubland with occasional shoulder high shrubs. Ground surface consists of quartz and gneiss cobbles in coarse, compacted, orange red, sand matrix. Subjected to vegetation clearance and erosion.	 Survey Unit 19, landform overview, oriented west.	None recorded

Survey Unit (SU)	Landform Element Type	Description	Photos	Sites Located Within SU
SU20	Slope - Mid- and Upper- (Steep)	A south facing steep slope. Exposures at approximately 20% and visibility at 30%. Vegetation is predominantly Chenopod scrubland and occasional low shrubs. Ground surface consists of quartz and gneiss pebbles in compacted, orange red, coarse sand matrix with pockets of rocky exposures. Subjected to vegetation clearance and erosion.	 Survey Unit 20, landform overview, oriented northwest.	None recorded

Survey Unit (SU)	Landform Element Type	Description	Photos	Sites Located Within SU
SU21	Simple Slope	A steep northeast facing slope with sharp rocky outcrops. Exposures at approximately 30% and visibility at 80%. Sparsely vegetated with low lying shrub and ankle high grasses, some taller bushes on the higher ridge. Ground surface consists of quartz and gneiss gravel/pebbles in compacted, orange red, fine sand matrix with pockets of rocky exposures.	 Survey Unit 21, landform overview, oriented southwest.	Broken Hill (ACAES) AFT 45

Survey Unit (SU)	Landform Element Type	Description	Photos	Sites Located Within SU
SU22	Simple Slope	A steep southeast facing slope with sharp rocky outcrops. Exposures at approximately 30% and visibility at 80%. Sparsely vegetated with low lying shrub and ankle high grasses, some taller bushes on the higher ridge. Ground surface consists of quartz and gneiss gravel/pebbles in compacted, orange red, fine sand matrix with pockets of rocky exposures.	 Survey Unit 22, landform overview, oriented southeast.	None recorded

Survey Unit (SU)	Landform Element Type	Description	Photos	Sites Located Within SU
SU23	Simple Slope (Gentle)	A gentle, northeast facing slope. Exposures at approximately 20% and visibility at 30%. Vegetation is predominantly Chenopod scrubland and occasional waist height and 2m high shrubs. Ground surface consists of quartz and gneiss gravel in compacted, orange red, coarse sand matrix. Subjected to vegetation clearance, erosion and minor vehicle track damage.	 Survey Unit 23, landform overview, oriented southwest.	Broken Hill (ACAES) AFT/HTH 10
SU24	Open Depression - Creek Line	A first order, gentle slope, ephemeral creek line transecting in a west by southwest/east by northeast direction at approximately 10m wide. Exposures at approximately 20% and visibility at 20%. Vegetation is predominantly Chenopod scrubland with occasional shoulder high shrubs. Ground surface consists of quartz and gneiss cobbles in coarse, firm, orange red, sand matrix and some rocky exposures. Subjected to vegetation clearance and erosion. Some vehicle track impacts on eastern most edge of the SU.		None recorded

Survey Unit (SU)	Landform Element Type	Description	Photos	Sites Located Within SU
SU25	Ridge Line	An exposed, rocky, steep ridge oriented in a southwest / northeast direction. Exposures at approximately 20% and visibility at 20%. Vegetation is predominantly Chenopod scrubland and 2m high shrubs. Ground surface consists of quartz and gneiss gravel amongst large rocks (approx 40 - 80cm diameter) with compacted, orange red, coarse sand matrix in pockets amongst the rock. Subjected to erosion.		None recorded
SU26	Open Depression - Creek Line	A first order, gentle slope, ephemeral creek line transecting in a northeast/southwest direction at approximately 5m wide. Exposures at approximately 20% and visibility at 20%. Vegetation is predominantly Chenopod scrubland with occasional shoulder high shrubs. Ground surface consists of quartz and gneiss cobbles in coarse, firm, orange red, sand matrix and some rocky exposures. Subjected to vegetation clearance and erosion.		None recorded

Survey Unit (SU)	Landform Element Type	Description	Photos	Sites Located Within SU
SU27	Slope - Mid-(Steep)	A southeast facing steep mid-slope. Exposures at approximately 30% and visibility at 50%. Vegetation is predominantly Chenopod scrubland and occasional 2.5 - 3m shrubs. Ground surface consists of quartz and gneiss pebbles in compacted, orange red, coarse sand matrix with pockets of rocky exposures. Subjected to vegetation clearance and erosion.		None recorded
SU28	Open Depression - Creek Line	A first order, gentle slope, ephemeral creek line transecting in an east/west direction at approximately 5m wide. Exposures at approximately 20% and visibility at 20%. Vegetation is predominantly Chenopod scrubland and thick shoulder high shrubs. Ground surface consists of quartz and gneiss cobbles in coarse, firm, orangy red, sand matrix and some rocky exposures. Subjected to vegetation clearance and erosion.		None recorded

Survey Unit (SU)	Landform Element Type	Description	Photos	Sites Located Within SU
SU29	Slope - Lower (Gentle)	A gentle, southwest facing slope. Exposures at approximately 20% and visibility at 30%. Vegetation is predominantly Chenopod scrubland and occasional waist height and 2m high shrubs. Ground surface consists of quartz and gneiss gravel in compacted, orangy red, coarse sand matrix. Subjected to vegetation clearance, erosion and significant vehicle track damage.		Broken Hill (ACAES) AFT 11
SU30	Open Depression - Drain	A gentle slope, open depression drainage line transecting in an east /west direction at approximately 5m wide. Exposures at approximately 20% and visibility at 20%. Vegetation is predominantly Chenopod scrubland with occasional shoulder high shrubs. Ground surface consists of quartz and gneiss cobbles in coarse, firm, orange red, sand matrix and some rocky exposures. Subjected to vegetation clearance and erosion.		None recorded
SU31	Slope - Mid- (Steep)	A northwest facing steep mid-slope. Exposures at approximately 20% and visibility at 20%. Vegetation is predominantly Chenopod scrubland and dense shrubs. Ground surface consists of quartz and gneiss pebbles in compacted, orange red, coarse sand matrix with pockets of rocky exposures. Subjected to vegetation clearance, erosion and minor vehicle track impact.		None recorded

Survey Unit (SU)	Landform Element Type	Description	Photos	Sites Located Within SU
SU32	Open Depression - Creek Line	A first order, gentle slope, ephemeral creek line transecting in a southeast/northwest direction at approximately 5m wide. Exposures at approximately 20% and visibility at 20%. Vegetation is predominantly Chenopod scrubland and occasional shoulder high shrubs. Ground surface consists of quartz and gneiss cobbles in coarse, firm, orange red, sand matrix and some rocky exposures. Subjected to vegetation clearance, erosion and vehicle track impact.		None recorded
SU33	Slope - Lower (Gentle)	A gentle, northwest facing slope. Exposures at approximately 40% and visibility at 30%. Vegetation is predominantly Chenopod scrubland and occasional waist height shrubs and 6m high trees. Ground surface consists of quartz and gneiss pebbles in compacted, orange red, coarse sand matrix. Subjected to vegetation clearance, erosion and significant vehicle track damage. Mining disturbance and infrastructure in the southwestern extent of the SU.	 Survey Unit 33, landform overview, oriented west.	None recorded

Survey Unit (SU)	Landform Element Type	Description	Photos	Sites Located Within SU
SU34	Open Depression	A gentle slope, open depression drainage line transecting in a southeast /northwest direction at approximately 5m wide. Exposures at approximately 20% and visibility at 20%. Vegetation is predominantly Chenopod scrubland with occasional 2m high shrubs. Ground surface consists of quartz and gneiss cobbles in coarse, firm, orange red, sand matrix and some rocky exposures. Subjected to vegetation clearance, erosion and significant vehicle track damage. Mining disturbance and infrastructure in the northwestern extent of the SU.		None recorded
SU35	Slope - Lower (Gentle)	A gentle, northwest facing slope. Exposures at approximately 20% and visibility at 20%. Vegetation is predominantly Chenopod scrubland and occasional 2m heigh shrubs. Ground surface consists of quartz and gneiss pebbles in compacted, orange red, coarse sand matrix. Subjected to vegetation clearance, erosion and significant vehicle track damage. Mining disturbance and infrastructure in the north western extent of the SU.		None recorded

Survey Unit (SU)	Landform Element Type	Description	Photos	Sites Located Within SU
SU36	Open Depression	A gentle slope, open depression drainage line transecting in an east /west direction at approximately 8m wide. Exposures at approximately 20% and visibility at 20%. Vegetation is predominantly Chenopod scrubland and occasional 2m heigh shrubs. Ground surface consists of quartz and gneiss pebbles in compacted, orange red, coarse sand matrix. Subjected to vegetation clearance, erosion and significant vehicle track damage. Mining disturbance and infrastructure in the north western extent of the SU.		None recorded
SU37	Simple Slope	A gentle, west facing basal slope. Exposures at approximately 20% and visibility at 20%. Vegetation is predominantly Chenopod scrubland and occasional 2m heigh shrubs. Ground surface consists of quartz and gneiss pebbles in compacted, orange red, coarse sand matrix. Skeletal soils. Subjected to vegetation clearance, erosion and significant vehicle track damage. Mining disturbance and infrastructure in the northwestern extent of the SU. Low PAD.		None recorded

Survey Unit (SU)	Landform Element Type	Description	Photos	Sites Located Within SU
SU38	Open Depression	A gentle slope, open ephemeral, first order creek line transecting in an north /south direction at approximately 7m wide. Exposures at approximately 20% and visibility at 20%. Vegetation is predominantly Chenopod scrubland and occasional waist height shrubs. Ground surface consists of quartz and gneiss pebbles in compacted, orange red, coarse sand matrix. Subjected to vegetation clearance and erosion. Low PAD.		None recorded
SU39	Open Depression - Creek Line	A very gentle slope, open ephemeral, first order creek line transecting in an north /south direction at approximately 4m wide. Exposures at approximately 20% and visibility at 20%. Vegetation is predominantly Chenopod scrubland and occasional waist height shrubs. Ground surface consists of quartz and gneiss pebbles in compacted, orange red, coarse sand matrix. Subjected to vegetation clearance and erosion. Low PAD.		None recorded
SU40	Simple Slope	A gentle, southwest facing basal slope. Exposures at approximately 20% and visibility at 20%. Vegetation is predominantly Chenopod scrubland and occasional waist heigh shrubs. Ground surface consists of quartz and gneiss pebbles in compacted, orange red, coarse sand matrix. Skeletal soils. Subjected to vegetation clearance, erosion and significant vehicle track damage. Low PAD.		None recorded

Survey Unit (SU)	Landform Element Type	Description	Photos	Sites Located Within SU
SU41	Simple Slope	A gentle, southwest facing basal slope. Exposures at approximately 20% and visibility at 20%. Vegetation is predominantly Chenopod scrubland and occasional waist heigh shrubs. Ground surface consists of quartz and gneiss gravel in compacted, orange red, coarse sand matrix. Skeletal soils. Subjected to vegetation clearance, erosion and significant vehicle track damage. Low PAD.		None recorded
SU42	Flat	A very gentle to no incline, open landscape. Exposures at approximately 40% and visibility at 30%. Vegetation is predominantly Chenopod scrubland and occasional knee high shrubs with increasing ground cover closer to the highway (southeasterly direction). Ground surface consists of minor inclusions of quartz and gneiss gravel and intermittent cobbles in compacted, orange red, coarse sand matrix. Skeletal soils. Subjected to vegetation clearance, erosion and significant vehicle track damage. Low PAD.	 Survey Unit 42, landform overview, oriented north.	Broken Hill (ACAES) AFT12; Broken Hill (ACAES) AFT 13

Survey Unit (SU)	Landform Element Type	Description	Photos	Sites Located Within SU
SU43	Open Depression - Creek Line	A very gentle slope, incised (2m deep), ephemeral, second order creek line transecting in an west/east direction at approximately 20m wide. Exposures at approximately 70% and visibility at 60%. Vegetation is predominantly Chenopod scrubland and grasses with young eucalypt and occasional waist height shrubs. Ground surface consists of unconsolidated, orange red, coarse sand matrix with large rock inclusions. Subjected to vegetation clearance, erosion and vehicle track disturbances.	 Survey Unit 43, landform overview, oriented east.	Broken Hill (ACAES) AFT 14
SU44	Plain	An east facing to open gentle basal slope transitioning to flat. Exposures at approximately 40% and visibility at 60%. Vegetation is predominantly Chenopod scrubland and occasional knee high shrubs. Occasional sandstone and quartz cobble within soft, deep, silty soil matrix. Subjected to vegetation clearance, erosion and vehicle track disturbances. Medium PAD.		Broken Hill (ACAES) AFT 15

Survey Unit (SU)	Landform Element Type	Description	Photos	Sites Located Within SU
SU45	Open Depression - Creek Line	A very gentle slope, open, ephemeral, first order creek line transecting in a west/east direction at approximately 15m wide. Exposures at approximately 40% and visibility at 20%. Vegetation is predominantly Chenopod scrubland, grasses and occasional waist height shrubs. Ground surface consists of firm, orange red, coarse sand matrix with sandstone and quartz cobble inclusions. Subjected to vegetation clearance and erosion.		None recorded
SU46	Flat	A north facing to open gentle basal slope transitioning to flat. Exposures at approximately 20% and visibility at 50%. Vegetation is predominantly waist high scrub. Occasional sandstone and quartz cobble within soft, deep, silty soil matrix. Subjected to vegetation clearance, erosion and vehicle track disturbances. Medium PAD.		None recorded
SU47	Simple Slope	A northeast facing, to open, gentle basal slope. Exposures at approximately 20% and visibility at 50%. Vegetation is predominantly waist high scrub. Occasional sandstone and quartz cobble within soft, deep, silty soil matrix. Subjected to vegetation clearance, erosion and vehicle track disturbances. Medium PAD		None recorded

Survey Unit (SU)	Landform Element Type	Description	Photos	Sites Located Within SU
SU48	Crest	A gently sloped hill crest. Exposures at approximately 60% and visibility at 20%. Vegetation is predominantly waist high scrub. Occasional quartz gravel inclusions within soft, orange red, silty sand matrix. Subjected to vegetation clearance, erosion and significant vehicle track disturbances.		None recorded
SU49	Simple Slope	An east facing, to open, gentle basal slope. Exposures at approximately 20% and visibility at 20%. Vegetation is predominantly waist high scrub and grasses. Ground surface consists of firm, orange red, coarse sand matrix with sandstone and quartz cobble inclusions. Subjected to vegetation clearance, erosion and vehicle track disturbances.	 Survey Unit 49, landform overview, oriented west.	None recorded

Survey Unit (SU)	Landform Element Type	Description	Photos	Sites Located Within SU
SU50	Flat	A southeast facing, to open, gentle basal slope transitioning to flat. Exposures at approximately 20% and visibility at 50%. Vegetation is predominantly knee high scrub and grasses. Occasional quartz cobble within compacted, orange red, coarse sand matrix. Subjected to vegetation clearance, erosion and vehicle track disturbances.	 Survey Unit 50, landform overview, oriented south.	None recorded
SU51	Open Depression - Drainage Line	A gentle slope, open depression drainage line transecting in an east /west direction at approximately 20m wide. Exposures at approximately 20% and visibility at 20%. Vegetation is predominantly Chenopod scrubland and grassland with occasional 2m high shrubs. Ground surface consists of quartz cobbles in coarse, firm, orange red, sand matrix. Subjected to vegetation clearance and erosion.		None recorded

Survey Unit (SU)	Landform Element Type	Description	Photos	Sites Located Within SU
SU52	Flat	An open flat. Exposures at approximately 10% and visibility at 10%. Vegetation is predominantly knee high grasses. Occasional quartz cobble within firm, orange red, coarse sand matrix. Subjected to vegetation clearance and erosion. Evidence of industry activity.	 Survey Unit 52, landform overview, oriented south	None recorded
SU53	Open Depression - Drainage Line	A gentle slope, open depression drainage line transecting in a southeast / northwest direction at approximately 20m wide. Exposures at approximately 10% and visibility at 10%. Vegetation is predominantly knee high grasses. Occasional quartz cobble within firm, deepening, orange red, coarse sand matrix. Subjected to vegetation clearance and erosion.		None recorded

Survey Unit (SU)	Landform Element Type	Description	Photos	Sites Located Within SU
SU54	Creek Flat	An open creek flat. Exposures at approximately 20% and visibility at 30%. Vegetation is predominantly Chenopod scrubland and knee high grassland. Occasional quartz pebble within firm, orange red, coarse sand matrix. Subjected to vegetation clearance and erosion. Evidence of modern camping. High PAD evidenced by creek line cutting to the east of the survey corridor.	 Survey Unit 54, landform overview, oriented southwest.	None recorded

Survey Unit (SU)	Landform Element Type	Description	Photos	Sites Located Within SU
SU55	Open Depression - Creek Line	A second order, deeply incised, ephemeral creek line transecting in a northwest/southeast direction at approximately 10m wide. Exposures at approximately 20% and visibility at 30%. Vegetation is predominantly Chenopod scrubland and knee high grassland. Ground surface consists of quartz cobbles in coarse, loose, orange red, sand matrix. Subjected to vegetation clearance and erosion. High PAD and approximately 1m of deposit as evidenced by the stratigraphic profile of the creek cutting to the east of the survey corridor (downstream).	 Survey Unit 55, landform overview, oriented southwest.	None recorded
SU56	Spur (Gentle)	A northwest/southeast oriented, gentle spur. Exposures at approximately 20% and visibility at 30%. Vegetation is predominantly Chenopod scrubland and knee high grassland. Ground surface consists of quartz cobbles in coarse, loose, orange red, sand matrix. Subjected to vegetation clearance and erosion. High PAD evidenced by creek cutting to the east of the survey corridor (downstream).		None recorded

Survey Unit (SU)	Landform Element Type	Description	Photos	Sites Located Within SU
SU57	Open Depression - Creek Line	A first order, gently sloped, ephemeral creek line transecting in a west/east direction at approximately 5m wide. Exposures at approximately 20% and visibility at 30%. Vegetation is predominantly Chenopod scrubland and knee high grassland. Ground surface consists of quartz cobbles in coarse, loose, orangy red, sand matrix. Subjected to vegetation clearance and erosion. High PAD evidenced by creek cutting to the east of the survey corridor (downstream).		None recorded
SU58	Creek Flat	An open creek flat. Nil exposures and nil visibility due to thick scrub and grass cover. Ground cover is firm, orange red, coarse sand matrix. Subjected to vegetation clearance, erosion and minor vehicle track disturbance. Deep sandy soil structure.	 Survey Unit 58, landform overview, oriented north.	None recorded

Survey Unit (SU)	Landform Element Type	Description	Photos	Sites Located Within SU
SU59	Simple Slope (Very Gentle)	A northeast facing, to open, gentle basal slope. Low gradient south to southwest slope on southwest extent of the SU. Exposures at approximately 10% and visibility at 30%. Vegetation is predominantly waist high scrub and grasses with occasional 2m high shrubs. Ground surface consists of firm, orange red, coarse sand matrix with quartz cobble inclusions. Subjected to vegetation clearance, erosion, railway line infrastructure and significant vehicle track disturbances.	 Survey Unit 59, landform overview, oriented northeast.	None recorded
SU60	Crest	A low hill crest. Exposures at approximately 30% and visibility at 20%. Vegetation is predominantly Chenopod scrubland. Ground surface is mostly skeletal soil profile with compacted, orangy red, coarse sand matrix in parts. Subjected to vegetation clearance, erosion and minor vehicle track disturbance. Artefacts visible on surface adjacent modern disturbance on upper slope to south of small Knoll, 20m off crest. Lots of high quality quartzite around outcropping as cobbles and gravels with no clear signs of use.		None recorded

Survey Unit (SU)	Landform Element Type	Description	Photos	Sites Located Within SU
SU61	Open Depression - Drain	A gentle slope, open depression drainage line transecting in a southeast /northwest direction at approximately 25m wide. Exposures at approximately 10% and visibility at 10%. Vegetation is predominantly Chenopod scrubland. Occasional quartz cobble within firm, deepening, orange red, coarse sand matrix. Subjected to vegetation clearance, erosion and vehicle track disturbance.		None recorded
SU62	Plain	Open plain, transitioning to northeast facing basal slope on the southwestern extent of the SU. Vegetation is predominantly Chenopod scrubland, chest high scrub and knee high grassland. Exposures at approximately 10% and visibility at 10% on the northeastern extent of the SU, transitioning to 20% exposure, 60% visibility on the southwestern extent of the SU. Ground surface is loose, deepening, orange red, coarse sand matrix on a base of compacted sand. Subjected to vegetation clearance, erosion, vehicle track disturbance, recreational activity and waste deposits.	 Survey Unit 62, landform overview, oriented east.	Broken Hill (ACAES) AFT 20

Survey Unit (SU)	Landform Element Type	Description	Photos	Sites Located Within SU
SU63	Slope - Lower (Gentle)	A northeast facing, to open, gentle basal slope. Exposures at approximately 20% and visibility at 40%. Vegetation is predominantly Chenopod scrubland, 3m high scrub and knee high grassland. Ground surface consists of intermittent quartz cobbles on firm, orange red, coarse sand matrix. Deep, sandy deposit on southwest margin of the SU (approx 1m). Subjected to vegetation clearance and erosion.		BH Site 32 now part of Broken Hill (ACAES) AFT 20
SU64	Slope - Mid- and Upper- (Steep)	A northeast facing steep mid and upper slope on the northeastern extent of the SU, transitioning to a southeast facing slope on the southern extent of the SU. Exposures at approximately 10% and visibility at 50%. Vegetation is predominantly Chenopod scrubland and occasional 2.5 - 3m shrubs. Ground surface consists of predominantly rocky outcrops with quartz and gneiss pebbles in firm, orange red, coarse sand matrix in pockets. Subjected to vegetation clearance and erosion.		None recorded
SU65	Crest	A steep, rocky, hill crest with 2m high shrubs amongst rocky exposures.		None recorded

Survey Unit (SU)	Landform Element Type	Description	Photos	Sites Located Within SU
SU66	Open Depression - Drainage Line	A steep sided ephemeral drainage line oriented in a northwest to southeast direction. Exposures at approximately 40% with 40% visibility characterised by large quartz and quartzite exposures on northeastern slope and nil exposure amongst the large rocky outcrops on the southwestern slope. Vegetation is dense, predominantly chest high scrub to 3m high shrubs. Ground surface is very rocky.	 Survey Unit 66, landform overview, oriented southeast.	None recorded

Survey Unit (SU)	Landform Element Type	Description	Photos	Sites Located Within SU
SU67	Slope - Mid- and Upper- (Steep)	A southeast, transitioning to south facing steep slopes. Exposures (10%) of loose, sandy profile (40% visibility) amongst extensive granitic outcrops. Vegetation is predominantly chest high scrub and 3m high shrubs.	 Survey unit 67, landform overview, oriented southwest.	BH Site 31; BH Site 42; BH Site 43
SU68	Open Depression - Shallow Drainage Line	An open, shallow ephemeral drainage area oriented north/south. Exposures at approx. 10% and 30% visibility. Vegetation is predominantly thick expanses of Pattison's Curse amongst 3m high shrubs. Ground surface is mostly loose orange red, coarse sand. Subjected to vegetation clearing and erosion.		None recorded

Survey Unit (SU)	Landform Element Type	Description	Photos	Sites Located Within SU
SU69	Slope - Lower (Gentle)	A northeast facing gentle slope. Granitic outcrops filled with deposits of soft, silty, red, coarse sand. Exposures at approximately 10% and visibility at 30%. Vegetation is predominantly Chenopod scrubland, 2m high scrub and knee high grassland. Ground surface consists of quartz cobbles in coarse, loose, orange red, sand matrix. Subjected to vegetation clearance and erosion.	 Survey Unit 69, landform overview, oriented north.	None recorded
SU70	Knoll	A steep, rocky, hill crest with 2m high shrubs amongst rocky exposures.		None recorded

Survey Unit (SU)	Landform Element Type	Description	Photos	Sites Located Within SU
SU71	Slope - Mid- and Upper- (Steep)	A southwest facing steep slopes. Exposures (10%) of looses sandy profile (40% visibility) amongst extensive granitic outcrops. Vegetation is predominantly chest high scrub, grasses and 3m high shrubs.	 Survey Unit 71, landform overview, oriented north.	Broken Hill (ACAES) AFT 30
SU72	Slope - Lower (Gentle and Undulating) lower slopes	A south by southeast facing gentle slope. Granitic outcrops filled with deposits of soft, silty, red, coarse sand. Exposures at approximately 10% and visibility at 30%. Vegetation is predominantly Chenopod scrubland, 2m high scrub and knee high grassland. Ground surface consists of quartz cobbles in coarse, loose, orange red, sand matrix. Subjected to vegetation clearance, erosion and extensive vehicle track disturbance.		None recorded

Survey Unit (SU)	Landform Element Type	Description	Photos	Sites Located Within SU
SU73	Plain	Open plain in a re-vegetation area on the western margin of the SU with 5% exp, 30% viz. The area is highly vegetated with low shrub and 2 to3 m native plants. NE extent of SU is a highly modified landscape from airfield infrastructure construction and vehicle tracks/roads. NE margin of SU is also characterised by highly modified landscape and extensive area of land disturbance and refuse dumping.	 Survey Unit 73, landform overview, oriented northwest.	AHIMS #23-4-0682
SU74	Open Depression - Creek Line	A second order, gently sloped, ephemeral creek line transecting in a north/south direction at approximately 50m wide. Exposures at approximately 5% and visibility at 30%. Dense vegetation is predominantly knee high grassland and dense 2 - 3m high thick revegetation. Ground surface consists of quartz cobbles in coarse, loose, orange red, sand matrix. Subjected to vegetation clearance and erosion.		Broken Hill (ACAES) AFT/HTH 22

Survey Unit (SU)	Landform Element Type	Description	Photos	Sites Located Within SU
SU75	Plain	A densely vegetated plain on the eastern extent of the SU with chest to 2.5m high scrubland. Vegetation is somewhat clearer Chenopod scrubland, waist high scrub and grasses in the mid SU. The western extent of the SU is characterised by increasing shrub density and less ground cover compared to the eastern extent and poor viz. Eastern extent of SU is characterised by exposures at 20% and visibility at 30%. Mid SU is 40% exposures with 30% visibility and the western extent has exposures at 80% with 10% visibility due to limited disturbances into lower deposits. Ground surface in mid SU has areas of naturally outcropping of sandstone blocks and calcrete gravels and western extent comprises of loose, fine, orange red, coarse sand containing small cobbles.	 Survey Unit 75, landform overview, oriented west.	Broken Hill (ACAES) AFT 23; Broken Hill (ACAES) AFT 25; Broken Hill (ACAES) HTH 26

Survey Unit (SU)	Landform Element Type	Description	Photos	Sites Located Within SU
SU76	Slope - Mid- and Upper- (Gentle)	A south facing side of low knoll and includes slopes and crest. Exposures vary from 30% to 95% and visibility varies from 10% to 60%. Ground surface consists of quartz cobbles and calcrete nodules in coarse, compacted, orange red, sand matrix. Dense vegetation is predominantly knee high grassland and waist high shrubs. The SU is impacted by vegetation clearing, erosion, farming infrastructure and vehicle track disturbances.	 Survey Unit 76, landform overview, oriented southeast	

Survey Unit (SU)	Landform Element Type	Description	Photos	Sites Located Within SU
SU77	Slope - Lower (Gentle)	A west facing gentle slope descending toward the highway. Exposures at approximately 10% and visibility at approximately 40%. Ground surface consists of quartz cobbles and calcrete nodules in coarse, compacted, orange red, sand matrix. Dense vegetation is predominantly knee high grassland and waist high shrubs. The SU is impacted by vegetation clearing, erosion, farming infrastructure and vehicle track disturbances. The northwest extent of the SU is characterised by roadside disturbance on road verge and thick vegetation.	 Survey Unit 77, landform overview, oriented west.	Broken Hill (ACAES) AFT 41

Survey Unit (SU)	Landform Element Type	Description	Photos	Sites Located Within SU
SU78	Plain	A west facing very gentle slope, to open plain. Exposures at approximately 20% and visibility at approximately 70%. Ground surface consists of quartz cobbles and calcrete nodules in coarse, compacted, orange red, sand matrix. Vegetation is predominantly knee high grassland and waist high shrubs. The SU is impacted by vegetation clearing, erosion, and vehicle track disturbances.	 Survey Unit 78, landform overview, oriented west.	Broken Hill (ACAES) HTH 27; Broken Hill (ACAES) AFT 38; Broken Hill (ACAES) HTH 39; Broken Hill (ACAES) AFT 40
SU79	Open Depression - Drain Line	A first order, gently sloped, ephemeral drain line transecting in a northeast/southwest direction at approximately 15m wide. Dense vegetation cover resulting in exposures at approximately 5% and visibility at 10%.		None recorded

Survey Unit (SU)	Landform Element Type	Description	Photos	Sites Located Within SU
SU80	Slope (Gentle)	A very gentle slope and small crest. Nil exposures or visibility on northwest extent of the SU due to dense vegetation cover. Exposure of 50% and visibility of 80% on the southeastern extent of the SU where the vegetation is charaterised by sparse ankle high shrubs and grasses. Ground surface is characterised by quartz gravel held in a coarse grain, loose, orange red sandy matrix. The SU is impacted by vegetation clearing, erosion, HV powerline infrastructure and significant vehicle track disturbances.	 Survey Unit 80, landform overview, oriented west.	Broken Hill (ACAES) AFT 28
SU81	Open Depression - Creek Line	A first order, gently sloped, ephemeral creek line transecting in a northeast/southwest direction at approximately 10m wide. Dense vegetation cover resulting in exposures at approximately 5% and visibility at 10%.		None recorded

Survey Unit (SU)	Landform Element Type	Description	Photos	Sites Located Within SU
SU82	Plain	A disturbed landscape, possibly graded southwest facing gentle slope associated with southwest/northeast transecting pipeline located at southeast extent of the SU. Exposures at approximately 5% and visibility at approximately 10%. Ground surface consists of quartz cobbles in coarse, firm, orange red, sand matrix. Vegetation is predominantly knee high grassland and waist high shrubs.	 Survey Unit 82, landform overview, oriented west.	Broken Hill (ACAES) AFT 34; Broken Hill (ACAES) AFT 35; Broken Hill (ACAES) AFT 36; Broken Hill (ACAES) AFT/HTH 37
SU83	Open Depression - Drain	A gently sloped, ephemeral drain line transecting in a northwest/southeast direction at approximately 5m wide. Dense vegetation cover resulting in exposures at approximately 5% and visibility at 10%.		None recorded

Survey Unit (SU)	Landform Element Type	Description	Photos	Sites Located Within SU
SU84	Plain	A highly disturbed landscape on northwest margin of the SU from vehicle tracks and equipment storage yard. An ephemeral water drain transecting north/south located mid SU associated with knee high vegetation cover resulting in 10% exposure and 10% visibility from mid SU to the southeastern extent of the SU. Vegetation is mostly 1.8m high shrub and high density of knee high shrubs impacting on visibility of the surface. Ground surface id a loose, coarse, orange red sand matrix.	 Survey Unit 84, landform overview, oriented southwest.	Broken Hill (ACAES) AFT 29
SU85	Open Drain - Creek Line	An gentle sloped creek line transecting northwest to southeast at approximately 15m wide. Vegetation is dense waist high shrubs interspersed with ankle high grasses, Exposures are approximately <5% and <5% visibility. Ground surface is a coarse, loose, red, sandy soil matrix @>30cm deposit.		None recorded

Survey Unit (SU)	Landform Element Type	Description	Photos	Sites Located Within SU
SU86	Plain	A highly disturbed landscape on northwest margin of the SU from vehicle tracks, fences, HV infrastructure and deep water tanks. Dry cracked landscape evident between vegetation cover in mid section of SU. Vegetation is mostly knee high dense scrub. Exposures at 10% and visibility at 60% on SE margin of the SU, on the southern side of Pinnacles Road.	 Survey Unit 86, landform overview, oriented southeast.	AHIMS # 23-4-0640; AHIMS #23-4-0641

APPENDIX 3 – PHASE 2 SURVEY UNIT DESCRIPTIONS

Survey Unit 87

Survey Unit 87 (SU87) in the north of the phase 2 survey area comprises an undulating alluvial plain between the basal slopes of rocky ridges with braided drainage, and a deeper incised unnamed creek channel and drainage depression running northeast to Willa Willyong Creek.

Exposures were moderate to high (60%) and visibility generally good (60-80%) across this survey unit, vegetation was sparse grasses and groundcover with occasional shrubs and small trees. Exposures in erosion scours and drainage lines showed sandy silt deposits up to 50cm depth on clay and bedrock with surface quartz and schist gravels.

Disturbance associated with aeolian, and alluvial activity, sheetwash and gullying erosion was observed as well as mining activity, vehicle tracks and historic and modern rubbish scattered throughout the survey unit (Plate 1 and Plate 2).

No previously recorded AHIMS sites were located in this survey unit, two new sites BH 46, an artefact site comprising eight discrete scatter locations and a potential hearth, and BH47, a potential hearth, were located in this survey unit. There is low to moderate potential for subsurface Aboriginal objects to be located on this landform due to the presence of surface artefacts and depth of deposit observed. There is a low potential for intact cultural deposits due to the dynamic nature of the landform which is subject to erosional and depositional activity associated with alluvial, colluvial and aeolian processes.

Plate 1 Looking south from the western extent of the survey area in SU87, showing vegetation coverage gullying erosion and vehicle track disturbance.

Plate 2 Windrows associated with prospecting in SU87 northwest in the phase 2 area.

Survey Unit 88

Survey Unit 88 (SU88) in the north of the phase 2 survey area comprises a gentle to moderately graded slope to a rocky ridge with a northwest aspect.

Exposures were moderate to high (60%) and visibility generally good (70-80%) across this survey unit, vegetation was sparse grasses and groundcover with occasional shrubs. Exposures in erosion

scours showed shallow sandy silt deposits, often exposed to bedrock with surface quartz and schist gravels, cobbles and boulders, and outcrops.

Disturbance associated with aeolian, and colluvial activity and sheetwash was observed as well as mining activity, vehicle tracks and historic stone structures (Plate 3 and Plate 4).

No previously recorded AHIMS sites were located in this survey unit, no new sites were recorded. There is a very low potential for intact cultural deposits on the mid and upper slopes, due to the shallow deposits observed and the dynamic nature of the landform which is subject to erosional and depositional activity associated with colluvial and aeolian processes. There is low moderate potential for subsurface deposits to occur on the gentle lower slope at the transition to the alluvial plain landform in undisturbed areas.

Plate 3 Looking east upslope at historic stone structure footings in SU88.

Plate 4 Looking south at a quartz outcrop in SU88.

Survey Unit 89

Survey Unit 89 (SU89) in the centre of the phase 2 survey area comprises a rocky ridge crest in a northeast to southwest direction.

Exposures were moderate to high (50-80%) and visibility generally good (80%) across this survey unit, vegetation was sparse grasses and groundcover with occasional shrubs. Exposures in erosion scours showed shallow sandy silt deposits, often exposed to bedrock with surface quartz and schist gravels, cobbles and boulders, and outcrops (Plate 5). In occasional discrete locations the ground surface was densely covered in quartz gravels (80%-90%) inhibiting our ability to identify quartz artefacts, if present.

Disturbance associated with aeolian, and colluvial activity and sheetwash was observed as well as vehicle tracks.

Two previously recorded AHIMS sites were located in this survey unit. AHIMS 23-5-0127, stone quarry site, was relocated during the survey, AHIMS 23-5-0140 artefact site was not relocated. One new artefact scatter site BH48, was recorded. There is a very low potential for intact cultural deposits on the crest, due to the shallow deposits observed and the dynamic nature of the landform which is subject to erosional and depositional activity associated with colluvial and aeolian processes.

Plate 5 Looking northeast on crest showing ground surface exposure and outcropping bedrock in SU89.

Survey Unit 90

Survey Unit 90 (SU90) in the south of the phase 2 survey area comprises a gentle to moderately graded slope to a rocky ridge with a southeast aspect.

Exposures were moderate to high (60%) and visibility generally good (70-80%) across this survey unit, vegetation was sparse grasses and groundcover with occasional shrubs. Exposures in erosion scours showed shallow sandy silt deposits, often exposed to bedrock, with surface quartz and schist gravels, cobbles and boulders, and outcrops.

Disturbance associated with aeolian and colluvial activity and sheetwash was observed as well as mining activity, exploration drilling, machine earthworks and vehicle tracks (Plate 6 and Plate 7).

Four (4) previously recorded AHIMS sites were located in this survey unit. AHIMS 23-5-0120, stone quarry site, and AHIMS 23-5-0141, artefact site, were relocated during the survey. AHIMS 23-5-0138 and AHIMS 23-5-0139, artefact sites, were not relocated. There is a very low potential for intact cultural deposits on the mid and upper slopes, due to the shallow deposits observed and the dynamic nature of the landform which is subject to erosional and depositional activity associated with colluvial and aeolian processes. There is moderate potential for subsurface deposits to occur on the gentle lower slope at the transition to the alluvial plain landform, however this location was highly disturbed by machine activity, vehicle tracks and mining activity.

Plate 6 Looking east on at slope with machine cutting in SU90.

Plate 7 Looking northwest on slope in SU90, showing machine activity disturbance, likely associated with nearby drilling exploration activities.

Survey Unit 91

Survey Unit 91 (SU91) in the north of the phase 2 survey area comprises an undulating alluvial plain between the basal slopes of rocky ridges with braided drainage, and a deeper incised unnamed creek channel and drainage depression running northeast to Willa Willyong Creek.

Exposures were moderate to high (60%) and visibility generally good (60-80%) across this survey unit, vegetation was sparse grasses and groundcover with occasional shrubs and small trees. Exposures in erosion scours and drainage lines showed sandy silt deposits of 1 to 2m depth on clay and bedrock with surface quartz and schist gravels (Plate 8). In occasional discrete locations the ground surface was densely covered in quartz gravels (80%-90%) inhibiting our ability to identify quartz artefacts, if present (Plate 9).

Disturbance associated with aeolian, and alluvial activity, sheetwash and gullying erosion was observed as well as fencing, dams, mining activity, exploration drilling, vehicle tracks and historic and modern rubbish scattered throughout the survey unit (Plate 10).

Six (6) previously recorded AHIMS sites were located in this survey unit. AHIMS 23-5-0123, BH site 9 associated with 23-5-0153 and 23-5-0154, artefact sites, were relocated during the survey. AHIMS 23-5-0125 and 23-5-0126 were not relocated during the survey. Three (3) new sites, BH site 51, artefact scatter and hearth site, BH site 52 hearth site, and BH sites 53 and 54, artefact scatter sites, were recorded in the survey area. There is low to moderate potential for subsurface Aboriginal objects to be located on this landform due to the presence of surface artefacts and depth of deposit observed. There is a low to moderate potential for intact cultural deposits due to the dynamic nature of the landform which is subject to erosional and depositional activity associated with alluvial, colluvial and aeolian processes.

Plate 8 Looking south at exposed bed rock in the creek bed in SU91 in the south of the project area, showing depth of deposit.

Plate 9 Looking east at a discrete area of dense quartz gravels on the ground surface in SU91, impacting visibility and ability to identify artefactual material from naturally fractured material.

Plate 10 Looking south at pitting and spoil piles associated with historic prospecting activity in SU91 in the south of the project area.

Survey Unit 92

Survey Unit 92, in the southwest corner of the phase 2 survey area, is located on a very gentle north facing slope transitioning to the alluvial plain and drainage depression landform to the northeast.

Exposures and visibility were moderate (50%) in this survey unit. Vegetation comprised groundcover, small shrubs and grasses. Exposures in sheetwash and gullying erosion showed shallow silty sands with gravels on bedrock, occasional bedrock outcrops occur on this landform (Plate 11).

Disturbance associated with aeolian and colluvial activity, sheetwash and gullying erosion was observed (Plate 12).

No previously recorded AHIMS sites were located in this survey unit, additional artefacts associated with previously recorded BH Site 9, associated with AHIMS 25-3-0153, were recorded in this survey unit. There is a low potential for intact cultural deposits on slopes, due to he shallow deposits observed and the dynamic nature of the landform which is subject to erosional and depositional activity associated with colluvial and aeolian processes. There is moderate potential for subsurface deposits to occur on the gentle lower slope at the transition to the alluvial plain landform, and potential for intact deposits in undisturbed areas.

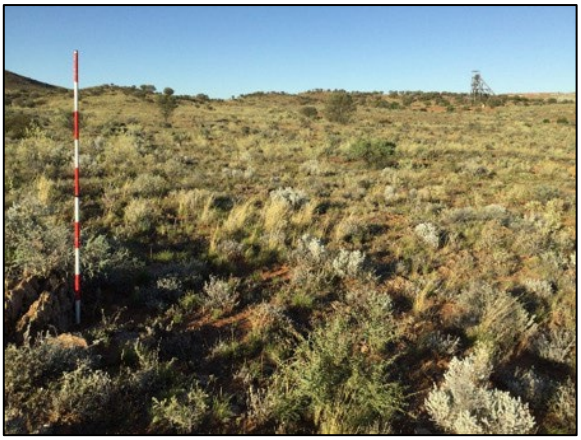


Plate 11 Looking southwest on slope in SU92, showing vegetation ground coverage and outcropping bedrock.

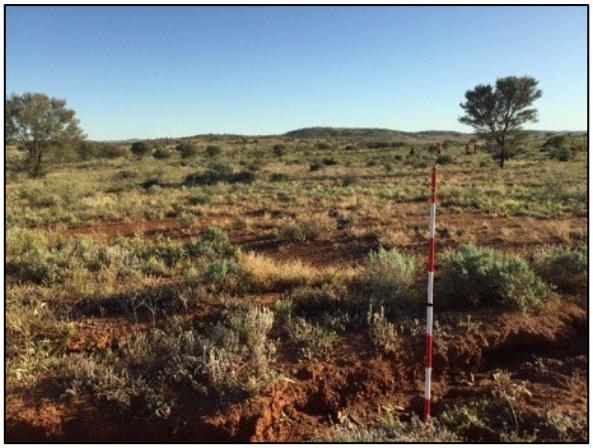


Plate 12 Looking north in SU91, showing gullying erosion in shallow deposit.

APPENDIX 4 – SILVER CITY ENERGY STORAGE PROJECT TEST EXCAVATION METHODOLOGY

A copy of the Silver City Energy Storage Project Test Excavation Methodology is provide as a separate document.

APPENDIX 5 – SILVER CITY ENERGY STORAGE PROJECT TEST EXCAVATION REPORT

TEST EXCAVATION REPORT

13 INTRODUCTION

As recorded in the Silver City Energy Storage (SCES) Project Archaeological report, the initial assessment in August 2022 recommended a program of archaeological test excavation at seven test zones representing four different landform types comprising of surface sites with areas of potential archaeological deposit (PAD) to determine the nature, extent and archaeological significance of each site/test zone.

The numbering of the Test Zones is arbitrary and based on recordings made during the initial field survey.

An archaeological test excavation program following the *Code of Practice for the Archaeological Investigation of Aboriginal Objects in New South Wales 2010* was undertaken within:

- Test Zone 2 (PM-IF6/AHIMS #23-5-0131),
- Test Zone 4 (Broken Hill (ACAES) AFT 14/AHIMS #23-4-0178),
- Test Zone 5 (Broken Hill (ACAES) AFT 18/AHIMS #23-5-0169),
- Test Zone 6 (Broken Hill (ACAES) AFT 20/AHIMS #23-4-0697),
- Test Zone 9 (Kanandah 1/AHIMS #23-4-0640),
- Test Zone 10 (FD-IF7/AHIMS #23-5-0153) and
- Test Zone 11(Broken Hill (ACAES) AFT 28/AHIMS #23-4-0701)

14 TEST PIT LOCATION METHODOLOGY

The landforms within the Project Area identified for test excavation included:

- plains, leading to/from shallow, ephemeral creeks;
- plains leading to/from undulating terrain with rocky, granitic outcrops;
- plains leading to/from deeply incised, second order ephemeral creek lines; and
- open depression, deeply incised, third order creek line.

Based on the landforms identified above for test excavation, a series of test zones were used to characterise the subsurface deposit of each landform. The proposed test zones were determined to have the highest archaeological potential for each landform type within the Project Area. Test zone 2 is the exception as it has moderate archaeological potential. As such this zone was included in excavation to test the validity of predictive model. Please note that Test zone 6 also contains the location of proposed underground cable.

The proposed test zones for each landform and tested sites are shown in Table 11.

Table 11: Landform test zones and recorded sites

Landform	Test Zone	Tested sites
plains, leading to/from shallow, ephemeral creeks	2, 9 and 11	#23-5-0131, #23-5-0640 and BH (ACAES) AFT 28 (#23-4-0701)
plains leading to/from undulating terrain with rocky, granitic outcrops	6 – underground cable	BH AFT 20 (#23-4-0697)
plains leading to/from deeply incised, second order ephemeral creek lines	4 and 5	BH AFT 14 (#23-5-0178) and BH AFT 18 (#23-5-0169)
open depression, deeply incised, third order creek line	10	#23-5-0153

The aim of this test program was to hand excavate a minimum of 8 test pits across each test zone with a minimum of 3 test pits at test zone 2, representing 4 landforms, to help confidently predict the archaeological nature of each landform type. The test pit locations and numbers were finalised in the field and the test pit location grids were used as an infield guide. Test pits were located on transects with intervals between pits ranging from 20m to 40m depending on field conditions. The exact location and number of individual test pits was determined during fieldwork in consultation with the RAPs.

The overall objectives of the testing program were to:

- Collect information about the nature, extent, and integrity of subsurface archaeological deposit in order to assess the significance of the deposits and develop appropriate mitigation methods,
- Test validity of predictive model through excavation of areas of moderate PAD (zone 2); and
- Determine whether additional salvage excavation may be required prior to construction.

15 ADDITIONAL TEST PIT LOCATIONS

Additional test pits were excavated to assist with investigation of the archaeological nature of each landform type. The additional pits were added during the test excavation program in consultation with the RAPs in the following zones:

- Test zone 2 – five additional pits due to the identification of a number of new artefact scatters on the same landform to the northeast during the phase 2 survey.
- Test zone 5 - one additional pit to investigate the integrity of the subsurface deposits at the confluence between two creek lines in the south of the test zone.
- Test zone 6 – twelve additional pits to investigate the basal slope landform at the southwestern extent of the test zone, and to further explore concentrations of artefacts, both as an expansion of existing test units and as pits on additional transects to the original transect.
- Test zone 9 – one additional pit to further characterise the archaeological nature of this test zone.

16 TEST EXCAVATION RESULTS

A total of seventy (70) test pits were excavated across seven test zones within four landforms during archaeological test excavation for the Project. Figures 1 to 5 depict the test pit arrangements for each investigation location. The presence of subsurface artefacts was confirmed at four test zones – Zones 4, 5, 6 and 11 – and within three of the four landforms identified for testing, including:

- plains, leading to/from shallow, ephemeral creeks;
- plains leading to/from undulating terrain with rocky, granitic outcrops; and
- plains leading to/from deeply incised, second order ephemeral creek lines.

The contexts of the artefacts recovered are provided in Table 1. Fifteen of the seventy pits contained artefacts, and 69 artefactual specimens were recovered. Sixty-two (62) of these specimens (89.9%) were recovered from eleven pits within a 40m by 5m area in the southern end of testing zone 6 (Figure 8).

Subsurface artefacts were not located in the test pits excavated in test zones 2, 9 or 10, or within the open depression, deeply incised, third order creek line landform.

Descriptions and photographs for each pit are provided in Appendix 7 and artefact analysis data in Appendix 8. The densities of artefacts recovered are mapped in Figures 1-6 and a summary of results for each testing zone is provided below, grouped according to landform.

Table 2: The MNA (minimum number of artefacts) and NAS (number of actefactual specimens) counts of artefacts found during the test excavations. (Note: these counts are explained in the Artefact Analysis Section.)

Zone	Pit	Spit	NAS	MNF	Cores	MNA	MNA/m²	NAS/m²
4	3	1	1	1	0	1	12	12
		2	2	2	0	2		
	5	2	2	2	0	2	8	8
5	5	2	1	1	0	1	4	4
6	8	1	1	1	0	1	28	28
		2	5	5	0	5		
		3	1	1	0	1		
	9	1	2	1	0	1	4	8
	11	1	1	1	0	1	4	4
	12	1	1	1	0	1	4	4
	13	1	14	10	2	12	64	72
		2	4	4	0	4		
	14	1	3	1	1	2	20	28
		2	2	2	0	2		
		3	1	0	0	0		
		Pit clean	1	1	0	1		
	15	1	3	3	0	3	24	24
		2	1	1	0	1		
		3	2	2	0	2		
	16	1	1	1	0	1	4	4
	17	1	3	3	0	3	28	36
		2	4	2	0	2		
		3	2	2	0	2		
	19	1	3	2	0	2	12	16
		2	1	1	0	1		
	20	1	5	5	0	5	24	24
		2	1	1	0	1	4	4
11	4	7	1	0	1	1	4	4

16.1.1 Plains leading to/from shallow ephemeral creeks

16.1.1.1 Zone 2

Test Zone 2 is located on a north western facing basal slope and plain extending to a shallow second order ephemeral creek line transecting in a southwest/northeast direction. The area has been subjected to vegetation clearance, erosion and significant vehicle disturbance.

Pits 1, 2 and 3 were located on the basal slope of a low rocky ridge with a northwest aspect and had evidence of colluvial and alluvial wash activity. Numerous surface artefacts, hearths and potential hearth stones were located in the vicinity of these pits.

Additional Pits 4, 5 and 6 were located adjacent to a minor drainage line south east of the main creek line and pit 7 between this drainage line and the main creek line. These pits were located on a lag surface, resulting from alluvial and colluvial wash activity. Historic and modern debris was located

in a dump and throughout this area, including glass, metal and ceramic shards (Plate 1). Test pits were not placed in the southwest of the test zone as asbestos sheet fragments were observed in this area. Pit 6 was located adjacent to an area of bedrock outcropping.

It was hypothesised that more intact deposits may occur on the lower slope of the rocky ridge southeast of the testing zone. Pit 8 was located on the basal slope to the creek, in the vicinity of a low density surface artefact scatter as it was anticipated that the deposit may be more intact at this location (Plate 2).

All 8 pits had very shallow soils/deposits, likely due to topsoil loss from alluvial and colluvial wash. Deposits comprised sandy silt sediment transitioning to silty clay soils with gravel inclusions and calcrete overlying bedrock/degraded bedrock in pits 1, 2, 3, 6 and 8 and calcrete and cemented, silty clay in pits 4, 5 and 7 adjacent to the drainage line. The shallowest deposit was just 6cm deep in pit 5, adjacent to the drainage line, and the deepest profile was 40cm depth in pit 3 on the lower basal slope. The other pits were excavated to 20-35cm depth onto calcrete and bedrock/degraded bedrock or cemented clays. No artefacts were recovered from this test zone.

Based on test excavation results, the archaeological potential of this test zone was revised from moderate-high to low.

Plate 17 Historic dump in test zone 2.

Plate 18 Looking southeast from creek towards test pit 8 showing exposed bedrock in shallow creek bed.

16.1.1.2 Zone 9

Test zone 9 is located on a plain sloping very gently west south west to an unnamed, non-perennial shallow and meandering creek. Vegetation coverage is dense, mostly knee-high saltbush scrub, small trees and grasses. Disturbance is evident across the test zone including waterpipe lines, a transmission line, mining exploration drilling sites, rubble piles, informal vehicle tracks, and small waterholes (approximately 5m diameter) which may be associated with natural flooding inundation or possibly man-made borrow pits for backfilling pipeline trenches and areas of deflation which may be natural or associated with machine activity for transmission line construction (Plate 3). The ground surface is covered with small gravels and blocky pegmatite and some background quartz of varying quality for knapping. Very occasional surface artefacts were visible on the surface within the flood wash zone in proximity to the creek line, it is not likely these artefacts are in-situ.

Plate 19 Looking east towards pit 8 showing buried water pipeline and powerlines in test zone 9.

The test pits were spaced approximately 40m along a northwest to southeast transect. Pits 1 and 2 in the northwest of the test zone were located near low rocky outcrops of granitic schist and pegmatite. Pits 7 and 8 in the southeast of the test zone were located in an outwash area that would likely flood or become inundated during a rain event. Pit 7 was located on a rise adjacent to a dry, shallow waterhole or borrow pit.

An additional pit (pit 9), was located in this test zone on an area of higher ground closer to the creek line with possible integrity due to its locally elevated location out of the flood zone.

All 9 pits were fairly shallow, likely due to topsoil loss from human disturbance and alluvial activity, however this activity also caused aggrading of deposits, such as lenses of deposited alluvial gravel and sand sediments observed in pit 7. The test pits were characterised by sandy silt deposits with gravel inclusions transitioning to stone free red silty clay soils, overlying calcrete, bedrock and degraded bedrock. Bedrock was as shallow as 8cm in pit 2 and 15cm in pit 1, at the north western end of the test zone, but pits were generally excavated to bedrock at 30-40cm depth, with the deepest profile in pit 6 to 43cm depth. No artefacts were recovered from this test zone.

The archaeological potential of this test zone was revised from moderate-high to low following test excavation.

16.1.1.3 Zone 11 -

Test zone 11 is located on a small crest and very gentle slope with a south east aspect between two creek lines, with a low-lying swampy area adjacent north east at the eastern end of the test zone. Vegetation in the test zone is charaterised by sparse ankle high shrubs and grasses, acacia and salt bush and sparse small eucalyptus trees. The ground surface is characterised by surface quartz gravel on a coarse grained, loose and soft red sandy matrix. Disturbance in this test zone includes vegetation clearing, erosion, adjacent transmission infrastructure, significant vehicle track disturbance and modern rubbish from the mid-1950s to present. Surface artefacts were visible in low densities (approximately one artefact per 5-10m^2) across the test zone, with slightly higher density in the north west of the test zone (approximately one artefact pre 2m^2) (Plate 4).

Plate 20 Looking north towards pit 1 showing surface artefact locations (white marker paint spots) in test zone 11.

The test pits were spaced approximately 30-40m along a northwest to southeast transect. Test pit 1 in the north west was located in the area of higher density artefact scatter, comprising silcrete and quartz artefacts (Plate 4). Test pit 8 was located in proximity to the creek and a low-lying swampy area in the south east of the test zone. Test pits 1 to 4 were located higher on the slope, with a slightly steeper drop after test pit 4, test pits 5 to 8 are approximately 9 metres lower in elevation.

All 8 pits were fairly shallow, and comprised sandy silt transitioning to silty clay with gravel inclusions, overlying calcrete and bedrock, clay or degraded bedrock. The pits were generally, 30-40cm depth, with the deepest pit at 57cm depth on bedrock in pit 6. One artefact was recovered at 30-35cm depth in pit 4, this pit was excavated to 45cm depth into the clay profile to ensure no artefacts had moved down into this context.

Based on test excavation results, the archaeological potential of this zone was revised from moderate to low.

16.1.1.4 Summary

Despite a surface expression of artefacts on this landform across all three test zones, there was only one subsurface Aboriginal object located during the test excavation. This landform type is dynamic, subject to erosional and depositional activity associated with alluvial, colluvial and aeolian processes.

All the test zones have been subject to varying levels of disturbance associated with human activity such as vehicle and machine activity, mining, transmission line construction, water pipeline construction and rubbish pits. Surface and subsurface artefacts and deposits located in this landform are unlikely to have vertical spatial integrity. Artefacts and artefact bearing deposits located in proximity to creeks and drainage lines are not likely to be in-situ, but rather to have been eroded and deposited during flood activity. Artefact scatters on lag surfaces on the plains subject to deflation, aeolian processes or lower flow inundation or wash activity are also disturbed, but may have more spatial integrity, in that they have not moved as far from their original deposited location.

Undisturbed or less disturbed areas in discrete areas of locally elevated topography within the plain landforms, such as the slopes to the rocky ridge within and adjacent southeast to test zone 2, the small raised area adjacent to the creek in test zone 9 in the vicinity of test pit 9 and the higher elevation slope in the north west of test zone 11 (between pits 1 to 4) have potential for intact deposits to occur. However, the only subsurface artefact located on these landform features was in pit 4 in zone 11.

Within the Project Area, the archaeological potential of the landform comprising plains leading to/from shallow ephemeral creeks is revised to low.

16.1.2 Plains leading to/from undulating terrain with rocky, granitic outcrops

16.1.2.1 Zone 6

Test zone 6 is located across an open plain, transitioning to a northeast facing basal slope at the southwestern extent and a minor drainage line and gentle slope with a south east aspect to a crest adjacent east to the test zone at the north eastern extent. This drainage line and slope were not tested during the test excavation. Vegetation coverage is predominantly scrub and grassland with fairly dense ground cover and small mature trees. On the plain the ground surface is a loose, red, coarse sand matrix on a base of compacted sand and on the basal slope intermittent quartz cobbles on a firm, red coarse sand matrix with exposed schist bedrock outcrops. Surface artefacts are located throughout the test zone.

This test zone has been subject to past disturbance associated with vegetation clearance, erosion, vehicle track disturbance, including track and drain construction, recreational activity and waste deposits. Historic rubbish and rubbish heaps (up to 2m by 2m and less than 1m high) comprising building rubble, ceramic, glass and metal refuse were observed throughout the test area on the plain (Plate 5). Earthworks associated with rifle range construction have disturbed the south western extent of the test area on the plain landform (Plate 6). Disturbance on the slope includes vegetation clearance and associated colluvial activity and water wash erosion. Test pits were located in areas that appeared less modified.

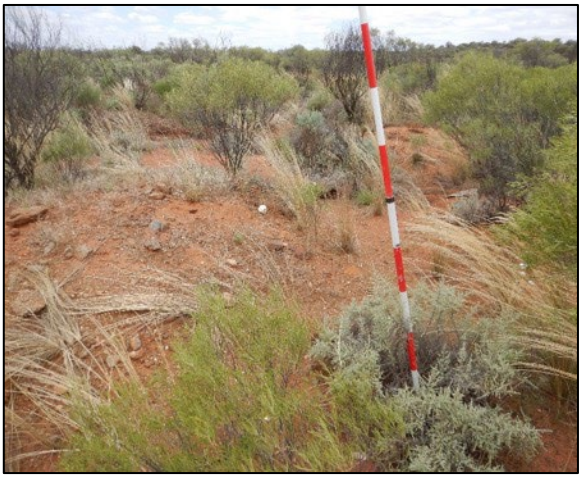


Plate 21 Example of building rubble dump pile near pit 6 in test zone 6.

Plate 22 Looking north at rifle range stop butt construction and pit 18 in test zone 6.

Pits 1-7 were located on the northern end of the plain in the test zone, pits 1 to 3 north east of the road and drain disturbance and pits 4 to 7 south west of the road and north east of the rifle range. Pits 8 to 20 were located south west of the rifle range on the southwestern extent of the test zone. Pits 16-18 and 20 were located on the plain transitioning to the northeast facing basal slope. Pits 8 and 9, 12 to 15 and 19 were located on the lower slope of the basal slope landform and Pits 10 and 11 were located upslope. Bullets were recovered at 0-10cm depth from pits 9 and 12.

Pits 1-7 were shallow, comprising sandy silt transitioning to silty clay, with gravel inclusions, overlying calcrete and basal clay at 20-40cm depth. No artefacts were recovered from these pits.

Pits 16-18 and 20 had generally shallow deposits of sandy silt transitioning to silty clay, with gravel inclusions, overlying calcrete and basal clay at 20-50cm depth, with the deepest deposit at 50cm depth in pit 17. One quartz flake was located at 0-10cm depth in pit 16 and pit 20, nine (9) quartz flakes were located in pit 17 between 0 and 30cm depth.

Pits 10 and 11 were located upslope on the basal slope landform and comprised very shallow deposits of sandy silt on bedrock. Pit 10 was excavated to bedrock at 7 to 18cm depth and pit 11 was excavated to bedrock at 3-9cm depth. One (1) white quartz flake was recovered from pit 11.

Pits 8, 9, 12, 13, 14, 15 and 19 were located on the lower slope of the basal slope landform and comprised shallow deposits of clayey silt or sandy silt, transitioning to silty basal clay with calcrete and gravel inclusions and degraded bedrock at 24 to 32cm depth. Four (4) white quartz flakes were recovered from pit 19 at 0-24cm depth and seven (7) white quartz flakes were recovered from pit 8 between 0-28cm depth.

Additional Pits 9, 13, 14 and 15 were excavated as an expansion of pit 8 due to the high number of artefacts recovered from pit 8 (Plate 7).

Plate 23 Looking north at pits 8, 9, 13, 14 and 15 at base of excavation.

Potential hearth stones were located in the east of pits 13 and 15, excavation ceased at 28cm depth in pit 13 and at 20cm depth in the east of pit 15 due to the potential for a hearth to be located in these pits. A total of thirty-three (33) additional artefacts were recovered from 0-30cm depth from the expansion of pit 8. The artefacts were predominantly white quartz flakes, as well as two (2) white quartz cores which were recovered at 0-10cm depth in pits 13 and 14 and one (1) crystal quartz flake at 0-10cm depth in pit 13. The highest density of artefacts was eighteen (18) artefacts in pit 13.

Based on test excavation results, the archaeological potential of this zone was revised from moderate to moderate-high at the southwestern end. The rest of the zone is considered to have low archaeological potential.

16.1.2.2 Summary

Numerous surface artefacts are located across this test zone, however no subsurface Aboriginal objects were located during the test excavation of pits 1-7 on the plain landform. This landform has been subject to erosional and depositional activity associated with water wash and aeolian processes, and has also been subject to varying levels of disturbance associated with vegetation clearing, vehicle track and drain construction, vehicle and machine activity, including major earthworks and rubbish dumping. The surface artefact scatters on this landform are likely located on lag surfaces subject to deflation, aeolian processes or lower flow inundation or wash activity resulting in a loss of topsoil.

The northeast facing basal slope in the southwest of the test zone, and transition to the plain at the base of this slope is evidenced to have subsurface artefacts, up to 30cm depth, in densities up to 72 artefacts per square metre. Where these subsurface artefacts were recovered is a sheltered

location on the basal slope which would lend itself to comfortable occupation. This landform has been subject to colluvial activity, vegetation clearance and erosion. These deposits may have some integrity, but there has likely been topsoil loss, and disturbance of upper sediments, as well as downward movement of artefacts through the profile with bioturbation and cracking clays during wetting and drying. Two bullets, associated with the adjacent rifle range, were located at 0-10cm depth in pits 9 and 12.

Surface and subsurface artefacts and deposits located in the plain landform are unlikely to have spatial integrity. Undisturbed areas in discrete areas of locally elevated topography within the plain landforms, such as the basal slope in the southwest of the test zone, and the base of the slope in the north of the test zone (which was not tested) have potential for intact deposits to occur. Subsurface artefacts have been shown to occur in moderate to high densities on the basal slope landform and in lower densities on the adjacent plain landform at the transition to the slope. As such the archaeological potential of the southwest and north of test zone 6 is revised to moderate-high.

16.1.3 Plains leading to/from deeply incised, second order ephemeral creek lines

16.1.3.1 Zone 4

Zone 4 is located on a plain and east facing to open gentle basal slope between two drainage lines. The second order creek line the north of the test zone is ephemeral and incised up to 2m deep, transecting in an east west direction at approximately 20m wide. Vegetation is predominantly scrubland with occasional shrubs and young eucalypts. The ground surface has occasional sandstone and quartz cobbles, very occasional schist outcropping bedrock and numerous quartz, crystal quartz and silcrete surface artefacts. This zone has been subject to vegetation clearance, erosion and haul road vehicle track disturbances (Plate 8). Frequent historic and modern debris is scattered throughout the test zone including metal, modern and historic glass fragments,

Plate 24 Looking south at pits 4-8 in test zone 4, showing frequent surface gravels and artefacts and vehicle track disturbance.

Test pits 1-4 were located on a lag surface, pit 1 was located north of the drainage line at the northern extent of the test zone, pits 2-4 were located south of the drainage line, outside of haul road and vehicle track disturbance areas. Test pits 5-8 were located on a slight rise south southeast in an area with exposed schist bedrock outcrops and decreasing surface artefacts.

Pits 5-8 were shallow sandy silt transitioning to silty clays with frequent gravel and schist/gneiss fragments, overlying calcrete, clay and degraded schist bedrock, appearing from 10-30cm depth. Two artefacts were recovered from pit 5 at 10-20cm depth.

Pits 1-5 were similar but deeper profiles, with degraded bedrock at 40-70cm depth. One white quartz and two crystal quartz artefacts were recovered from pit 3 at 10-30cm depth.

Based on test excavation results, the archaeological potential of this zone was revised from high to moderate.

16.1.3.2 Zone 5

Zone 5 is located on an open creek flat north of a spur at the confluence of a second order, deeply incised, ephemeral creek line transecting in a northwest/southeast direction at approximately 10m wide and first order, gently sloped, ephemeral creek line transecting in a west/east direction at approximately 5m wide. The creek flat and gentle slope south of the drainage lines are included in this test zone, but were not tested during this excavation, as the area was determined to be previously highly disturbed with vehicle track and railway construction.

Vegetation in this test zone is moderately dense native scrubland and grassland. The ground surface in this zone is firm red sand with occasional quartz pebbles and cobbles and very occasional surface artefacts. The creeks are deeply incised with cobbles of assorted material in the bed, and no visible outcropping or rock eroding from creek banks (Plate 9). The spur between the two drainage lines had no evidence of surface artefacts. This zone has been subject to vegetation clearance and erosion, there is mid-century to modern debris throughout the test zone, including recent charcoal and a pile of oyster shells, evidence of modern camping (Plate 10). Frequent historic and modern rubbish, mostly flood debris, was located on the spur at the confluence of the two drainage lines, including asbestos sheet fragments at the north eastern extent, minimal rubbish was observed in the creek channels.

Pits 1 to 5 were located on the creek flat north of the northern drainage line in a north south transect, pit 5 was located near the modern campsite. Pits 6 to 8 were located along the drainage line northwest to southeast and pit 9 was located on the spur between the two drainage lines, placed to avoid asbestos rubbish.

This zone was characterised by a shallow deposit of silty sand transitioning to sandy clay with minimal gravels overlying cracking clay and calcrete at 30-35cm depth across all pits (Plate 9). One crystal quartz flake was recovered at 10-20cm depth from pit 5.

The archaeological potential of this zone was revised from high to low based on test excavation results.

Plate 25 Section in creek bank at zone 5, showing deposit type and depth.

Plate 26 Example of surface historic and modern rubbish in test zone 5, near pit 5.

16.1.3.3 Summary

Numerous surface artefacts are located across test zone 4, and occasional surface artefacts across test zone 5 however few subsurface Aboriginal objects were located during the test excavation on this landform type. These test zones have been subject to erosional and depositional activity associated with alluvial, water wash and aeolian processes, as well as varying levels of disturbance associated with vegetation clearing, vehicle track and haul road construction, vehicle and machine activity, camping and rubbish dumping. The surface artefact scatters on the plain and flats are likely located on lag surfaces subject to deflation, aeolian processes or lower flow inundation or wash activity resulting in a loss of topsoil. Artefacts and artefact bearing deposits located in proximity to creeks and drainage lines are not likely to be in-situ, but rather to have been eroded and deposited during flood activity.

Subsurface artefacts have been shown to occur on these landforms at very low densities, likely due to disturbance and topsoil loss across these landforms. Five artefacts were recovered from two pits in zone 4 and just one artefact was recovered from zone 5. Subsurface artefacts are located in discrete, less disturbed areas, andwhere artefacts have moved down the soil profile.

Within the Project Area, the archaeological potential of the landform comprising plains leading to/from deeply incised, second order ephemeral creek lines is revised to low-moderate.

16.1.4 *Open depression, deeply incised third order creek line*

16.1.4.1 Zone 10

Zone 10 is located on a slope from a rocky knoll to a creek flat and deeply incised ephemeral, third order water course and shallower braided drainage lines running northwest to Willa Willyong Creek. This watercourse has been modified upstream by the placement of fill. Vegetation in this test zone was sparse ground cover and very occasional shrubs and small trees. The ground surface in this test zone comprises soft, loose mobile silty sands with schist, gneiss and quartz cobbles and frequent wash gravels of the same material. Quartz gravel and cobbles vary in quality for knapping, and quartz artefacts are also present on the surface. This zone has been previously disturbed by vegetation clearance, mining activities, vehicle track and drain construction as well as associated erosion and natural flooding erosion activity.

Plate 27 Looking northwest from pit 3 to pit 1 showing track and drain construction disturbance in zone 10.

The pits were placed in a south east transect, spaced approximately 20m apart, transecting the gentle slope, creek flat and drainage lines. Pits 1 to 3 were located on the basal slope and flat, pit 4 was located on the creek bank, pits 5 to 7 were located between the creek and drainage line and pit 8 on the basal slope in the southeast of the test zone.

Pits 1 to 3 and 5 to 8 comprised loose silty sand topsoils with quartz gravels transitioning to clayey silt overlying calcrete and degrading bedrock. The deposit was deep in pit 6 which was excavated to 1m. Bedrock was at 30-40cm depth in pits 1, 3, 5 and 8, and shallow at 26cm and 18cm in pits 2 and 7. Pit 4 was excavated to 80cm in an old creek channel gravel deposit. No artefacts were recovered from this test zone.

Based on test excavation results, the archaeological potential of this zone was revised from moderate to low.

16.1.4.2 Summary

Despite a surface expression of artefacts on this landform, no subsurface artefacts were recovered during the test excavation. This landform type is dynamic, with mobile topsoils subject to erosional and depositional activity associated with alluvial, colluvial and aeolian processes. This test zone has been subject to varying levels of disturbance associated with vehicle and machine activity, mining, and natural erosive and depositional processes. Artefacts and artefact bearing deposits located in proximity to creeks and drainage lines are not likely to be in-situ, but rather to have been eroded and deposited during flood activity. No subsurface artefacts were located in this landform.

Within the Project Area, the archaeological potential of the landform comprising deeply incised, third order creeklines is revised to low.

16.2 Reburial

All artefacts recovered during the test excavation were reburied on site within excavated test pit units. Artefacts were buried loose, rather than bagged, at the request of the registered Aboriginal parties' representatives. A GPS location was taken for each artefact reburial location. Reburial locations for artefacts from each zone are shown in **Error! Reference source not found.** below.

Table 2: Artefact reburial locations

Test Zone	Easting (GDA94 zone 54)	Northing (GDA94 zone 54)
Test Zone 4, test pit 3 reburial locale	548349.014	6465774.885
Test Zone 5, test pit 3 reburial locale1	547512.076	6463172.448
Test Zone 6, test pit 13 reburial locale	545822.775	6461553.463
Test Zone 11 test pit 4 reburial locale	541073.891	6459774.832

16.3 Revision of subsurface potential following excavation

The archaeological potential of the sites and landforms investigated during test excavation was revised as shown in Table 3 below.

Table 3: Archaeological potential of sites following test excavation.

Site name/Site	Landform	Test Zone	# of artefacts from testing	Initial Archaeological Potential	Revised Archaeological Potential
PM-IF6/AHIMS #23-5-0131	plains, leading to/from shallow, ephemeral creeks	2	0	Moderate-high	Low
Broken Hill (ACAES) AFT 14/AHIMS #23-4-0178	plains leading to/from deeply incised, second order ephemeral creek lines	4	5	High	Moderate
Broken Hill (ACAES) AFT 18/AHIMS #23-5-0169	plains leading to/from deeply incised, second order ephemeral creek lines	5	1	High	Low
Broken Hill (ACAES) AFT 20/AHIMS #23-4-0697	Plains leading/to from undulating terrain	6	62	Moderate	Moderate-high at SW end
Kanandah 1/ AHIMS #23-4-0640	plains, leading to/from shallow, ephemeral creeks	9	0	Moderate-high	Low
FD-IF7/AHIMS #23-5-0153	open depression, deeply incised, third order creek line	10	0	Moderate	Low
Broken Hill (ACAES) AFT 28/AHIMS #23-4-0701	plains, leading to/from shallow, ephemeral creeks	11	1	Moderate	Low

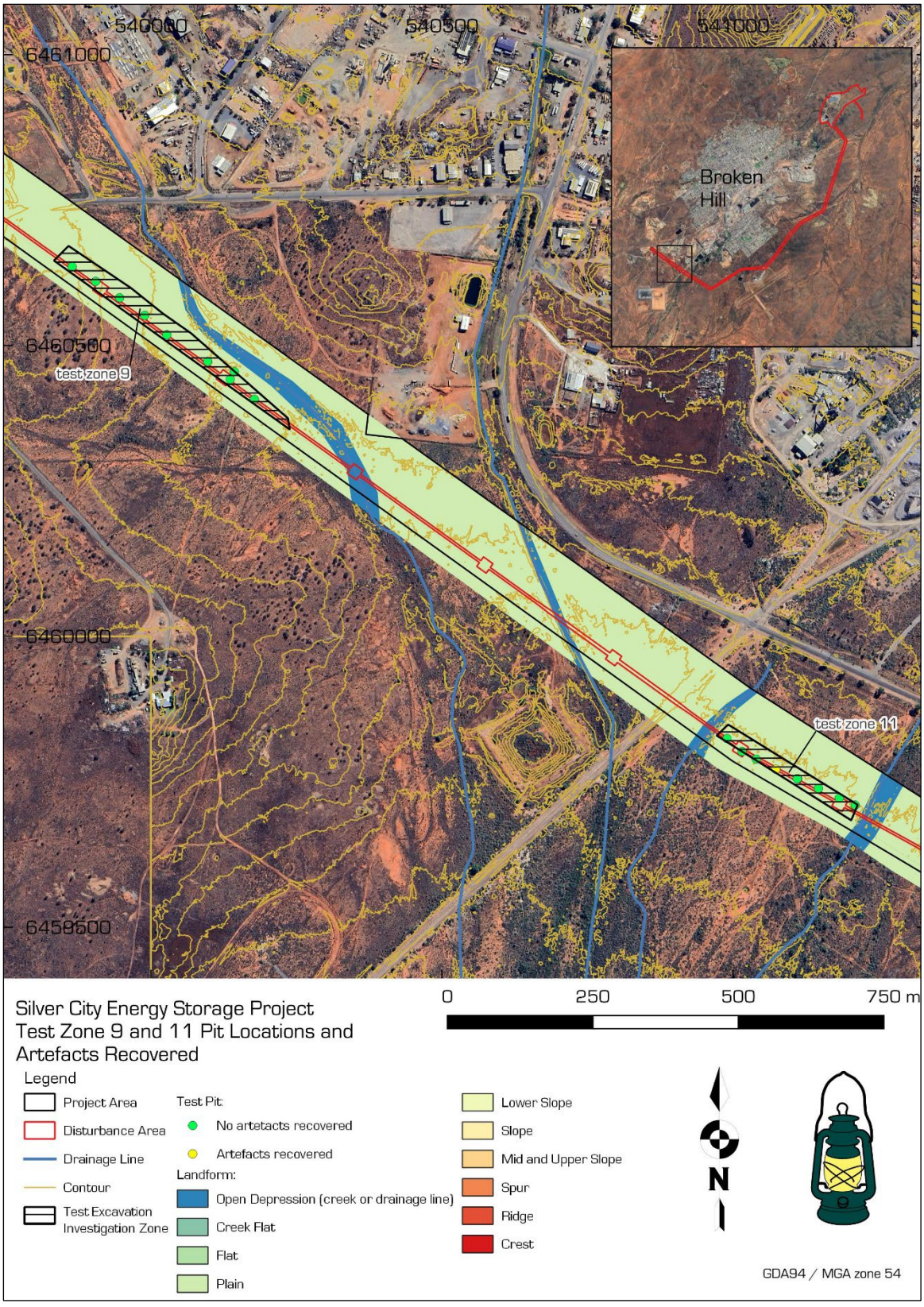


Figure 1: Test Excavation results Zone 9 and Zone 11

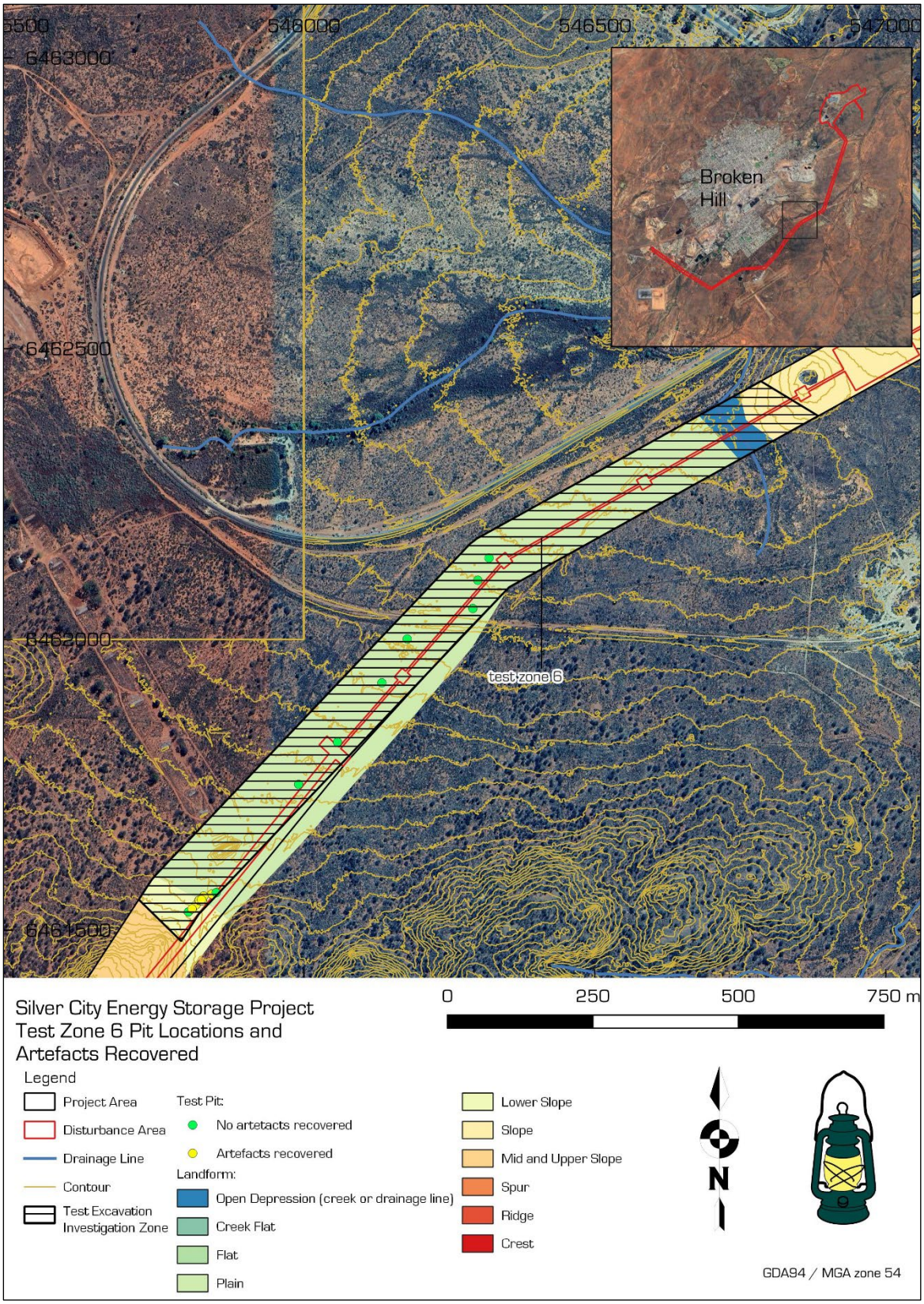


Figure 2: Test Excavation results Zone 6

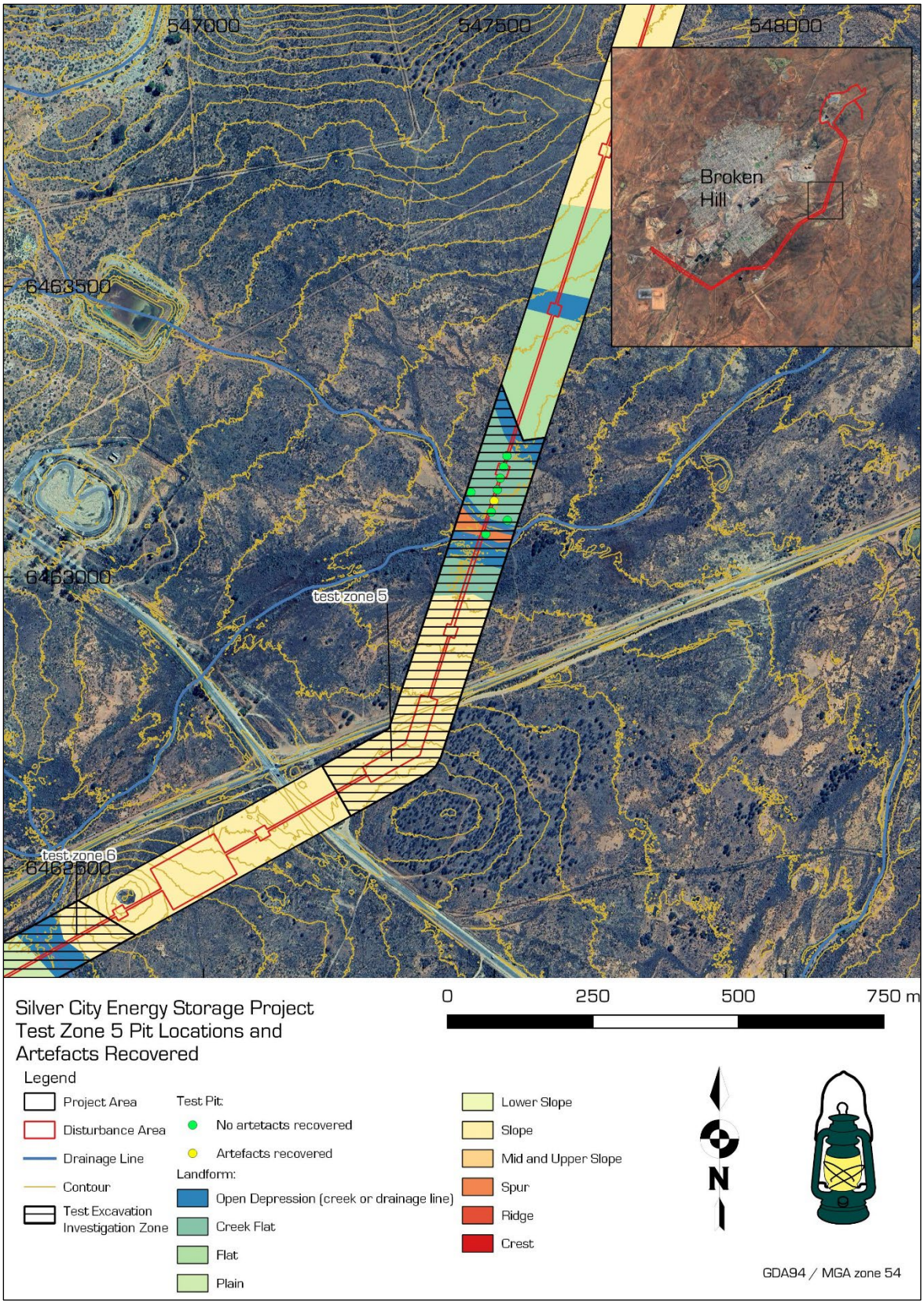


Figure 3:: Test Excavation results Zone 5

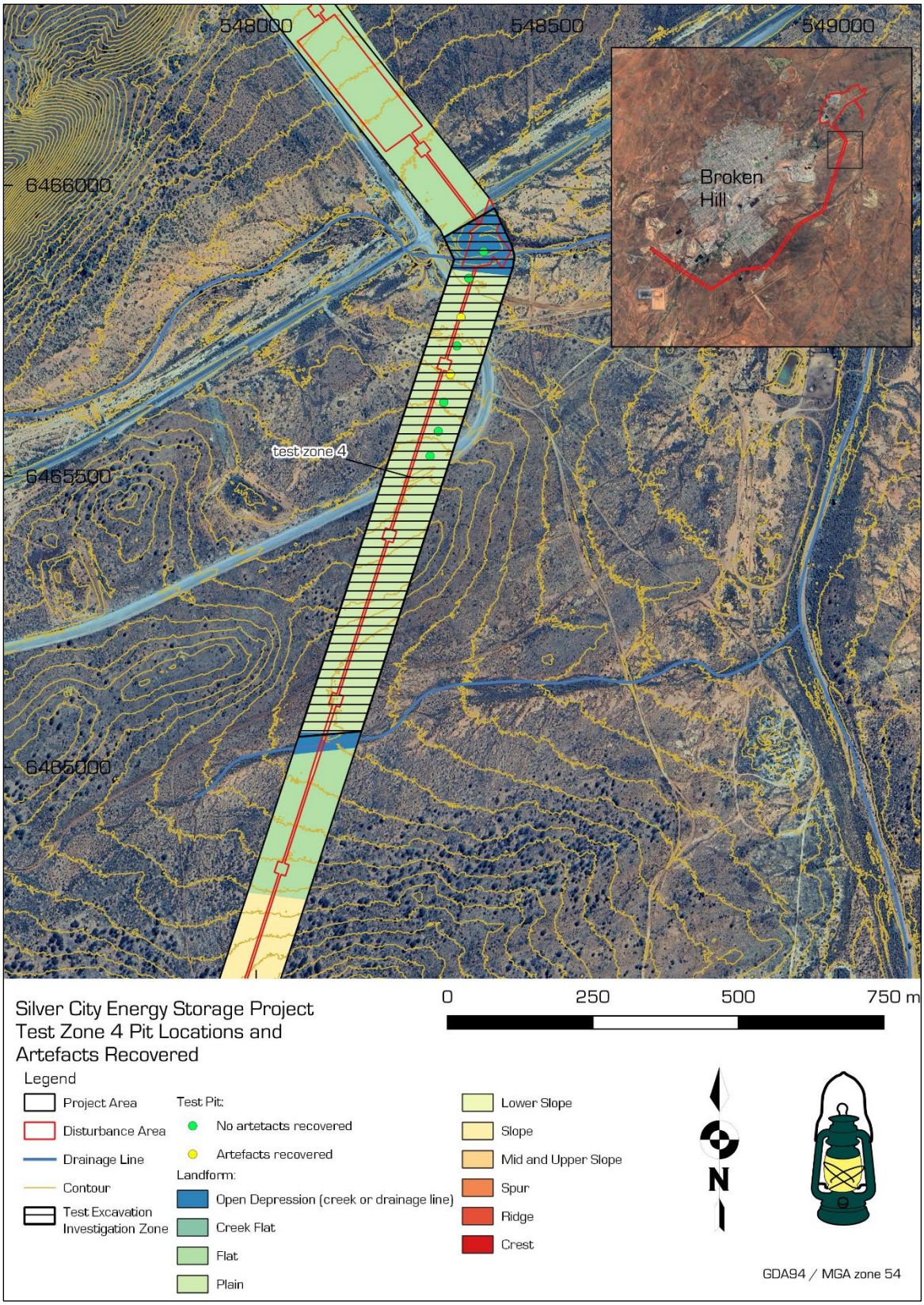


Figure 4:: Test Excavation results Zone 4

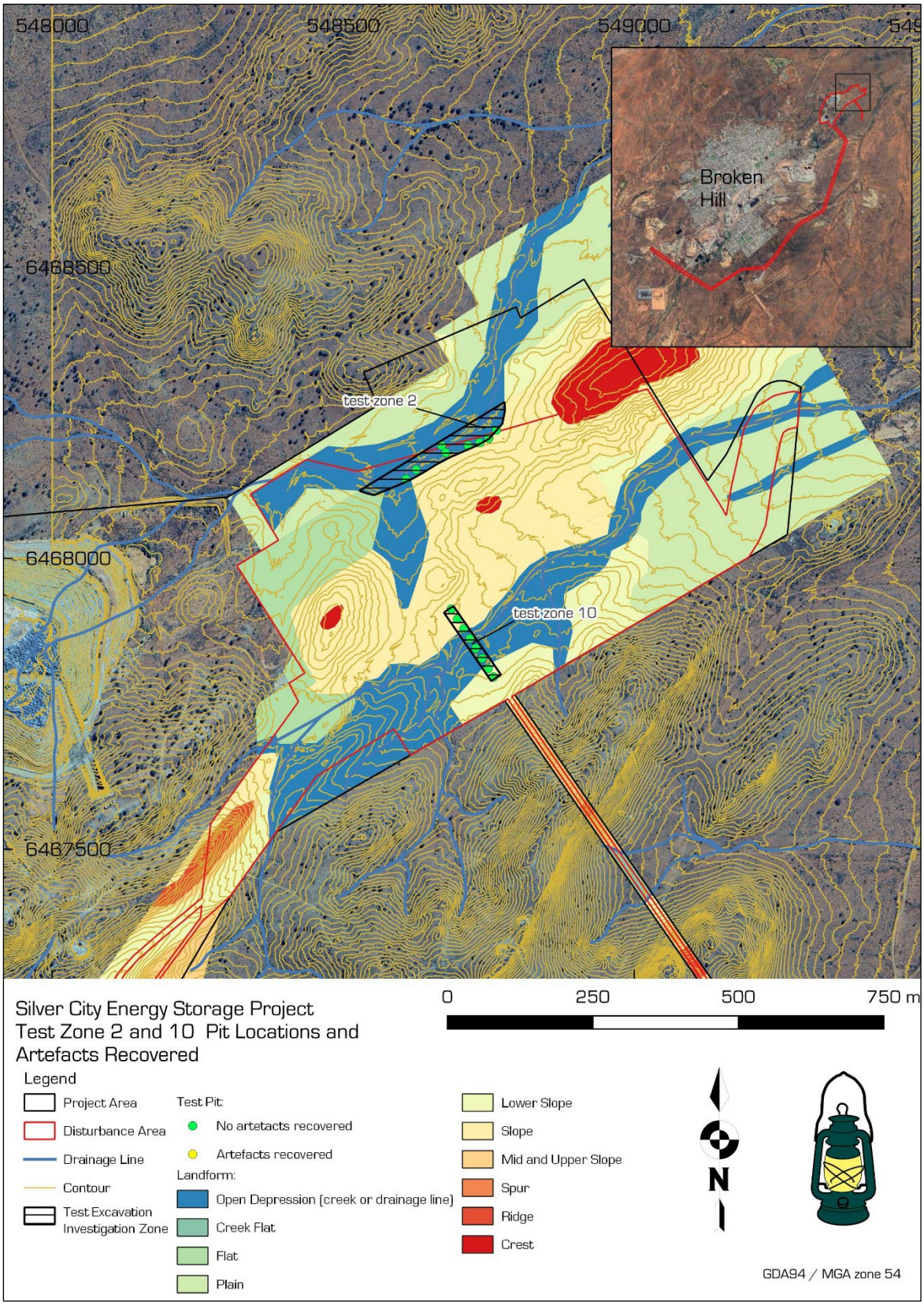


Figure 5: Test Excavation results Zone 2 and Zone 10

17 ANALYSIS AND DISCUSSION

17.1 Estimating Test Excavation Site Discovery Rates

In order to estimate the site detection capabilities of the test pit layouts used in each zone, a large number of Monte Carlo simulations were run using a simulation tool called Dig It Check It (Way and Tabrett, 2018a, Way and Tabrett, 2018b). This program allows archaeologists to input their survey area shape along with key features of the sites they predict the landscape to contain (e.g., site diameter, average artefact density) and then simulate repeated excavation using the pit locations the archaeologist provides but random site locations within the survey area. Sites are modelled as circular artefact scatters and a user-defined artefact density distribution function governs how the artefacts are arranged within them. Once the simulations are complete, the program calculates the percentage of times the pit layout intersected a site (rate of intersection) and the percentage of times the pit layout detected a site (rate of detection). Various levels of stochasticity (randomness) built into the process to simulate real sites mean that the rate of detection is often lower than the rate of intersection. The rate of detection provides an estimate of the ability of a test pit layout to discover the presence of a site when excavated and its accuracy increases with the number of simulations run.

To establish the size of sites likely to be present in a zone and the densities of artefacts likely to be encountered, we trawled the results of previous surface surveys and test excavations, AHIMS descriptions of existing nearby sites and our own test excavation results to create a range of site size and density parameter values representative of the area. The results of our simulations using these parameters for the test pits excavated in each zone are provided in Table A. Based on these results we can make a number of conclusions. First, it is clear that with the exception of zone 10, the number and arrangement of test pits excavated in the zones was extremely unlikely to detect sites 25m in diameter or smaller (<5% detection rate, and in many zones, <1% detection rate). Second, larger sites, as big as 50m in diameter, are likely to have been detected more effectively in zones 2, 10 and 11 (8.9% to 35.7%) than in the other zones (0.4% to 6.2%). These simulation results assume a homogenous/constant likelihood of site existence within each zone and are not scaffolded by the predictive archaeological sensitivity model, or informed by surface survey finds. Where test pits were dug in areas of predicted higher sensitivity it is more likely that they encountered sites, and therefore more likely that they detected them than these results revealed. While it is impossible to guess the magnitude of this effect, the results in Table A show that the likelihood of discovering any subsurface sites with the pits excavated was in most cases low to extremely low, and the fact that some subsurface sites were discovered implies that the archaeological sensitivity model used to target particular landforms for investigation was reasonably effective, but also that the landscapes tested are probably quite densely covered with sites.

Some examples of the number of test pits needed to discover all sites 25m in diameter and with an average density of 10 artefacts/m^2 for each zone are provided in Table Y; they demonstrate the large investment needed to obtain high discovery rates (e.g., 370 pits needed to be excavated in zone 6 to intersect all sites with a diameter of 25m and average density of 10 artefacts/m^2 and obtain a detection rate of just 30.9%).

It should be noted that the below results are relevant for artefact scatters as the chief site type and with a density distribution function taken from research at Lake George, NSW (Way, 2017). Another common site type in the Broken Hill area is quarries, which typically have a much higher average density of artefacts (perhaps even a different density distribution function, more research is needed here) so we can predict that the likelihood of their detection with any pit layout would be considerably higher than an artefact scatter as a result. Other common site types around Broken Hill include hearths, which are typically recorded as single units representing a complex of artefacts (hearth stones), rather than by recording each stone individually, and isolated artefacts. Neither of these site types is well-modelled using Dig It Check It because they are recorded as single objects.

Table A: Simulation results for some expected artefact scatter characteristics for all of the test excavation zones. (All simulations were performed 1000 times each using the LGR density distribution function.)

Zone	Site Diameter (m)	Average Artefact Density (artefacts/m^2)	Rate of Site Intersection (%)	Rate of Site Detection (%)	Number of Pits
2	5	5	0.2	0.1	8
		10	0.9	0.2	8
		25	0.6	0.2	8
	25	5	8.7	2.9	8
		10	8.1	3	8
		25	8.3	4	8
	50	5	24.1	8.9	8
		10	26.8	12.6	8
		25	24.4	14.4	8
4	5	5	0	0	8
		10	0.1	0	8
		25	0	0	8
	25	5	1	0.3	8
		10	1.7	0.6	8
		25	1.7	0.6	8
	50	5	5	1.2	8
		10	4.7	1.4	8
		25	4.7	2	8
5	5	5	0	0	9
		10	0.2	0	9
		25	0.1	0.1	9
	25	5	1.4	0.6	9
		10	1.4	0.4	9
		25	1.4	0.6	9
	50	5	4.9	1.7	9
		10	3.9	1.2	9
		25	4	2.2	9
6	5	5	0.1	0	20
		10	0	0	20
		25	0.1	0.1	20
	25	5	0.2	0.1	20
		10	0.1	0.1	20
		25	0.5	0.2	20
	50	5	1.9	0.4	20
		10	0.9	0.7	20
		25	2.5	1.4	20
9	5	5	0.1	0	9
		10	0.3	0.1	9
		25	0.4	0.3	9
	25	5	4	1.1	9
		10	4.2	2	9

		25	5	2.4	9
	50	5	11.7	3.8	9
		10	13.1	4.3	9
		25	13	6.2	9
10	5	5	1	0.3	8
		10	1.8	0.9	8
		25	0.8	0.6	8
	25	5	25.1	8.2	8
		10	26	10.9	8
		25	26.5	14.4	8
	50	5	51.8	26	8
		10	53.6	30	8
		25	52.8	35.7	8
11	5	5	0.3	0	8
		10	0.3	0.1	8
		25	0.7	0.2	8
	25	5	8.8	2.2	8
		10	8.6	3.8	8
		25	8.1	3.3	8
	50	5	30.7	12.9	8
		10	33.6	14.9	8
		25	31.2	15.5	8

Table Y: The number of pits required to intersect nearly all sites 25m in diameter with an average artefact density of 10 artefacts/m^2. (All of these results are for a LGR density distribution function and 1000 runs per permutation.)

Zone	Site Diameter (m)	Average Artefact Density (artefacts /m^2)	Rate of Site Intersection (%)	Rate of Site Detection (%)	Number of Pits Required
6	25	10	98	30.9	370
4	25	10	93.8	32.1	221
5	25	10	95.2	30.9	206

17.2 Artefact Analysis

The following sections contain a summary of the artefact analysis conducted and its results, along with an interpretation of their context within the local area and wider region.

17.2.1 Artefact Analysis Methods

Each artefact was examined in the field using natural light, by eye and with a 10x hand lens. Artefacts were dry-brushed if too much sediment obscured their features. A range of descriptive observations and measurements was made for each artefact in compliance with New South Wales heritage requirements. Measurements were taken in millimetres using digital callipers accurate to two decimal places. The attributes of each artefact were recorded a Microsoft Excel database and statistical analysis was conducted in Excel. Photographs were taken of each artefact and are provided in Appendix 9. On completion of the analysis, artefacts were reburied in a test pit, chosen by the RAPs, in the same zone they were found in. These reburial locations are shown in Section 2.2 Table 2.

17.2.2 Glossary of Artefact Terms

The terms listed here are used in the following discussion of the lithic assemblage recovered, or in the spreadsheet containing the stone artefact attributes recorded. Artefacts were classified and their features described using these categories and according to these definitions.

Flake: a piece of fractured rock that displays at least one positive surface as well as any number of negative surfaces

> *Proximal:* that fragment of a flake that retains the platform.
>
> *Medial:* that fragment of a flake that retains neither the platform nor the termination.
>
> *Distal:* that fragment of a flake that retains the termination.
>
> *Longitudinal cone split (LCS):* that fragment of a flake that retains both a partial platform and a partial termination but has been split longitudinally along the percussion axis.
>
> *Longitudinal:* that fragment of a flake that retains a lateral margin

Core: A piece of rock from which flakes have been removed through fracturing and its diagnostic characteristics are that it has one or more negative surfaces, but no positive surfaces. Cores were classified as either broken or complete.

Flaked Piece: A piece of fractured rock with negative scars but which cannot be classified as either flake or core because one or more processes have obscured diagnostic features e.g., weathering, heat damage, breakage.

Cortex: The outer skin of a piece of rock, which has changed colour and texture due to weathering over long spans of time (adjective: cortical). Depending on how the weathering has occurred, this skin can be anything in between rough and powdery to smooth and shiny. For commonly knapped materials in Australia, such as chert, silcrete, quartzite, mudstone/tuff, cortex is often a rich orangey brown.

Bipolar percussion: A technique for striking a core and detaching a flake where the bottom of the core is rested on an anvil (usually another, larger rock) and the core is struck on the top, platform surface directly above the point where the core makes contact with the anvil surface. Such a blow from a hammer can produce simultaneous fracture fronts running in opposite directions through the core (one from the hammer blow and one from the compression force at the anvil contact point), often on the same core face (but sometimes on different faces depending on the morphology of the core).

NAS (Number of Artefactual Specimens): Count of the recovered artefacts, whether complete or fragments.

MNA (Minimum Number of Artefacts): Count of the minimum number of artefacts present in a context or category (e.g., the minimum number of quartz artefacts; the minimum number of artefacts found in a test unit/pit). This count only includes complete artefacts or diagnostic fragments thereof, so it will be equal to or smaller than NAS. The procedure for calculating this is outlined in Hiscock (2002).

In addition to these definitions, the descriptions of stone fracturing used are taken from the extensive experimental work of Tsirk (2014).

17.2.3 Assemblage Composition

The artefacts recovered included four complete cores (5.8% of the total assemblage) and 65 flakes and flake fragments (94.2% of the entire assemblage). The majority of artefacts were made from milky quartz (NAS=63, 91.3%), although small numbers of crystal quartz flakes and flake fragments were also found (NAS=5, 7.7%) as was one proximal flake fragment made from yellow silcrete (1.5%). While these NAS counts are the most common way to represent stone artefact

assemblages, they include all fragments of artefacts found, even if multiple pieces of the same artefact are discovered. NAS can therefore overrepresent the number of artefacts actually discovered. To work out how many artefacts were really found the minimum number of flakes (MNF) must be calculated using the equations created by Hiscock (2002), followed by the minimum number of stone artefacts (MNA), which is the MNF plus the number of diagnostic fragments of other stone artefacts such as cores, percussive implements and grinding implements. Table 3 shows the MNA counts for the three different raw materials recovered and the zones they were found in. Using MNA separated into these categories, the total number of artefacts found is actually 54.

Table 3: The MNA counts and proportions for each zone where artefacts were found.

	Raw Material (MNA)				
Zone	Milky Quartz	Crystal Quartz	Silcrete	Total	Percentage
4	2	2	1	5	9.3
5	0	1	0	1	1.9
6	45	2	0	47	87.0
11	1	0	0	1	1.9
Total	48	5	1	54	100.0
Percentage	88.9	9.3	1.9	100	NA

While most artefacts were made from quartz (MNA=48, 88.9%), the few that were made from crystal quartz (MNA=5, 9.3%) were spread across zones 4, 5 and 6. The only silcrete artefact discovered was found in TP5 in zone 4, and this pit contained the most diverse range of knapped stone materials: milky quartz, crystal quartz and yellow silcrete.

17.2.4 Reduction Methods and Techniques

The four cores retrieved during the test excavations were all made from milky quartz, and were found in spit 1 in zone 6, and spit 7 (@ 5cm spits=35cm) in zone 11. Two were single-platform cores, meaning all flakes removed from them were detached from the same platform, in the same direction. One core was discoidal, with flakes removed centripetally around the perimeter from a central platform edge producing a disc shape (Plate Z), and the other core was classed as bipolar, where flakes had been removed from opposing platforms while the core was rested on an anvil and struck from directly above. The cores were all relatively small, ranging in size from 24mm to 39mm in maximum dimension.

Plate Z: #18 discoidal quartz core.

Only one retouched flake was found during these test excavations: a quartz flake with amorphous unifacial dorsal retouch at its distal end (Plate B). It was the only artefact found in pit 11 in zone 6 (spit 1). This was also one of the largest flakes recovered (42mm), perhaps indicating that larger flakes were targeted for retouch but as this is the only retouched flake recovered this is a very tentative conclusion and a larger sample of retouched flakes from the area is needed to investigate this further. No retouched artefacts considered diagnostic of particular time periods in the Indigenous occupation of NSW (e.g., backed artefacts, Pirri points, tulas) were found as part of this test excavation phase.

Plate B: The only retouched flake found during the test excavations (#15).

Several observations can be made about the cultural traditions operating in relation to core reduction based on data extracted from the flakes collected. Firstly, there is no evidence of platform preparation on most of the flakes or flake fragments with intact platforms. Only two specimens out of the sample of 40 with intact platforms (both milky quartz) showed evidence of platform preparation: one displayed overhang removal scars and the other platform faceting. While the sample recovered is small, these preliminary results imply that little preparation of core platforms was done before flakes were detached. These flakes were also found in adjacent spits (1 and 2) of TP13 in zone 6 and may therefore be associated with the same knapping event or group of people.

Secondly, the intact flake platforms also tell us about the kinds of core surfaces the knappers liked to use as platform surfaces for flake removal on quartz cores. Of the 40 intact flake platforms, the most common platform construction was a partial single flaked surface (N=21, 52.5%) but 35% of these flakes displayed crushed platforms (N=14), 10% had platforms made from multiple flaked surfaces (N=4) and one had a platform surface that was entirely facetted (2.5%; mentioned earlier). This data provides several useful clues: it can be inferred that knappers mostly targeted flaked surfaces (either single or multiple flake scars) for flake removal, in one case reshaping the platform with faceting where it did not conform with the knapper's requirements. It also shows that while these flaked surfaces were targeted, a fairly high proportion of flake-removing blows crushed or shattered the flake's platform. It may be that these blows were focused too close to the edge of the platform (were more 'marginal') and the fracturing forces created by these blows (most likely applied with a hard hammer) broke apart the flakes' platforms because quartz is so hard and brittle. This marginal approach is often applied when thin flakes are sought, or knappers are seeking to maximise the length of useable cutting edge for the amount of knappable rock they have to work with (Mackay, 2008). Alternatively, perhaps bipolar percussion was used to detach these flakes (it does not always leave diagnostic evidence on artefacts) and the force of the detaching blows crushed the platforms, which is a relatively common phenomenon among bipolar quartz removals. A third explanation here is that the cores were all quite small, and controlling the positioning of a flake-detaching blow gets more difficult as cores become smaller and harder to hold still without hitting your fingers.

A final observation about flake platforms: there were no cortical platforms on the flakes found. While this may be a product of sample size, it may also be because quartz nodules were initially shaped where the quartz was quarried to remove cortex, leaving these cortex-covered flakes at the quarry site, or that cores were made from smaller chunks of boulder the knapper managed to break off at the quarry and therefore had very little cortex on them initially. The quartz quarries in the area are often in the form of boulders outcropping in reefs so this latter option seems likely.

There was also quite a high proportion of termination types commonly associated with bipolar percussion among milky quartz flakes: eight of the intact flake terminations (27.6%) were classified as blunt, where the fracture has travelled straight down through the core mass and exited out the bottom of the core, rather than tapering towards the closest free surface (a 'feather' termination). Except for one flake with a blunt termination from zone 4, all the flakes or flake fragments with blunt terminations were found in zone 6. When viewed in conjunction with the number of crushed platforms also seen here, the most parsimonious explanation for the frequent presence of blunt terminations in this assemblage is that the knappers working in zone 6 used bipolar percussion – where cores are rested on an anvil and struck from directly above to remove flakes – to reduce their quartz cores for at least some of the reduction process. Definitive evidence of bipolar reduction – on one core and three flakes – was also recorded for zone 6 (TP20, TP13 and TP14).

The sample of flakes also provides key information regarding the size and shape of flakes produced in the area. There were 22 complete flakes recovered, ranging in size from 6mm to 36mm in percussion length with a mean percussion length of 19.8 ±8.5mm. These flakes ranged in elongation (length:width) from 0.9 to 2.44. Based on their elongation values, however, only three flakes (13.6%) could be classified as blades, where they were at least twice as long as they were wide. These data suggest that the manufacture of blades was of limited importance to the occupants of zone 6 in the study area but a larger sample of this site is needed to be sure there is not another explanation (e.g., that blades were manufactured at the site but removed subsequently by the knappers when they left) because they were the one of the products sought.

17.2.5 Post-depositional Processes

As part of assessing site significance, the condition of artefacts and the integrity of the site's deposits need to be determined. Stone artefacts can provide useful evidence relating to the disturbance a site has experienced. In this case, because the artefacts were almost all made from quartz, which is extremely hard, no evidence of weathering or thermal damage was observed on any of the artefacts recovered.

The frequency and nature of flake breakages and damage in an assemblage can give provide information on the impact of post-depositional disturbances like human or animal trampling, or vehicular activity – a particularly important consideration for this study area. For this assemblage, the most frequently occurring breakage type was a single transverse snap where proximal and distal fragments were created (MNF=18, 41.9%). These can occur when a flake is trampled or squashed by something heavy (person or machine/vehicle), but can sometimes occur when a flake impacts a hard ground surface immediately after it is detached. It is also important to note here that proximal fragments and step-terminated, complete flakes can be very difficult to differentiate. Given that many more proximal fragments were found than distal (N=7, 16.3%) it may be that some of these proximal fragments are in fact step-terminated flakes in disguise and the larger number of them is an 'artefact' of our recording. Four medial fragments – a central fragment of a flake when it has been snapped into at least three sections transversely – were also found in zone 6 and are the same kind of break with similar potential causes. Only one flake fragment displayed a marginal break/snap (#3, a crystal quartz flake) which may have been the result of site disturbance. Longitudinal cone spits (LCSs) were the second-most frequent form of flake breakage (32.6% of flake fragments). Longitudinal cone split fragments typically happen at the point of flake manufacture, with the flake splitting along its percussion axis because the width of the platform was not sustainable, and are not usually a result of post-depositional processes. These breakages are therefore unlikely to be a result of site disturbance. No flaked pieces were recovered, which are typically broken fragments of knapped artefacts that are so broken they can no longer be attributed to either the flake or core categories. Based on these observations, the artefacts show low to medium evidence of damage as a result of post-depositional site disturbance.

One post-depositional process that has almost certainly impacted the range and number of artefacts recovered is the sampling of surface artefacts by private collectors. It may well have shifted the raw material proportions represented in surface scatters in the study area as well, with collectors targeting more colourful materials like silcrete and chert. Features produced by knapping (e.g., flaked surfaces, ripples, hertzian initiations, etc.) are typically more readily identifiable on these materials compared to quartz. It is also likely that the visibility of sites fluctuates in response to the impacts of natural processes – like wind, rain, run-off and flooding – altering the location of sediments and artefacts. Shiner (2004:100) describes a large increase in erosion in Western NSW since the commencement of sheep grazing that has resulted in the removal of artefact-encasing topsoil in many areas, leaving lag deposits of artefacts lying on exposed patches of compacted clayey subsoils ('scalding').

The artefacts recovered provide only limited assistance when investigating whether their sedimentary context has been altered by post-depositional disturbance. The study area is a complex depositional environment, with sediments and artefacts moved around by at least wind, water and human impacts such as construction earthworks, removal of vegetation, and recreational vehicular activities. In zone 6 where most of the artefacts were found, there is no evidence of smaller artefacts shuffling down through the deposit over time (size-sorting) and instead similar ranges of artefact sizes were observed in all artefact-containing spits (1-3; Figure W). This suggests that enough site disturbance has occurred that the artefacts are now quite randomly mixed through the top 300mm of the deposit in this zone. Unfortunately, because the artefacts are nearly all made from milky quartz analyses of the distribution of artefacts that refit, or were likely part of the same knapping event, are extremely difficult and at this stage we can extract no useful information of this kind. Salvage excavation of this area and the extraction of more artefacts and features like hearths may reveal more information about the disturbance of this site.

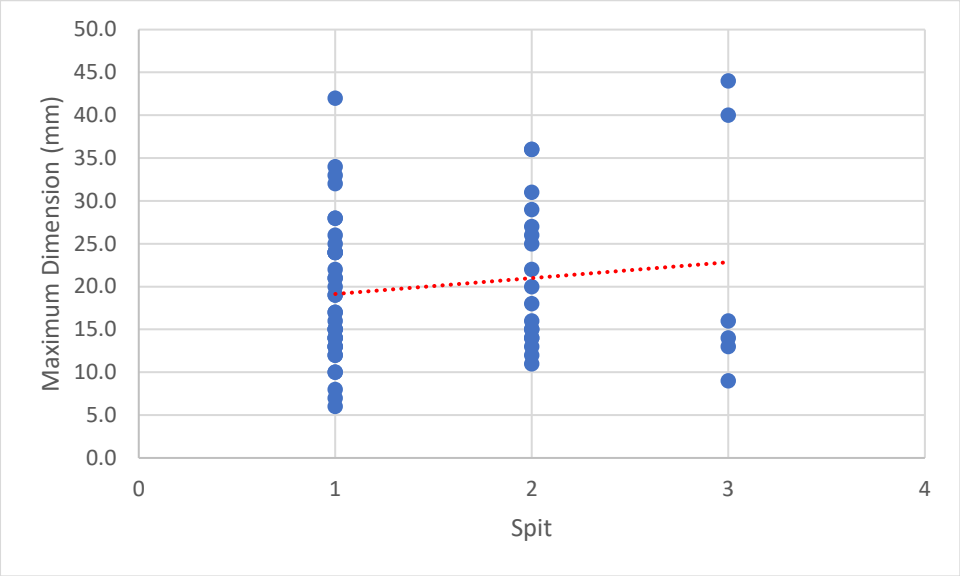


Figure W: In zone 6, the size distribution of artefactual specimens with depth is close to random, with the line of best fit (representing the linear correlation between maximum depth and maximum artefact dimension) almost flat.

17.2.6 Regional Context of these results

The knapped stone artefacts recovered from the test excavations are consistent with their local context in terms of raw materials and site types. The project area and its immediate vicinity contain many low-density artefact scatters and isolated finds similar to those found during excavation. There are also many outcropping quartz quarries (e.g., AHIMS sites 23-5-0122 and 23-5-0123) making quartz apparently the most ubiquitous local knappable stone material. The dominant proportion of artefacts recovered were quartz so this suggests that Indigenous people were utilising local, easily

accessible material for most of their knapping. The two ways in which the test excavation assemblage differed from its surrounding archaeological context were its deficit of retouched flakes (except for one amorphously retouched flake) and the narrow range of stone materials used to make the artefacts. The AHIMS database for the surrounding area shows artefacts have been found made from silcrete and chert, especially retouched implements like tulas and Pirri points (e.g., AHIMS site 23-4-0641 adjacent to test zone 9 which was a single chert Pirri point). It is unlikely that these differences are archaeologically significant, but more likely that the sample of artefacts recovered was too small to adequately reflect the diversity of materials used or retouched implements made in the area. It is also likely that the diversity of artefacts has been reduced in historic times by the impact of private citizens collecting artefacts from surface lag deposits.

With respect to the wider Western NSW regional context, there are three nearby areas that have been extensively investigated and are particularly suited for comparison here: Pine Point/Langwell, Stud Creek, and Fowlers Gap. Comparing the test excavation assemblage with the artefacts documented in these areas helps to clarify the significance of the finds and guide the development of future management and mitigation measures for the project area.

Shiner (2004) studied four complex surface artefact scatters at Pine Point and Langwell Stations as part of his PhD thesis. These sites are the closest geographically to the present study, located approximately 50km south of Broken Hill. Their landscape contexts are dominated by the floodplain and alluvial plain of Pine Creek but still include level and undulating plains much like the Broken Hill area. The key site types Shiner identified were also deflated surface artefact scatters, quartz and silcrete quarries and heat retainer hearths. The kinds of raw materials locally available in the Pine Point/Langwell area are quartz (ubiquitous gibber cobbles but rare reef outcrops), quartzite (rare gibber nodules/cobbles) and silcrete (limited outcrops and gibber pavements, but more sources directly to the north of Pine Point/Langwell). Based on dates obtained from heat-retainer hearths, Shiner concluded that the Pine Point/Langwell area was occupied between roughly 260 BP and 2000 BP.

Shiner's assemblages are very similar in terms of raw materials to the Broken Hill area, and found in similar deflated landform contexts. Across all sites, in terms of NAS counts, Shiner (2004) found that the most frequently knapped material was quartz (72.0%) with smaller proportions of crystal quartz (0.8%), silcrete (26.2%) and other (1.1%). Core types are difficult to compare because of differences in recording systems, but Shiner found 2.4% of cores were bipolar – a similarly small proportion to the test excavation results given that quartz was the dominant material. Across all four sites Shiner studied the overall rate of flake retouch was 5.9%. Among the retouched flakes found the most standardised retouched forms typical of arid assemblages were Pirri points which were made from both silcrete and quartz, backed artefacts which were nearly all made from quartz, and tula slugs which were all made from silcrete (Shiner, 2004). These artefacts made up only very small proportions of the retouched flake assemblage however: Pirri points accounted for just 1.7% of all retouched flakes, tulas or tula slugs only 2.3% and backed artefacts just 6.1%. The remaining forms of retouched flake were typically more morphologically amorphous, being categorised variously as things such as notches, denticulates and scrapers, and these more amorphous forms constituted nearly 90% of the retouched artefacts Shiner discovered. Based on these data, the small proportion of retouched flakes recovered during test excavations in the Silver City Energy Storage Project area (2.3%) is entirely consistent with findings from the nearby Pine Point/Langwell area. The amorphous shape of the retouched flake is also consistent, as these were by far the most frequently occurring retouched flake variety at Pine Point/Langwell. These data also suggest that obtaining a more extensive artefact sample through salvage excavation is key to understanding the nature of retouched flakes made in or transported to the project area, and critical to establishing how the archaeology in the project area fits within its regional context.

Holdaway et al.'s (2004) work at Stud Creek approximately 300km north-northeast of Broken Hill discovered large assemblages of mostly silcrete artefacts (over 50 000 were analysed). Although the artefacts were lag deposits, dates from the sediments they likely came from led Holdaway et al. (2004:38) to conclude they were definitely no older than 6000-7000 years old but more likely were 2000 years old or younger. The hearths in the Stud Creek region also date from between approximately 300 and 1500 years old. These assemblages reflected similar proportions of implement varieties to the Pine Point/Langwell assemblage. 84.5% appear to have been

amorphously retouched, while 4.9% were backed and 10.3% were classed together as tulas or burrens. None of the retouched flakes described by Holdaway et al. seem to have been made from a material other than silcrete however. It is possible that they simply did not report these because of the small number, but if there really were no retouched quartz artefacts then it may reflect a preference of the ancient knappers for manufacturing retouched flakes from materials other than quartz, especially when this material was highly locally available (the Stud Creek area is heavily populated with a variety of silcrete sources). The data from Pine Point/Langwell, for example, hint that knappers may have preferred particular materials: tulas were only manufactured using silcrete, even though quartz was a more widely available material.

The preferential use of raw materials in the region was also supported by the findings of Holdaway and Fanning (2014) in their extensive study of surface artefact scatters at Fowlers Gap Station, 112km north of Broken Hill. Retouched artefacts constituted only small proportions of the assemblages studied and were largely amorphously retouched, including only small proportions of standardised retouched flake forms such as tulas, Pirri points or backed artefacts (all <10% of the total retouched assemblage). While Pirri points and backed artefacts were frequently made from quartz at Fowlers Gap, tulas were almost always made from silcrete (no chert artefacts were identified in the area). The proportions of quartz artefacts to those of other raw materials is similar to assemblages from both Pine Point/Langwell and the test excavation assemblage from the Silver City Energy Storage Project area, at on average around 80% across all seven sites reported. Salvage excavation to retrieve a larger sample of retouched flakes in the Silver City Energy Storage Project Area, where quartz is the most available local material, is needed to determine whether the Indigenous knappers occupying the area were simply using what was most available, or whether they preferred to use silcrete or chert to make particular kinds of retouched implements as well.

Two other key features of the quartz assemblage retrieved during test excavation in the Project Area were evidence of the occasional use of bipolar percussion and a small proportion of blades among the complete flakes. Despite the dominance of quartz in many of the assemblages in Western NSW because of its local availability, and the frequent use of bipolar percussion to knap quartz by knappers all over the world for hundreds of thousands of years (e.g., Barham, 1987, Berman, et al., 1999, de la Pena and Wadley, 2014, Díez-Martín, et al., 2011, Hiscock, 2015a, Tabrett, 2017) only low rates of bipolar percussion have been observed, including in our study area. Bipolar percussion is known for its effectiveness in breaking hard materials like quartz, and its assistance in detaching flakes from very small cores when they would otherwise be unknappable is well established (e.g., Hiscock, 2015a, Tabrett, 2017, Hiscock, 2015b). This semi-arid setting is an interesting case study because it would have required the knappers to prioritise spending the time to find, or expend the effort to carry, a suitable anvil stone. Exploring how often it was used and why (when there are nearby quartz quarries with plenty of large boulder- and cobble-sized nodules available) in the analysis of future salvage collections can provide insight into how knappers viewed the availability of raw materials and the techniques they preferred to employ to knap it into useable pieces.

18 CONCLUSION

The results of the test excavation site discovery rates estimation simulations undertaken show that the likelihood of discovering any subsurface sites with the pits excavated was generally low to extremely low. The fact that subsurface sites were discovered during the test excavation program implies that the archaeological sensitivity model used to target particular landforms for investigation was reasonably effective.

Despite the small size of the assemblage recovered during the test excavations, it was possible to draw some inferences regarding raw material use, reduction methods and techniques and post depositional processes from the artefact analysis. The dominant proportion of artefacts recovered were quartz, a local, easily accessible material for knapping. However, it is likely that the sample of artefacts recovered was too small to adequately reflect the diversity of materials used or retouched implements made in the area. It is also likely that the diversity of artefacts has been reduced in historic times by the impact of private citizens collecting artefacts from surface lag deposits. The

artefacts show low to medium evidence of damage as a result of post-depositional site disturbance, but no evidence of movement down through the soil profile, which suggests that enough site disturbance has occurred that the artefacts are now mixed through the top 300mm of the deposit. While the results of the artefact analysis largely conform with the results of previous archaeological investigations in the region, the lack of retouched implements and diversity of raw material types within the assemblage means that it is difficult to draw any conclusions about how the archaeology in the project area fits within its regional context.

The results of the test excavation indicate that despite the various levels of disturbance throughout the project area, subsurface archaeological deposits have been shown to occur. That subsurface artefacts were located from a sample of the landscape suggests that the landscapes tested are densely covered in sites, both surface and subsurface. The absence of subsurface sites within test zone 2 refined the predicted moderate archaeological sensitively of this landform to low. In addition, the subsurface potential of all zones was revised to low with the exception of zones 4 (moderate) and zone 6 (moderate-high at southwest end). The revised subsurface potential of these zones is factored into the subsurface archaeological sensitivity mapping (section 6.9 of AR).

Additionally, while the artefact analysis provided information about artefact manufacture in the Project Area, it also raised questions about the nature of artefact transport, manufacture and raw material selection within the Project Area and the broader region, which require a larger assemblage to understand.

Due to the presence of subsurface artefacts within the testing area, which suggests a density of sites across the Project Area, further staged salvage is recommended prior to construction. This may include:

- Further salvage excavations of sites on landforms shown to have subsurface artefacts to determine the nature of the disturbance in the area;
- Further salvage excavations on landforms predicted to contain subsurface artefacts to determine the presence of sites;
- Salvage excavation, extraction of more artefacts and features like hearths, which may reveal more information about the disturbance of the sites;
- Obtaining a more extensive artefact sample through salvage excavation to understand the nature of retouched flakes made in or transported to the project area, which is critical to establishing how the archaeology in the project area fits within its regional context;
- Salvage excavation to retrieve a larger sample of retouched flakes in the project area, where quartz is the most available local material, to determine whether the Indigenous knappers occupying the area were simply using what was most available, or whether they preferred to use silcrete or chert to make particular kinds of retouched implements as well;
- The analysis of future salvage collections to provide insight into how knappers viewed the availability of raw materials and the techniques they preferred to employ to knap it into useable pieces.

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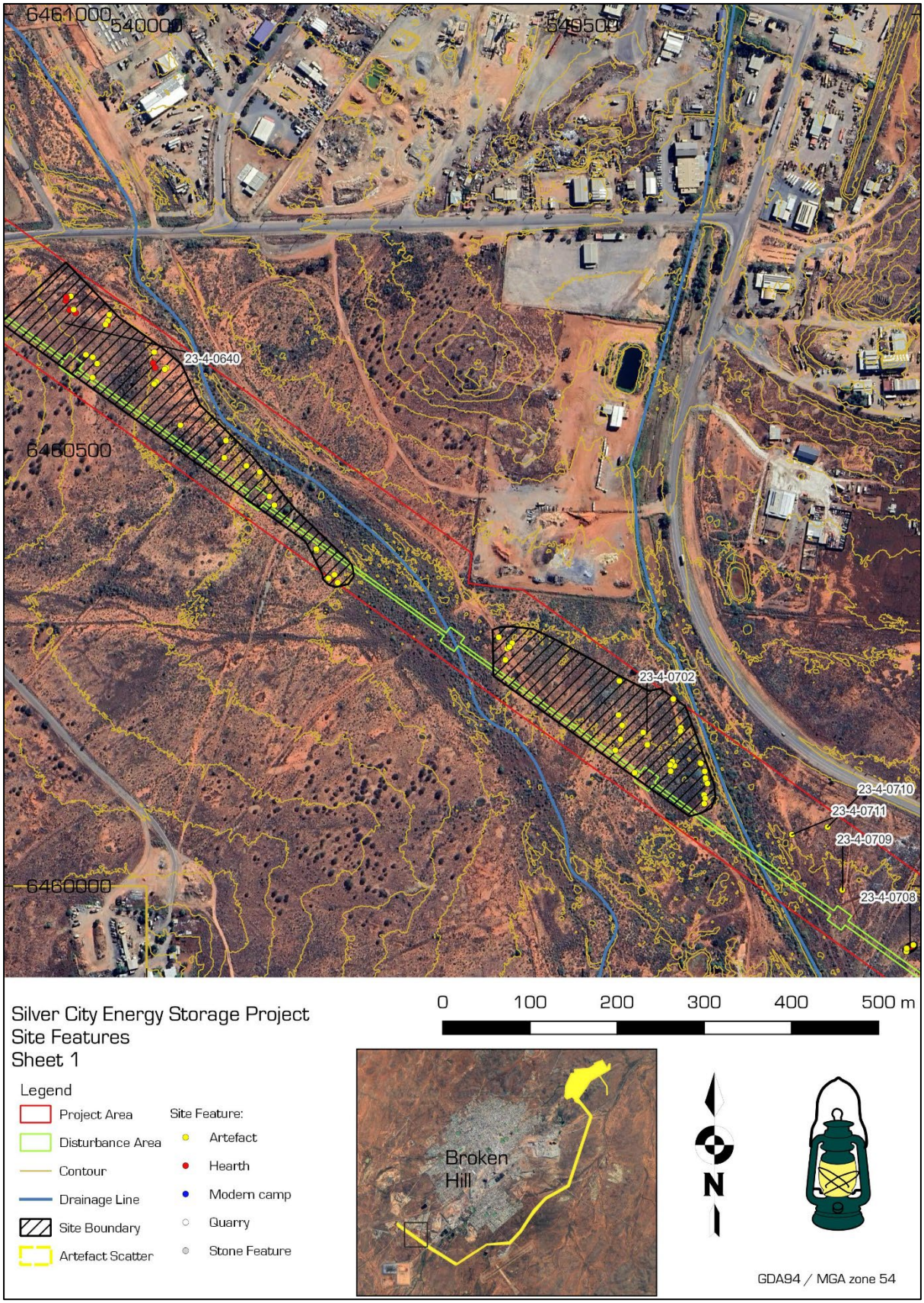
APPENDIX 6 – SILVER CITY ENERGY STORAGE PROJECT SITE FEATURE MAPS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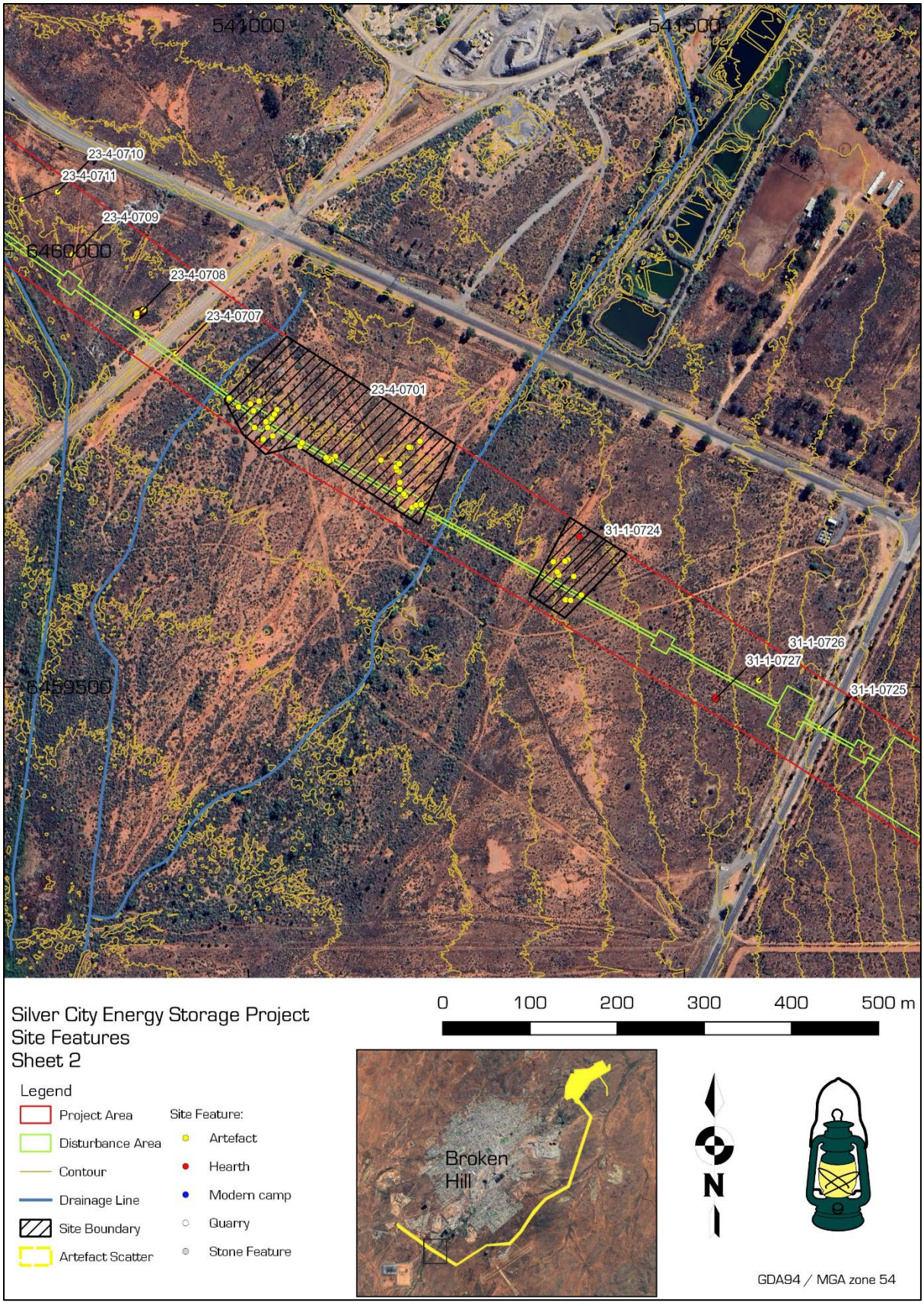
Silver City Energy Storage Project
Site Features
Sheet 1
Legend
Project Area
Disturbance Area
Contour
Drainage Line
Site Boundary
Artefact Scatter
Site Feature:
Artefact
Hearth
Modern camp
Quarry
Stone Feature
0
100
200
300
400
500 m
Broken Hill
N
GDA94 / MGA zone 54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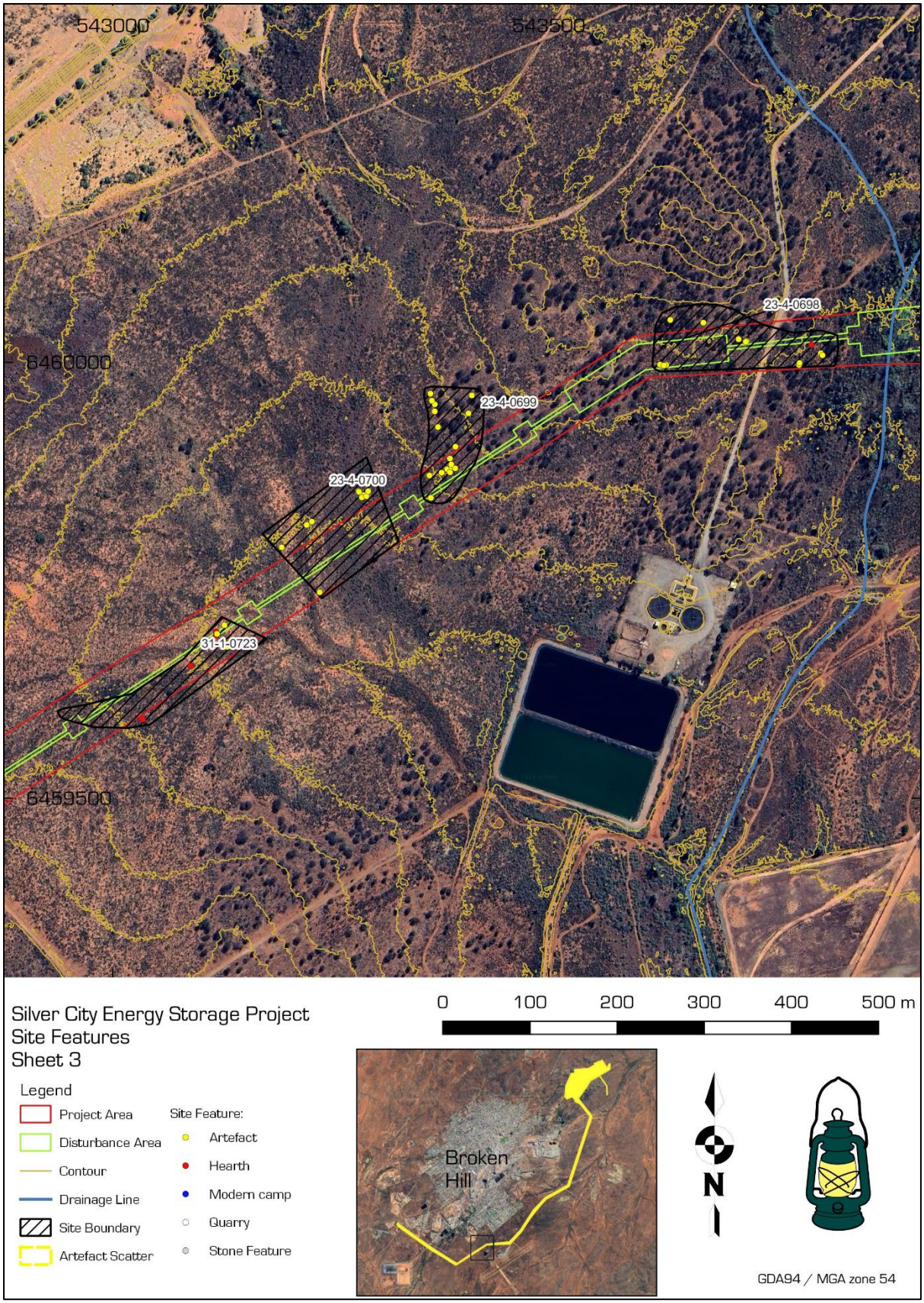
31-1-0727
31-1-0725
Silver City Energy Storage Project
Site Features
Sheet 2
Legend
Project Area
Disturbance Area
Contour
Drainage Line
Site Boundary
Artefact Scatter
Site Feature:
Artefact
Hearth
Modern camp
Quarry
Stone Feature
0
100
200
300
400
500 m
Broken Hill
N
GDA94 / MGA zone 54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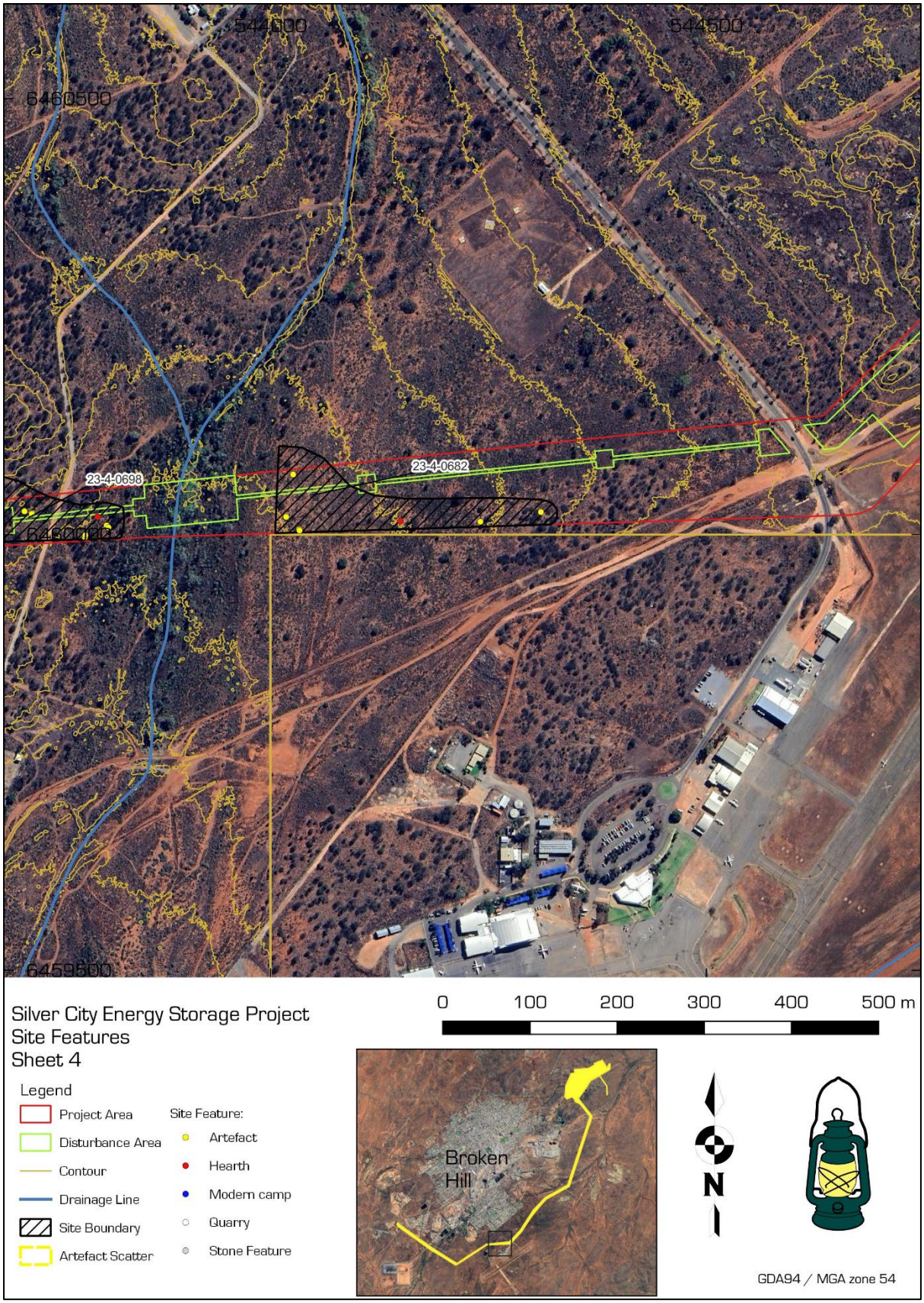
Silver City Energy Storage Project
Site Features
Sheet 3
Legend
Project Area
Disturbance Area
Contour
Drainage Line
Site Boundary
Artefact Scatter
Site Feature:
Artefact
Hearth
Modern camp
Quarry
Stone Feature
0
100
200
300
400
500 m
Broken Hill
N
GDA94 / MGA zone 54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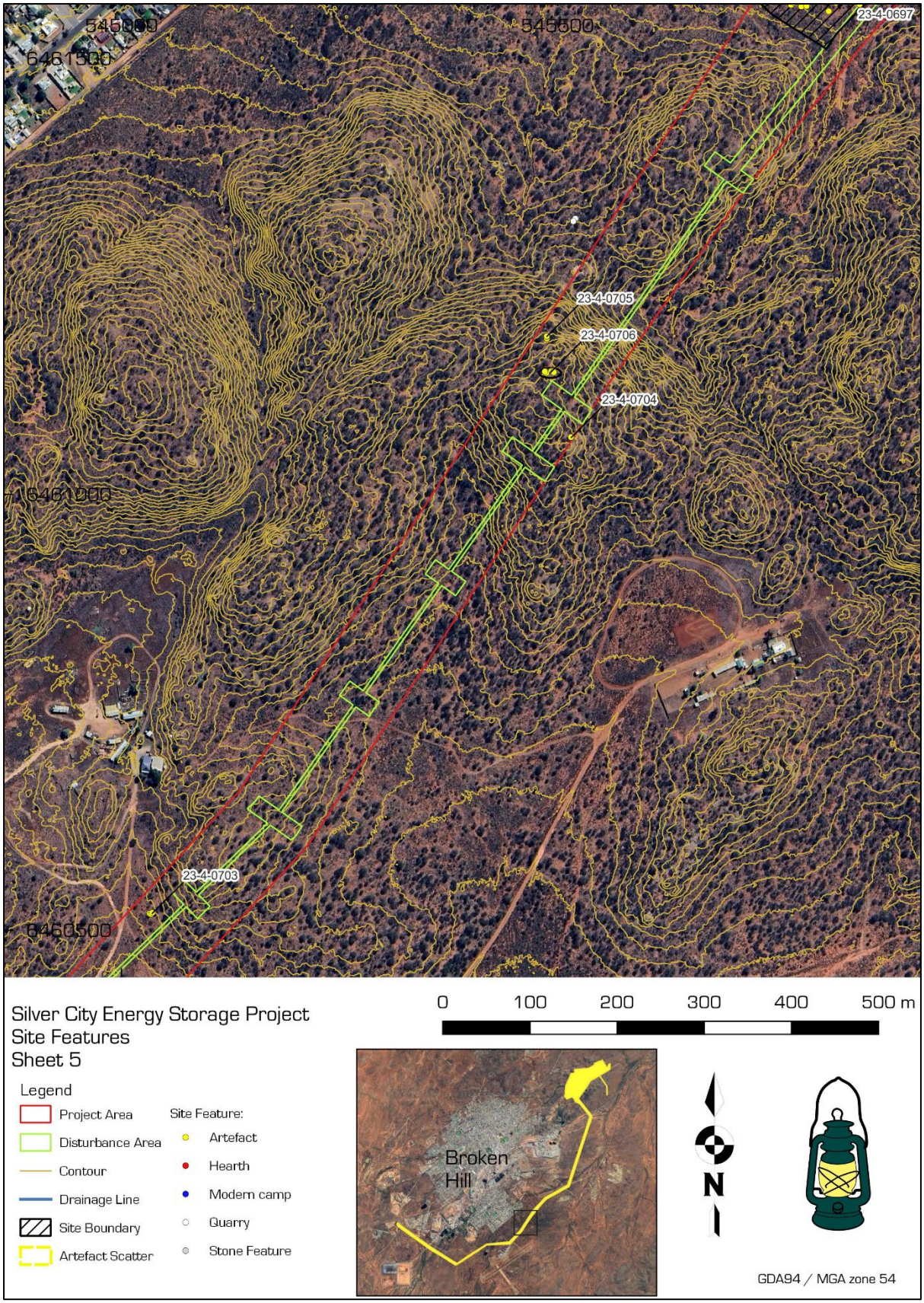
400
500 m
Silver City Energy Storage Project
Site Features
Sheet 4
Legend
Project Area
Disturbance Area
Contour
Drainage Line
Site Boundary
Artefact Scatter
Site Feature:
Artefact
Hearth
Modern camp
Quarry
Stone Feature
Broken Hill
N
GDA94 / MGA zone 54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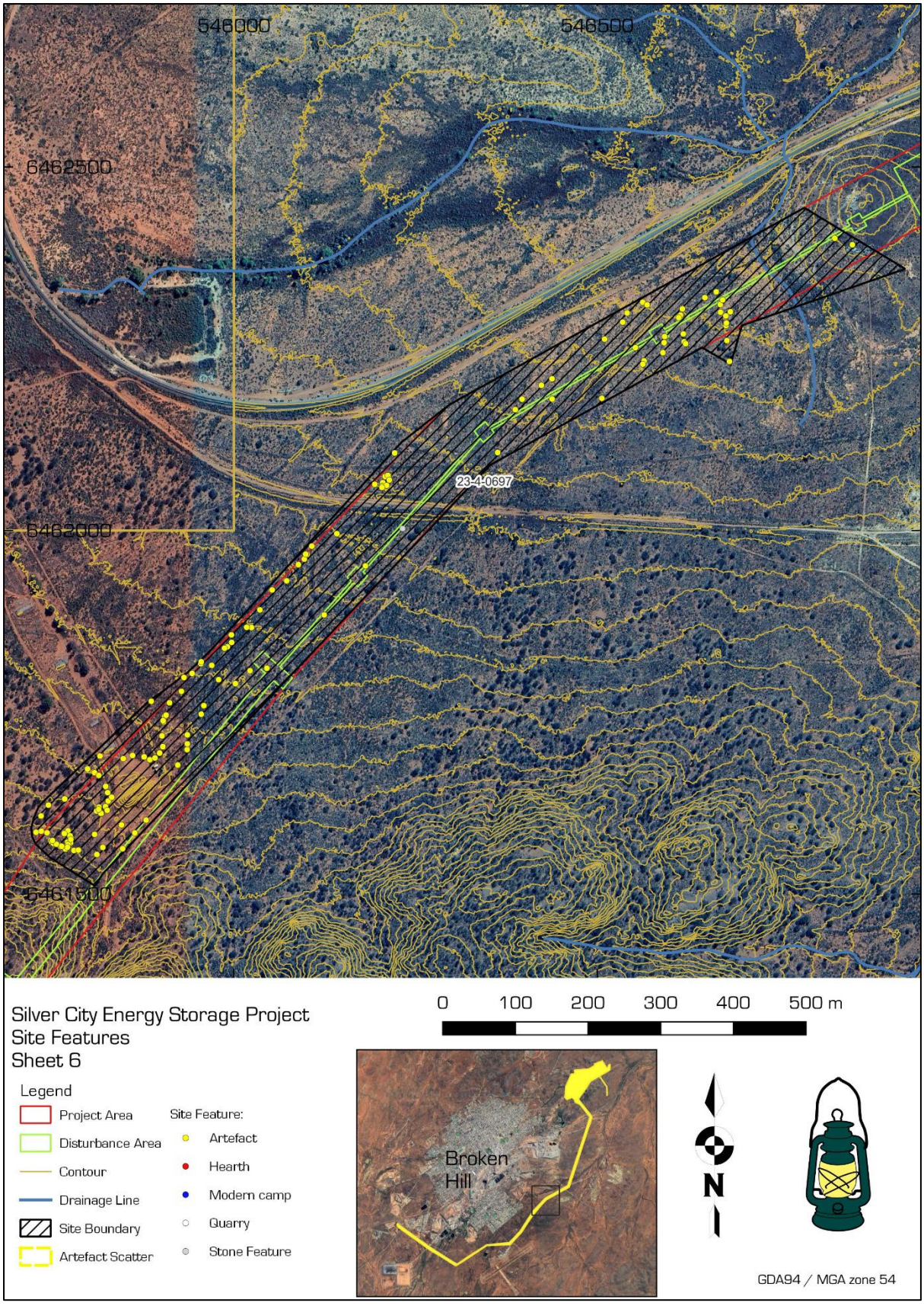
Silver City Energy Storage Project
Site Features
Sheet 5
Legend
Project Area
Disturbance Area
Contour
Drainage Line
Site Boundary
Artefact Scatter
Site Feature:
Artefact
Hearth
Modern camp
Quarry
Stone Feature
0
100
200
300
400
500 m
Broken Hill
N
GDA94 / MGA zone 54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Silver City Energy Storage Project
Site Features
Sheet 6
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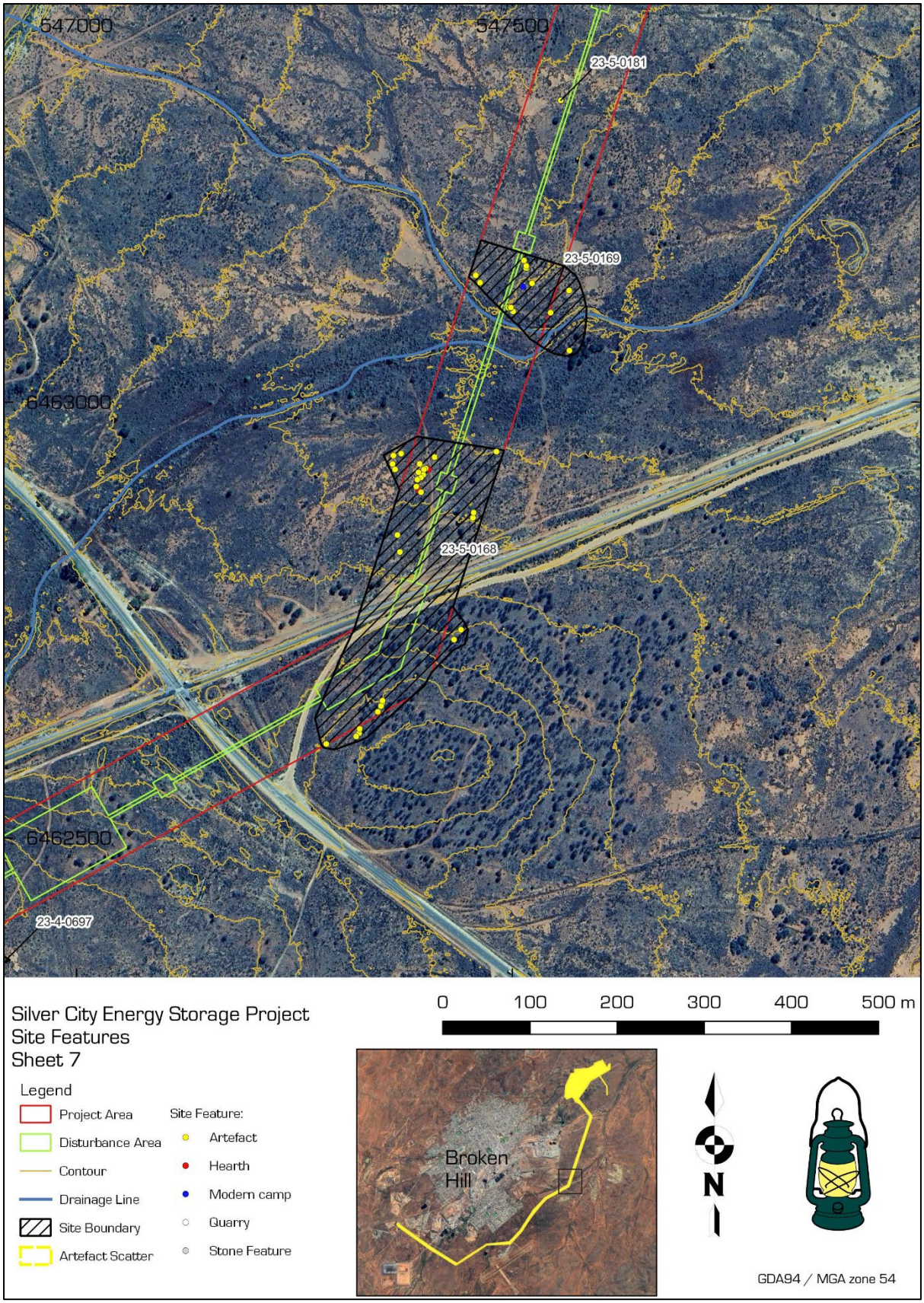
Project Area
Disturbance Area
Contour
Drainage Line
Site Boundary
Artefact Scatter
Site Feature:
Artefact
Hearth
Modern camp
Quarry
Stone Feature
0
100
200
300
400
500 m
Broken Hill
N
GDA94 / MGA zone 54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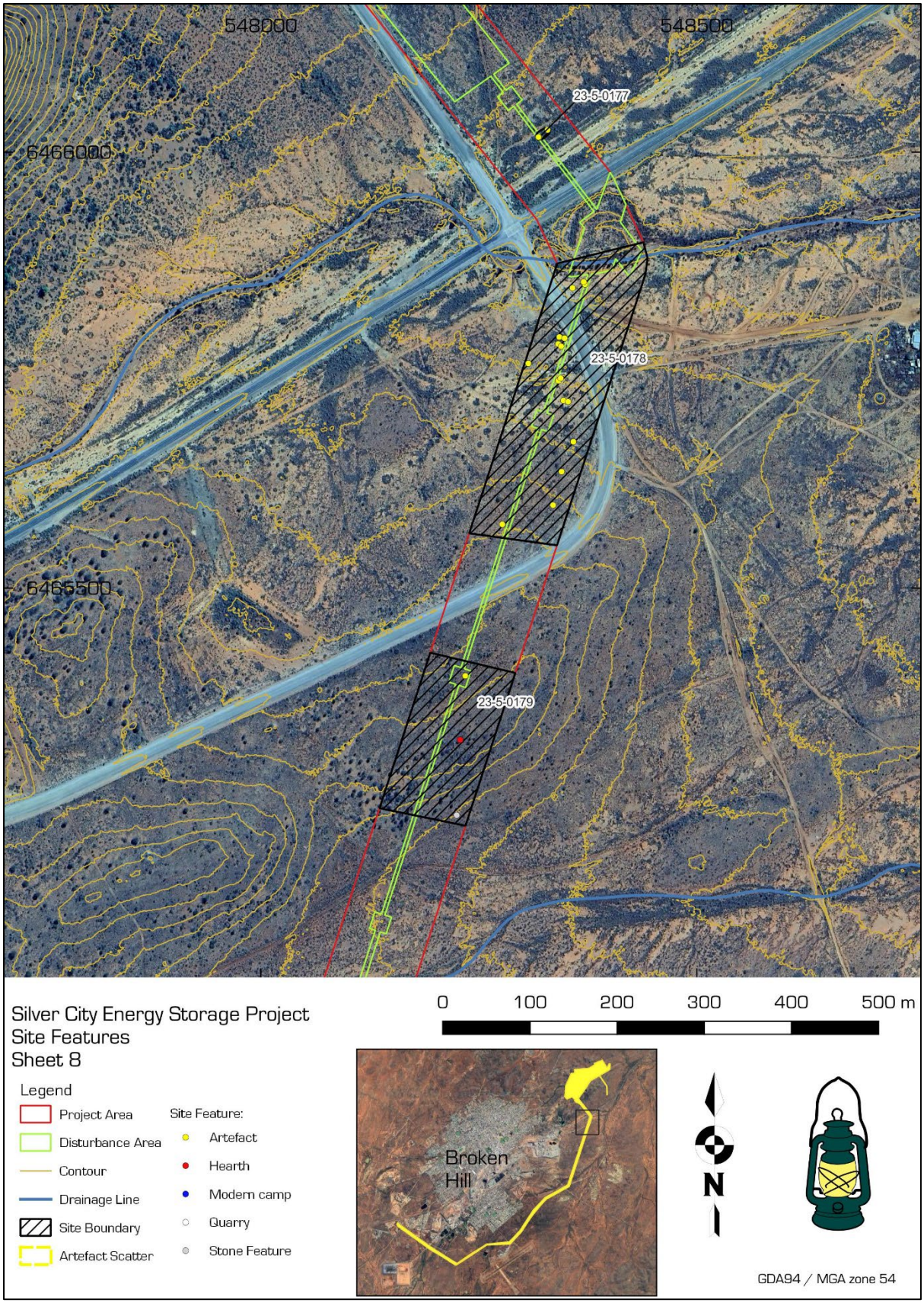
Silver City Energy Storage Project
Site Features
Sheet 7
Legend
Project Area
Disturbance Area
Contour
Drainage Line
Site Boundary
Artefact Scatter
Site Feature:
Artefact
Hearth
Modern camp
Quarry
Stone Feature
0
100
200
300
400
500 m
Broken Hill
N
GDA94 / MGA zone 54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Silver City Energy Storage Project
Site Features
Sheet 8
Legend
Project Area
Disturbance Area
Contour
Drainage Line
Site Boundary
Artefact Scatter
Site Feature:
Artefact
Hearth
Modern camp
Quarry
Stone Feature
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100
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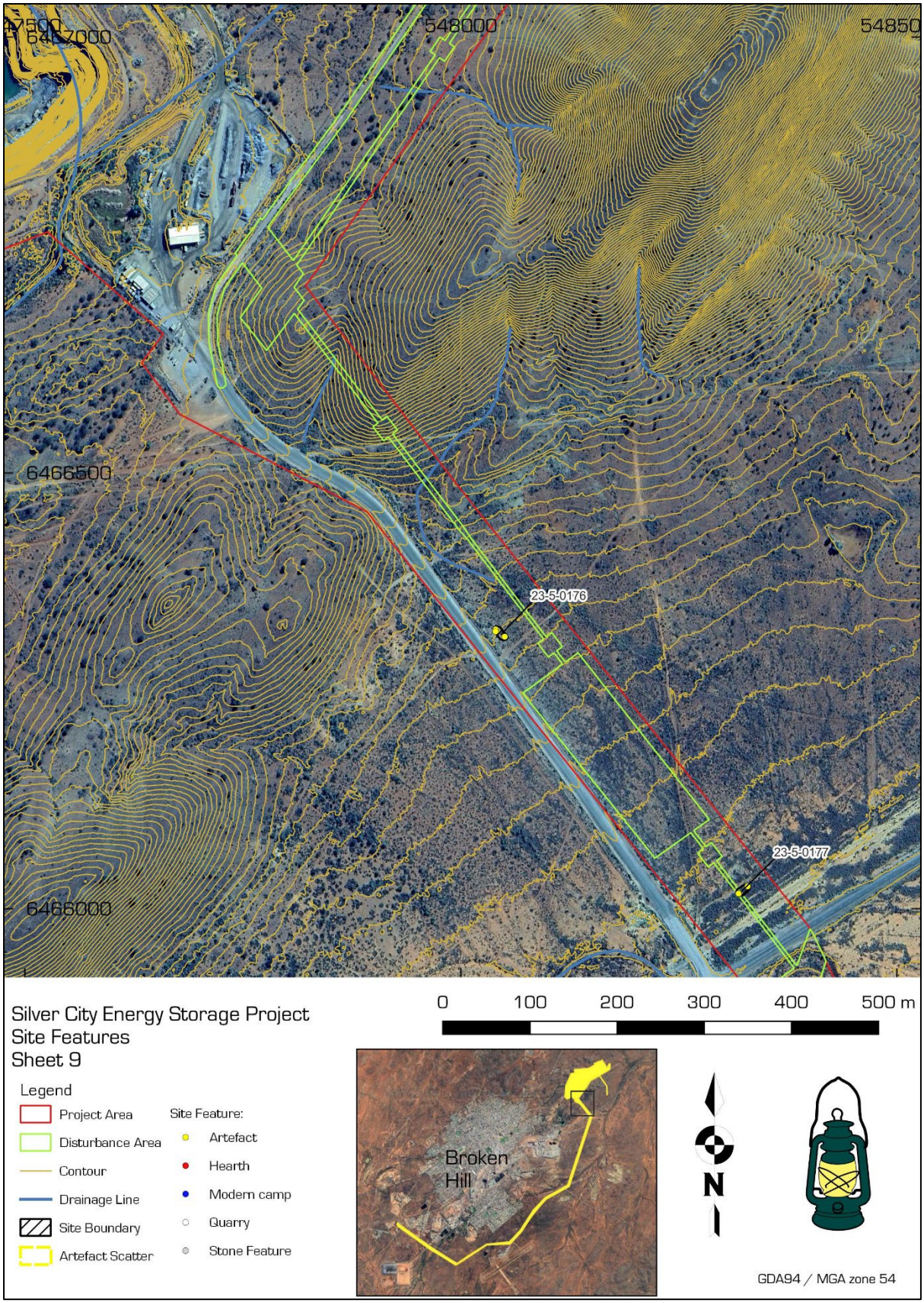
400
500 m
Broken Hill
N
GDA94 / MGA zone 54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Silver City Energy Storage Project
Site Features
Sheet 9
Legend
Project Area
Disturbance Area
Contour
Drainage Line
Site Boundary
Artefact Scatter
Site Feature:
Artefact
Hearth
Modern camp
Quarry
Stone Feature
0
100
200
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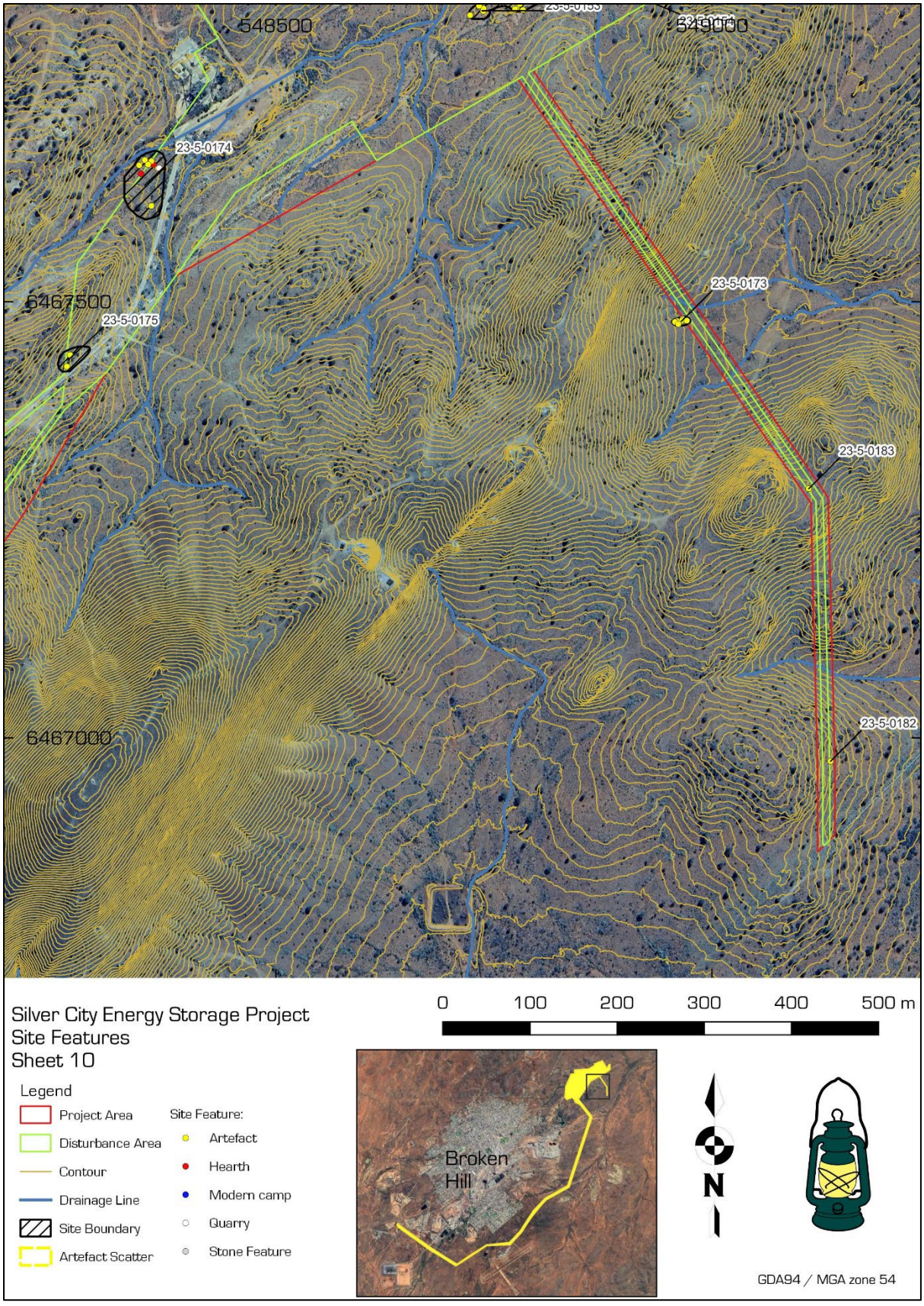
400
500 m
Broken Hill
N
GDA94 / MGA zone 54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Silver City Energy Storage Project
Site Features
Sheet 10
Legend
Project Area
Disturbance Area
Contour
Drainage Line
Site Boundary
Artefact Scatter
Site Feature:
Artefact
Hearth
Modern camp
Quarry
Stone Feature
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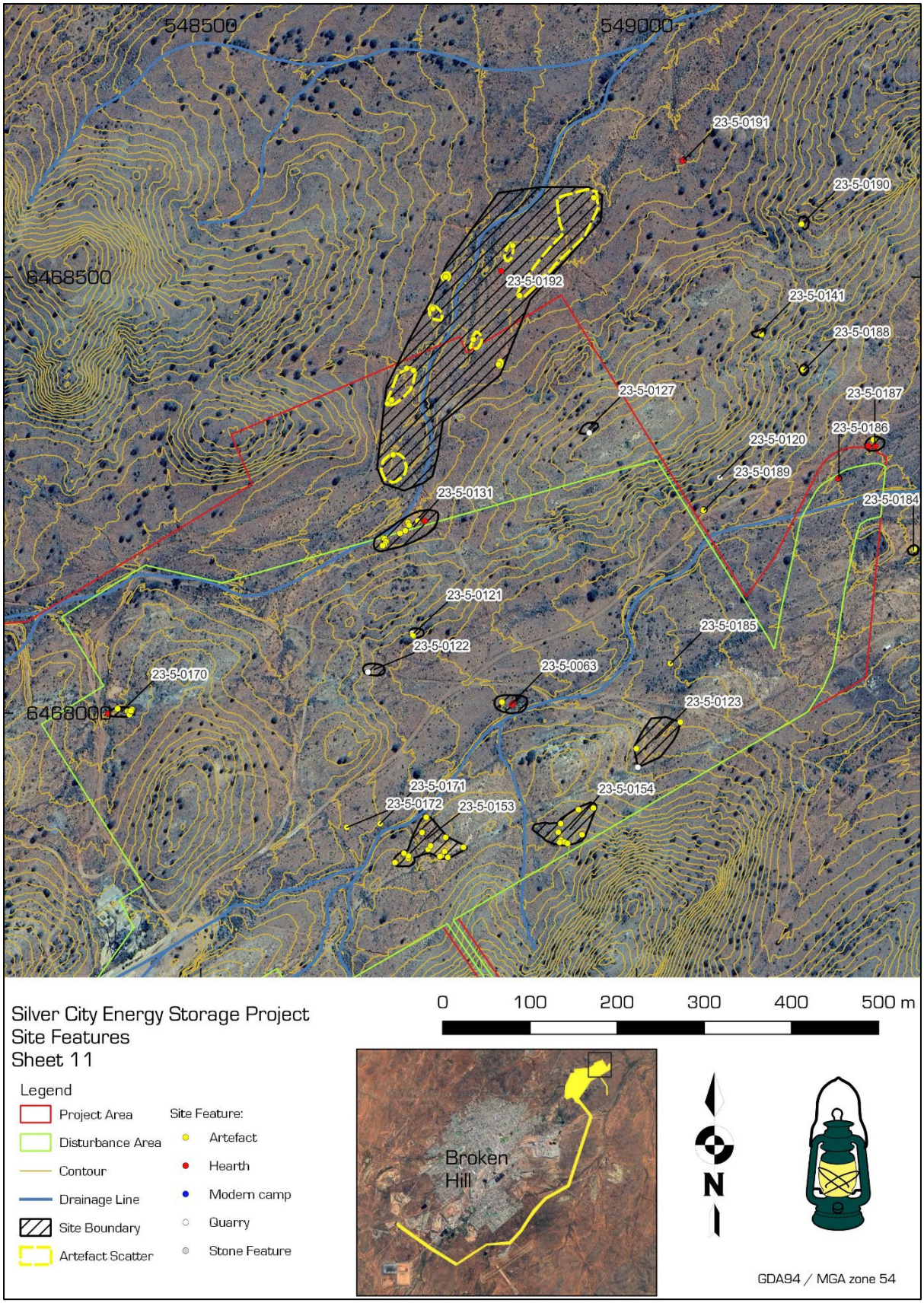
200
300
400
500 m
Broken Hill
N
GDA94 / MGA zone 54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23-5-0153
23-5-0154
Silver City Energy Storage Project
Site Features
Sheet 11
Legend
Project Area
Disturbance Area
Contour
Drainage Line
Site Boundary
Artefact Scatter
Site Feature:
Artefact
Hearth
Modern camp
Quarry
Stone Feature
0
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400
500 m
Broken Hill
N
GDA94 / MGA zone 54