McCardle Cultural Heritage Pty Ltd

ADW Johnson Pty Ltd

QR National Hexham Train Support Facility

LGA: Newcastle

Aboriginal Heritage Impact Assessment

August 2012

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Report No: J12034

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Position:	**Project Manager**
Signed:	
Date:	**August 2012**

CONTENTS

LIST OF TABLES

LIST OF FIGURES

McCardle Cultural Heritage Pty Ltd (MCH) was commissioned by QR National Coal to prepare an Aboriginal Heritage Impact Assessment (AHIA) for the proposed Hexham Train Support Facility (TSF) along the Pacific Highway, Hexham. The assessment was undertaken to meet the Director General Requirements March 22 2010, the Office of Environment and Heritage (OEH) Aboriginal Cultural Heritage Consultation Requirements for Proponents (2010) and the Brief.

Following this assessment in 2011, AMBS (2012) undertook an AHIA to address potential impacts to Aboriginal cultural heritage arising from the Hexham Relief Roads Project proposed by Australian Rail Track Corporation (ARTC). The results from the AMBS assessment have been included in this report.

The study area is located on the western side of the Pacific Highway at Hexham and includes 255 hectares of land currently zoned for industrial, special uses and environmental. The site is bounded by the Pacific Highway and the New England Highway to the north and east and by rural and environmental lands to the south and west, including Hexham Swamp Nature Reserve. The study area consists of low lying flats (part of the Hunter River floodplain) that are constantly water logged in the north and a highly disturbed landscape in the south.

A search of the OEH AHIMS register has shown that 93 known Aboriginal sites are currently recorded within a ten kilometre radius of the study area including 51 open camps, 25 artefact sites, 6 isolated finds, 3 grinding grooves, 3 artefact/PADs, 3 PADs, one scarred tree and one artefact/PAD/grinding groove site. Within the local area, previous assessments within a similar environmental context indicate that, within a well-watered context, there is high potential for archaeological material to be present on level, typically well-elevated landforms that provide ready access to low-lying waterlogged areas and the associated resources. The majority of sites within the area appear to contain low-moderate artefact densities situated on elevated landforms. No sites have been identified within Hexham swamp itself.

The geomorphological evolution of the Hexham Swamp area is complex and the period of interest is the past 20,000 years. During this time there are two major periods that significantly changed the landscape for past Aboriginal people of the area. At 18,000 to 10,000 BP sea level was rapidly rising and marine sands and temporary coastal barriers were rapidly moving inland and at the end of this period the Hexham area was an open bay. At 10,000 to 2,000BP the fluvial deposition of floodplain sediments dominated the estuary. The area was an open estuarine bay/lake from 600ya to the last 2,000 ya and the change to fresh water habitats accelerated in the last 200 years. In addition to this, the present water table is significantly lower than what it was prior to the Ironbark creek flood gates being installed and as such the current water logging throughout the area would have been significantly higher prior to the flood gates being installed. Thus the Hexham swamp area, being a bay/lake and waterlogged floodplain, has constantly being unsuitable for past occupation, however, the elevated land surrounding the swamp is proven to have been favored for past occupation.

Whilst the northern portion of the study area has been subject to European land uses and impacts, the southern portion of the study area is highly disturbed through

past land uses and it is expected that all cultural materials that may have been present no longer exist.

Vegetation during the assessment was dense with overall effective coverage being 1% and grass being the limiting factor with minimal erosion along the drainage line and exposures from cattle.

No sites were identified during the survey. This may be due to a number of reasons including the geomorphic history rendering the area unsuitable for camping, poor visibility, disturbances and the low lying flood prone landform that may not have been suitable for occupation. While the study area may have been utilised for hunting and gathering, resulting in reduced evidence of occupation, the disturbances in the northern portion would have disturbed that evidence. The disturbances in the southern section would have destroyed any such evidence.

The site identified by AMBS (HS1) was not re-located during a second site visit on 2 April 2012 following its identification by AMBS. It is noted that an additional cultural site was identified by the Aboriginal stakeholders during the AMBS assessment. AMBS did not nominate a site name and for management issues a site name has been nominated here CO/HS/1 (cultural objects/hexham swamp/1).

Due to the high significance of the Hexham area to the Awabakal people, the northern portion of the study area, which has been the least impacted upon has been identified as a Potential Cultural Deposit (PCD). The following recommendations were made:

1) The persons responsible for the management of works on site will ensure that all staff, contractors and others involved in construction and maintenance related activities are made aware of the statutory legislation protecting sites and places of significance; and

2) The involvement of the registered Aboriginal stakeholders in the ongoing management of the Aboriginal cultural materials within the project study should be promoted and included in the Environmental Management Plan and the Aboriginal Cultural Heritage Management Plan.

3) As part of the PCD will be impacted upon by the access road, an archaeological subsurface investigation will be required in accordance with the Code of Practice for Archaeological Investigations of Aboriginal Objects in NSW within the area to be impacted only;

4) As part of the potential subsurface component of site HS1(PAD) will be impacted on, an archaeological subsurface investigation will be required in accordance with the Code of Practice for Archaeological Investigations of Aboriginal Objects in NSW within the area to be impacted only;

5) The surface expression of site HS1 will not be impacted upon by the proposed development and will be suitable fenced prior to works to ensure its protection; and

6) Temporary fencing will be in place following the test excavation and before works start, to ensure no impacts will occur outside the identified development footprint.

7) The registered Aboriginal stakeholders will be provided the opportunity to collect the cultural objects COHS/1 prior to any works being undertaken.

Glossary

Aeolian deposits: sediments transported by wind (sand dunes, loess).

Alluvial: sediment mass that is deposited from transport by channelled stream flow or over-bank flow.

Aboriginal Cultural Heritage Values: traditional values of Aboriginal people, handed down in spiritual beliefs, stories and community practices and may include local plant and animal species, places that are important and ways of showing respect for other people.

Aboriginal Place: are locations that have been recognised by the Minister for Climate Change and the Environment (and gazetted under the *National Parks and Wildlife Act1974*) as having special cultural significance to the Aboriginal community. An Aboriginal Place may or may not include archaeological materials.

Aboriginal Site: an Aboriginal site is the location of one or more Aboriginal archaeological objects, including flaked stone artefacts, midden shell, grinding grooves, archaeological deposits, scarred trees etc.

Artefact: any object that is physically modified by humans.

Artefact scatter: a collection of artefacts scattered across the surface of the ground. Also referred to as open camp sites.

Assemblage: a collection of artefacts associated by a particular place or time and assumed generated by a single group of people and can comprise different artefact types.

Association: the co-occurrence of an artefact with other archaeological remains, usually in the same matrix.

Axe: a stone-headed axe usually having two ground surfaces that meet at a bevel.

Backed artefact: a stone tool where the margin of a flake is retouched at a steep angle and that margin is opposite a sharp edge.

Background scatter: a term used to describe low density scatter of isolated finds that are distributed across the landscape without any obvious focal point.

B.C: abbreviation for the term Before Christ. In academic, historical and archaeological professions, this term is now generally replaced by Before Common Era (B.C.E).

B.C.E: Before Common Era. See B.C.

Biface: a stone artefact flaked on both faces.

Bipolar flake: a stone artefacts produced by striking into an anvil with a hammer stone. These flakes usually display crushing at either end.

Blade: a flake that is at least twice as long as it is wide.

Bondi point: a small asymmetrical backed artefact with a point at one end and backing retouch.

B.P: Before Present, used in age determination instead of B.C or B.C.E. Present is academically defined as the year 1950 (the year the term was invented).

Bulb of percussion: a small, rounded protrusion on a flake resulting from the blow that separated the flake from its core or other flake.

Bulbar depression: a depression left on the core (where a flake's bulb of percussion was attached) when a blade or flake was struck off.

Calcined bone: burned bone reduced to white or blue mineral constituents.

Ceremonial Sites: Included in the OEH AHIMS database are sites which were associated with the spiritual beliefs and activities of Aboriginal people. They may be natural places in the landscape, or places where structures were made as part of particular ceremonies. Structures include bora rings, stone arrangements etc.

Conjoin: a physical link between artefacts broken.

Contact site: a site that displays interaction between early colonists and Aboriginal Australians.

Context: the position and associations of an artefact, feature, or archaeological find in space and time. Noting where the artefact was found and what was around it assists archaeologists in determining chronology and interpreting function and significance. Loss of context removes the artefacts meaning and make sit more difficult to determine function.

Core: a chunk of stone from which flakes are removed and will have one or more negative flake scars but no positive flake scars. The core itself can be shaped into a tool or used as a source of flakes to be formed into tools.

Cortex: the rough outer weathered surface of a rock, usually chemically altered and removed during knapping.

Cultural deposit: sediments and materials laid down by, or heavily modified by human activity.

Cultural Heritage Sensitivity: This term is used to denote not just the value of a place in the landscape to Aboriginal people, but also the vulnerability of the value. For instance, places with important spiritual values may be very sensitive because the rocks, pools or trees are easily damaged by the activities of others, or only a very few examples remain.

Debitage: small pieces of stone debris that break off during the manufacturing of stone tools. These are usually considered waste and are the by product of production (also referred to as flake piece).

Distal: the terminating end of a flake opposite the bulb.

Edge damage: the removal of small flakes, or crushing, from the edge of an artefact.

Elders: Older Aboriginal people in the local community for whom there is great respect because of their knowledge, dignity or communication skills. These people are not necessarily the descendents of traditional Aboriginal people from the area.

Elouera: a type of backed blade, triangular sectioned and resembling an orange segment in shape.

Exposure: an area of land surface where the ground surface is visible, usually as a result of thinner vegetation cover, erosion or human caused disturbances. In archaeological surveys, the percentage of ground surface exposed is recorded and the used to calculate effective survey coverage.

Flake: any piece of stone struck off a core and has a number of characteristics including ring cracks showing where the hammer hit the core and a bulb of percussion. May be used as a tool with no further working, may be retouched or serve as a platform for further reduction.

Flaked piece/waste flake: an unmodified and unused flake, usually the by product of tool manufacture or core preparation (also referred to as debitage).

Fluvial deposit: sediments laid down by running water.

Formation processes: human caused (land uses etc) or natural processes (geological, animal, plant growth etc) by which an archaeological site is modified during or after occupation and abandonment. These processes have a large effect on the provenience of artefacts or features.

Grinding Grooves: Aboriginal people made a range of edge ground implements such as 'axes' and 'hatchets'. The sharp edge of these tools was maintained by grinding it on sandstone outcrops, most often in stream beds where pools of water were available to wet the grindstone. Spear shafts were also sometimes shaped by grinding. The grinding sites can be identified by elongated grooves in the sandstone surface in sets of 2 to more than 100. Some portable grindstones are also reported from Aboriginal sites.

Grinding stone: an abrasive stone used to abrade another artefact or to process food.

Ground edge hatchet: a stone axe that is oval or rounded in shape and has edges formed by grinding and sharpening and were hafted to wooden handles using resin, wax or a combination of materials.

Hafting: the process of attaching a stone artefact onto a handle or spear.

Hammer stone: a stone that has been used to strike a core to remove a flake, often causing pitting or other wear on the stone's surface.

Harm: is defined as an act that may destroy, deface or damage an Aboriginal object or place. In relation to an object, this means the movement or removal of an object from the land in which it has been situated

Holocene: the post-glacial period, beginning about 10,000 B.P.

In situ: archaeological items are said to be "in situ " when they are found in the location where they were last deposited.

Isolated find: a single artefact not located with any other.

Knapping: the process of striking rocks causing them to fracture.

Midden: a type of archaeological site that is dominated by shell deposits that may have been sourced by Aboriginal people from fresh water, estuarine or open coastline habitats. The long-term disposal of refuse can result in stratified deposits, which are useful for relative dating.

Pleistocene: the latest major geological epoch, colloquially known as the "Ice Age" due to the multiple expansion and retreat of glaciers. Ca. 3.000,000-10,000 years B.P.

Post-depositional: after deposition.

Retouched flake: a flake that has been flaked again in a manner that modified the edge for the purpose of resharpening that edge.

Salvage archaeology: archaeological research carried out to preserve or rescue sites, materials and data from areas threatened by man-made or natural disturbance.

Scarred tree: a tree that bears a scar or scars which are wounds formed from the deliberate removal of bark or wood by Aboriginal people and are usually an indicator of an activity area.

Scraper: stone tool made on a flake or core with steep retouch along one or more edges.

Sedimentation: the accumulation of geological or organic material deposited by air, water, or ice.

Site: an area where archaeological evidence is observed.

Stone arrangement: an arrangement of stones into a shape or pattern and often used for ceremonial purposes or place markers.

Spiritual Significance: the importance of a place in the landscape that is valued by Aboriginal people because it is part of their spiritual culture. Examples include places associated with totem species or places that are the subject of traditional cultural stories.

Stratified Archaeological Deposits: Aboriginal archaeological objects may be observed in soil deposits and within rock shelters or caves. Where layers can be detected within the soil or sediments, which are attributable to separate depositional events in the past, the deposit is said to be stratified. The integrity of sediments and soils are usually affected by 200 years of European settlement and activities such as land clearing, cultivation and construction of industrial, commercial and residential developments.

Surface collection: archaeological materials obtained from the ground surface.

Surface scatter: archaeological materials found distributed over the ground surface.

Taphonomy: the study of processes which have affected organic materials such as bone after death; it also involves the microscopic analysis of tooth-marks or cut marks to assess the effects of butchery or scavenging activities.

Test excavation: excavation of small sections (a sample) of an area to determine the archaeological remains and significance.

Toe-hold: small scar on tree trunks and branches used to facilitate climbing.

Traditional Aboriginal Owners: Aboriginal people who are listed in the Register of Aboriginal owners pursuant to Division 3 of the *Aboriginal Land Register Act (1983)*. The Registrar must give priority to registering Aboriginal people for lands listed in Schedule 14 of the *National Parks and Wildlife Act 1974* or land subject to a claim under 36A of the *Aboriginal Land Rights Act 1983*.

Traditional Knowledge: Information about the roles, responsibilities and practices set out in the cultural beliefs of the Aboriginal community. Only certain individuals have traditional knowledge and different aspects of traditional knowledge may be known by different people, e.g. information about men's initiation sites and practices, women's sites, special pathways, proper responsibilities of people fishing or gathering food for the community, ways of sharing and looking after others, etc.

Typology: the systematic organization of artefacts into types on the basis of shared attributes.

Use wear: the wear displayed on an artefact as a result of use.

Weathering: the natural chemical or physical alteration of an object or deposit through time.

Abbreviations and Acronyms

ACHMP	Aboriginal Cultural Heritage Management Plan
AHIMS	Aboriginal Heritage Information Management System. Data base of recorded sites across NSW managed by OEH
OEH	Office of Environment and Heritage

OEH AHIMS Site Acronyms

ACD	Aboriginal ceremonial and dreaming
AFT	Artefact (stone, bone, shell, glass, ceramic and metal)
ARG	Aboriginal resource and gathering
ART	Art (pigment or engraving)
BOM	Non-human bone and organic material
BUR	Burial
CFT	Conflict site
CMR	Ceremonial ring (stone or earth)
ETM	Earth mound
FSH	Fish trap
GDG	Grinding groove
HAB	Habitation structure
HTH	Hearth
OCQ	Ochre quarry
PAD	Potential Archaeological Deposit. Used to define an area of the landscape that is believed to contain subsurface archaeological deposits.
PCD	Potential Cultural Deposit. Used to define an area of the landscape that is believed to contain subsurface cultural deposits and is determined by the Aboriginal stakeholders.
SHL	Shell
STA	Stone arrangement
STQ	stone quarry
TRE	Modified tree (carved or scarred)
WTR	Water hole

1 INTRODUCTION

1.1 INTRODUCTION

McCardle Cultural Heritage Pty Ltd (MCH) has been commissioned by QR National Coal to prepare an Aboriginal Heritage Impact Assessment (AHIA) for the proposed Hexham Train Support facility (TSF) along the Pacific Highway at Hexham, NSW.

The assessment has been undertaken to meet the Director General Requirements March 22 2010, the Office of Environment and Heritage (OEH) Aboriginal Cultural Heritage Consultation Requirements for Proponents (2010) and the Brief.

Following this assessment in 2011, AMBS (2012) undertook an AHIA to address potential impacts to Aboriginal cultural heritage arising from the proposed ARTC Hexham Relief Roads Project (Refer to *Section 5.3*). The results from the AMBS assessment have been included in this report.

1.2 PROPONENT DETAILS

Queensland Rail National
GPO Box 456
Brisbane, Qld, 4001

1.3 STUDY AREA & HOW IT IS DEFINED

The study area is defined by the proponent and is located on the western side of the Pacific Highway at Hexham. The study area includes 255 hectares of land currently zoned for industrial, special uses and environmental. The site is bounded by the Pacific Highway and the New England Highway to the north and east and by rural and environmental lands to the south and west, including Hexham Swamp Nature Reserve. The Lots and DP are provided in *Table 1.1*. The location and extent of the study area is illustrated in *Figures 1.1* to *1.3*.

Table 1.1 Lots and DPs

101	DP1084709
102	DP1084709
2	DP735456
10	DP735235
104	DP1084709
113	DP755232
1	DP155530
12	DP1075150
1	DP1062240
311	DP583724

1.4 DESCRIPTION OF THE PROPOSED DEVELOPMENT

The proposed development is for a Train Support Facility (TSF). The TSF will provide an efficient and cost effective method of supporting QR National's train system operating on the adjacent rail corridor.

MCH:

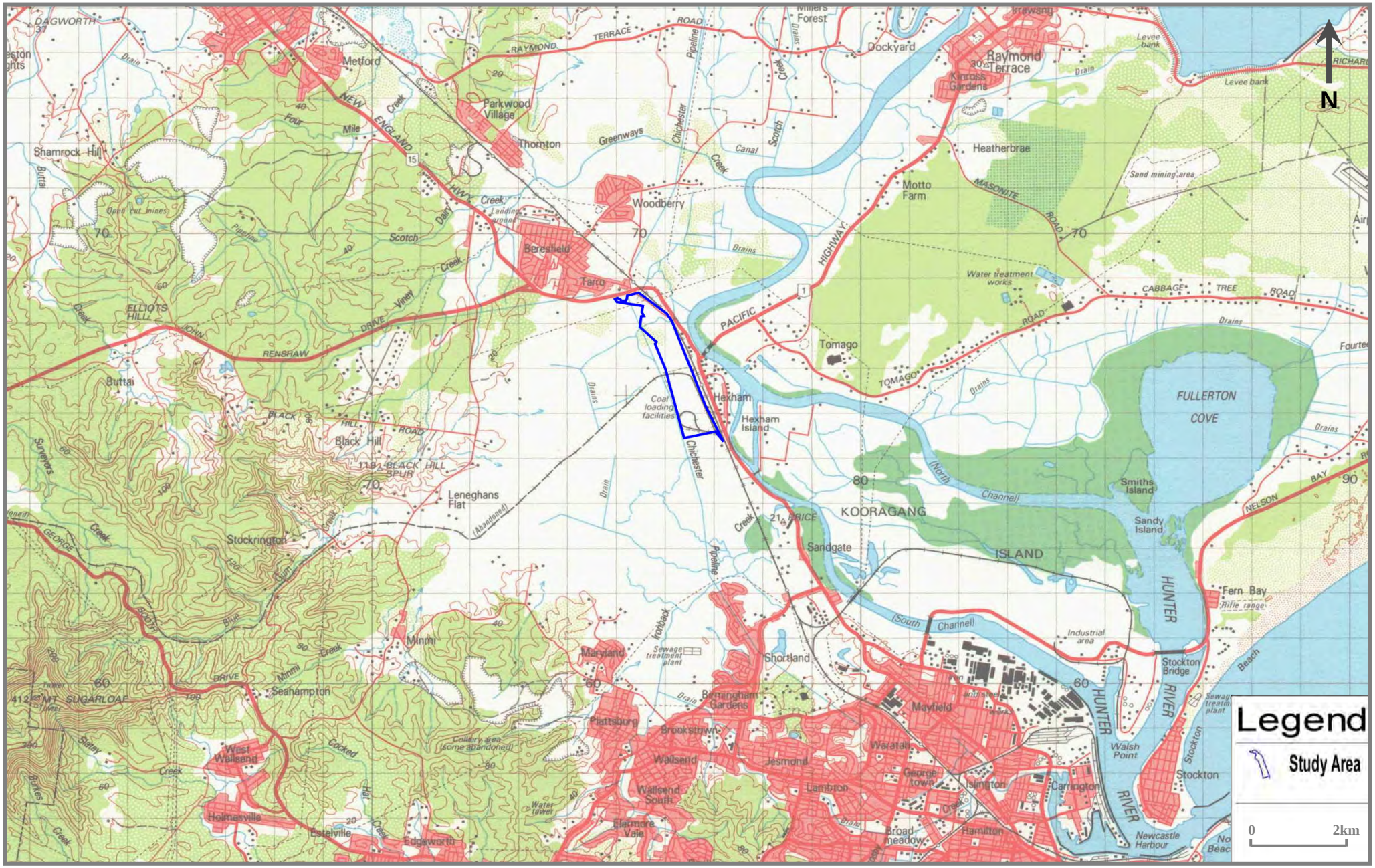


Figure 1.1 Regional Location of the Study Area

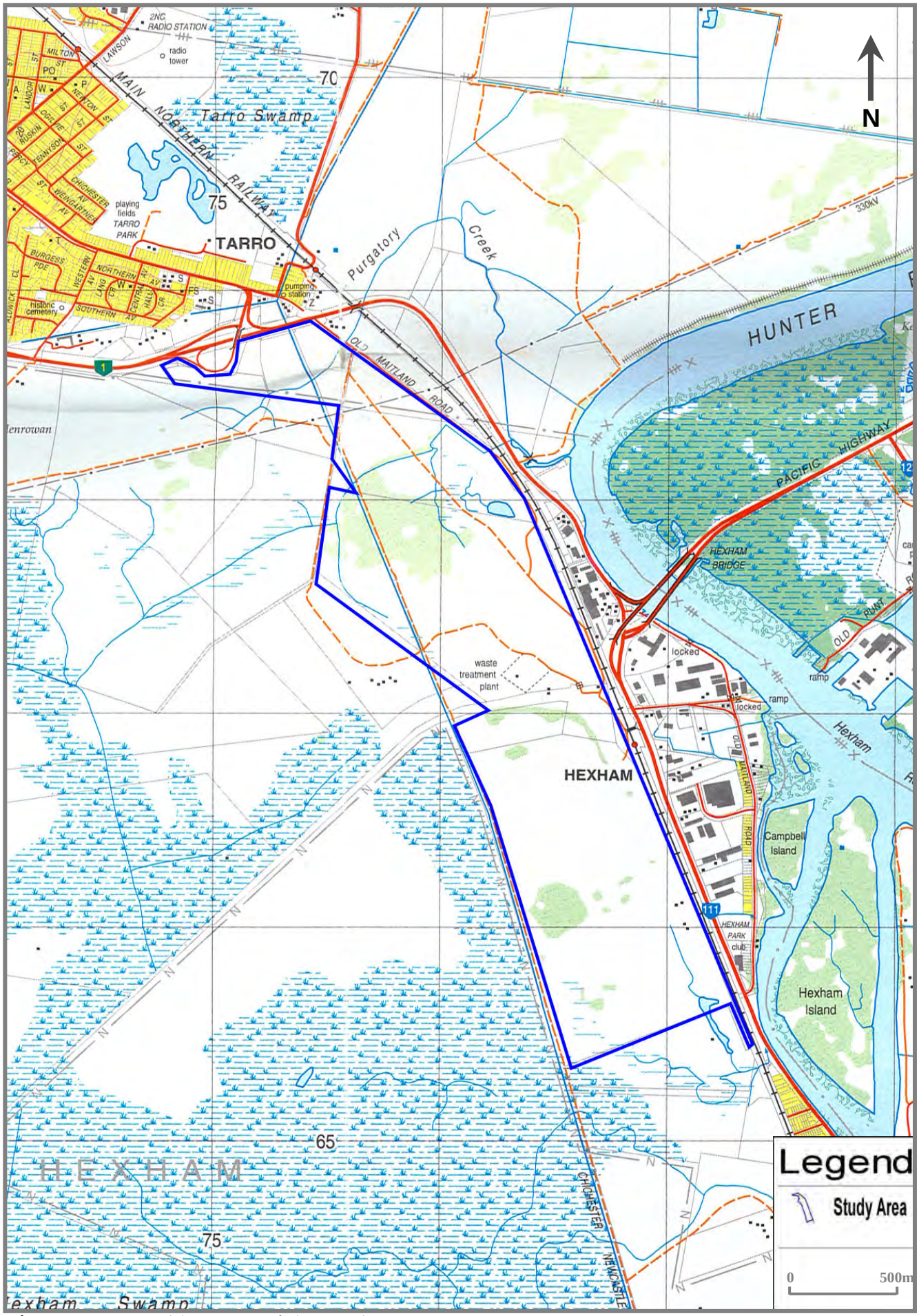


Figure 1.2 Local location of the study area

Source: 1:25 000 Topo Series: Beresfield

Figure 1.3 Aerial location of the study area

Source: Google Earth

1.5 DEVELOPMENT FOOTPRINT

Figures 1.4 to *1.6* show the development. In addition, an access road from the development site to Tarro interchange is proposed. The proposed development of the TSF involves some site filling and grading. For much of the works this will mean that levels will remain below the 100 year recurrence flood (they will be at around the 50 year recurrence flood level). This is because the proposed track has no alternative but to be constructed to match the existing levels of the adjoining rail network to which the proposed development must connect.

1.6 LEGISLATIVE PROJECT FRAMEWORK

The EP&A Act establishes the statutory framework for planning and environmental assessment in New South Wales. The implementation of the EP&A Act is the responsibility of the Minister for Planning and Infrastructure, statutory authorities and local councils. The EP&A Act contains three parts which impose requirements for planning approval:

- Part 3 relates to the preparation and making of Environmental Planning Instruments (EPIs) and State Environmental Planning Policies (SEPPs) and Local Environmental Plans (LEPs) which zone land for particular purposes;
- transitional Part 3A (now repealed) makes provisions in respect of 'major infrastructure and other projects' that require approval from the Minister for Planning and Infrastructure;
- Part 4 generally provides for the control of local development that requires development consent from the local Council;
- a new Division 4.1 has been inserted under Part 4 to establish the new assessment pathway for State significant development (sections 89C to 89L);
- Part 5 provides for the control of 'activities' that do not require development consent and are undertaken or approved by a determining authority; and
- the new Part 5.1 establishes the new assessment pathways for State significant infrastructure (sections 115T to 115ZM).

The applicable approval process is determined by reference to the relevant environmental planning instruments and other controls, SEPPs and LEPs.

The project is currently being assessed as a transitional Part 3A project under the now repealed Part 3A of the EP&A Act. However, it is understood by QR National that the project will transition to be assessed as a State significant infrastructure project under Part 5.1 of the EP&A Act.

The Director-General's requirements issued on 13 February 2008 and the revised Director-General's requirements issued on 22 March 2010 direct QR National to the Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation which sets out the appropriate methodology for assessing and reporting on potential impacts of a project on Aboriginal Cultural Heritage.

MCH:

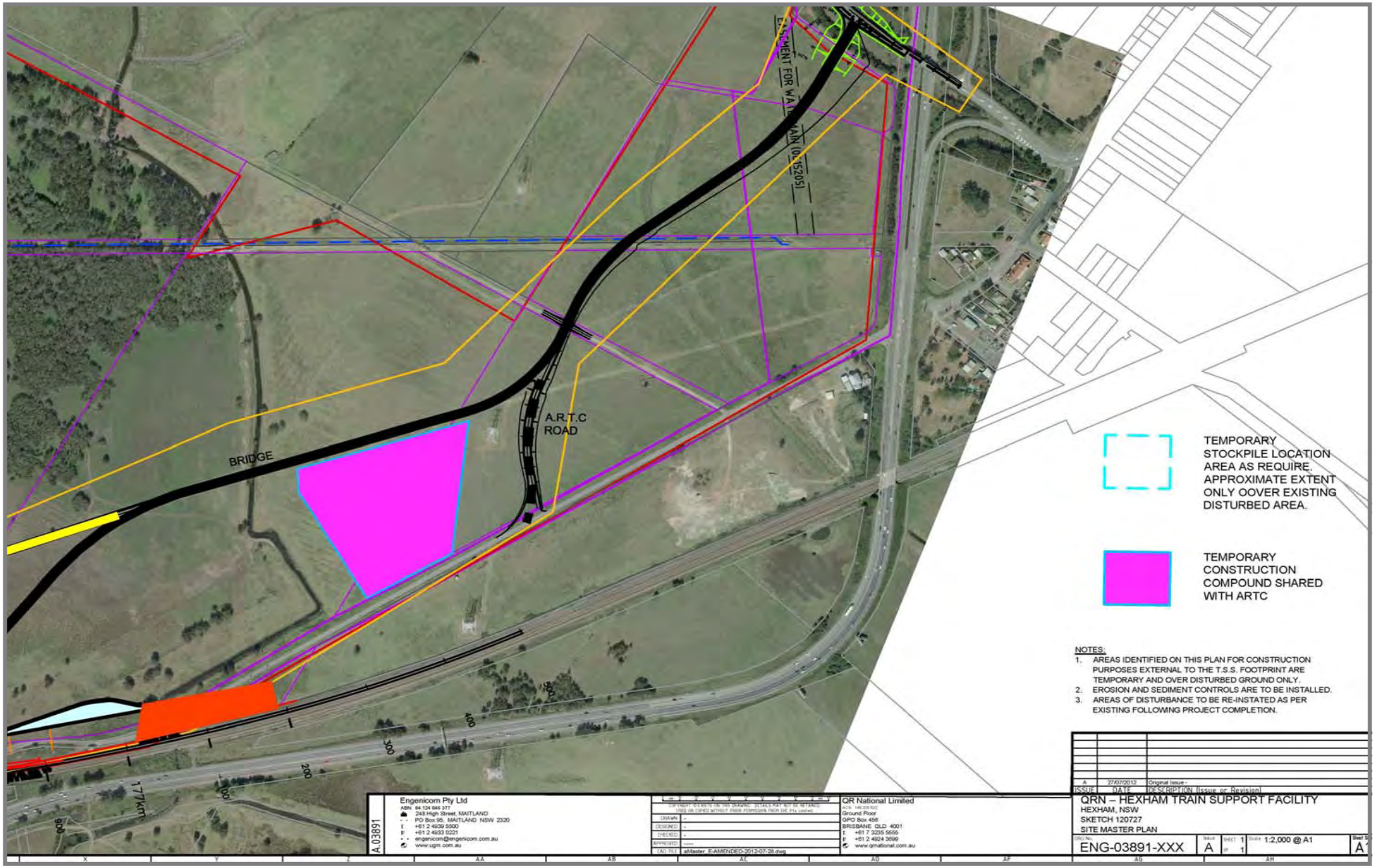


Figure 1.4 Development plan (northern section)

Source QR National

MCH:

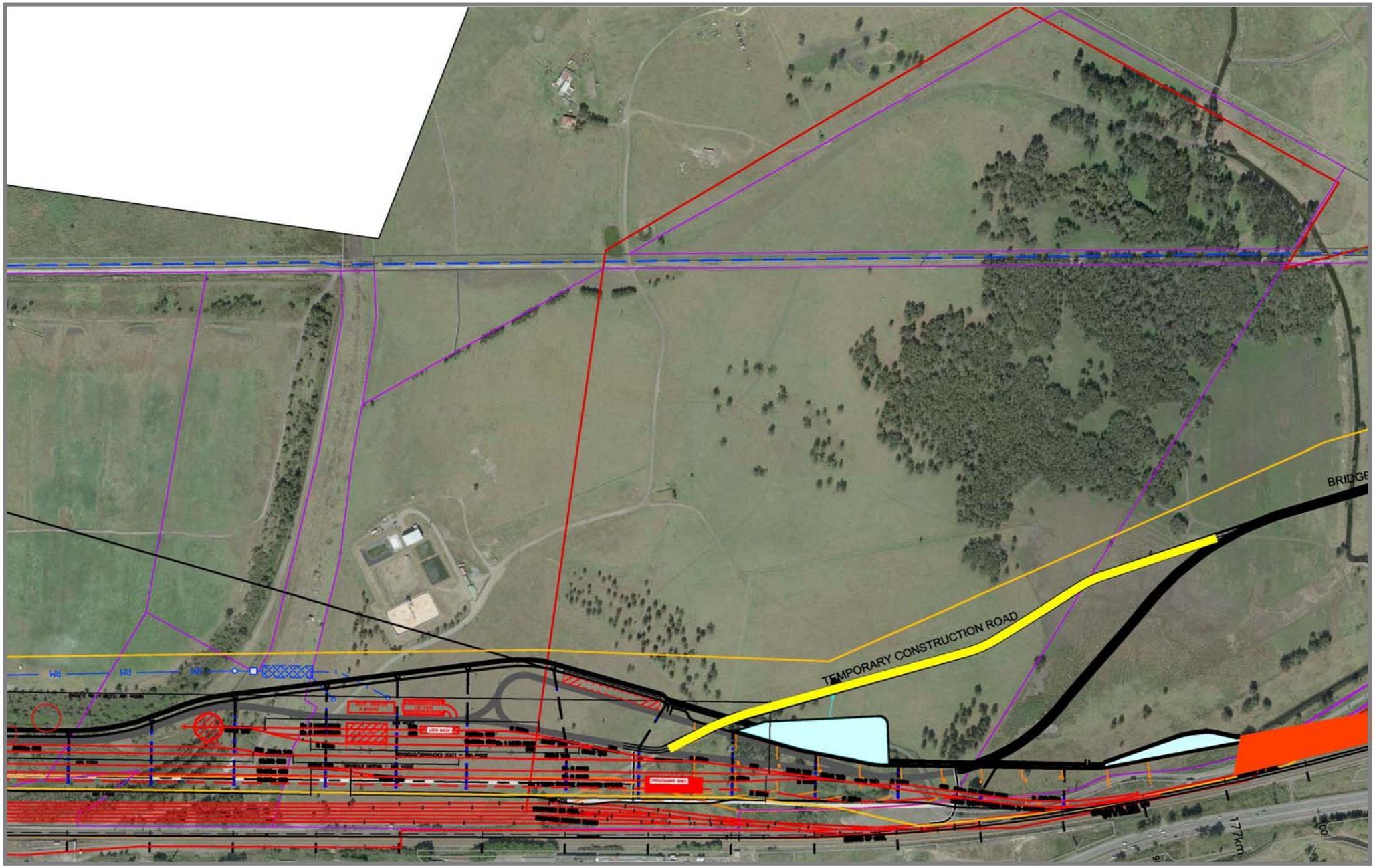
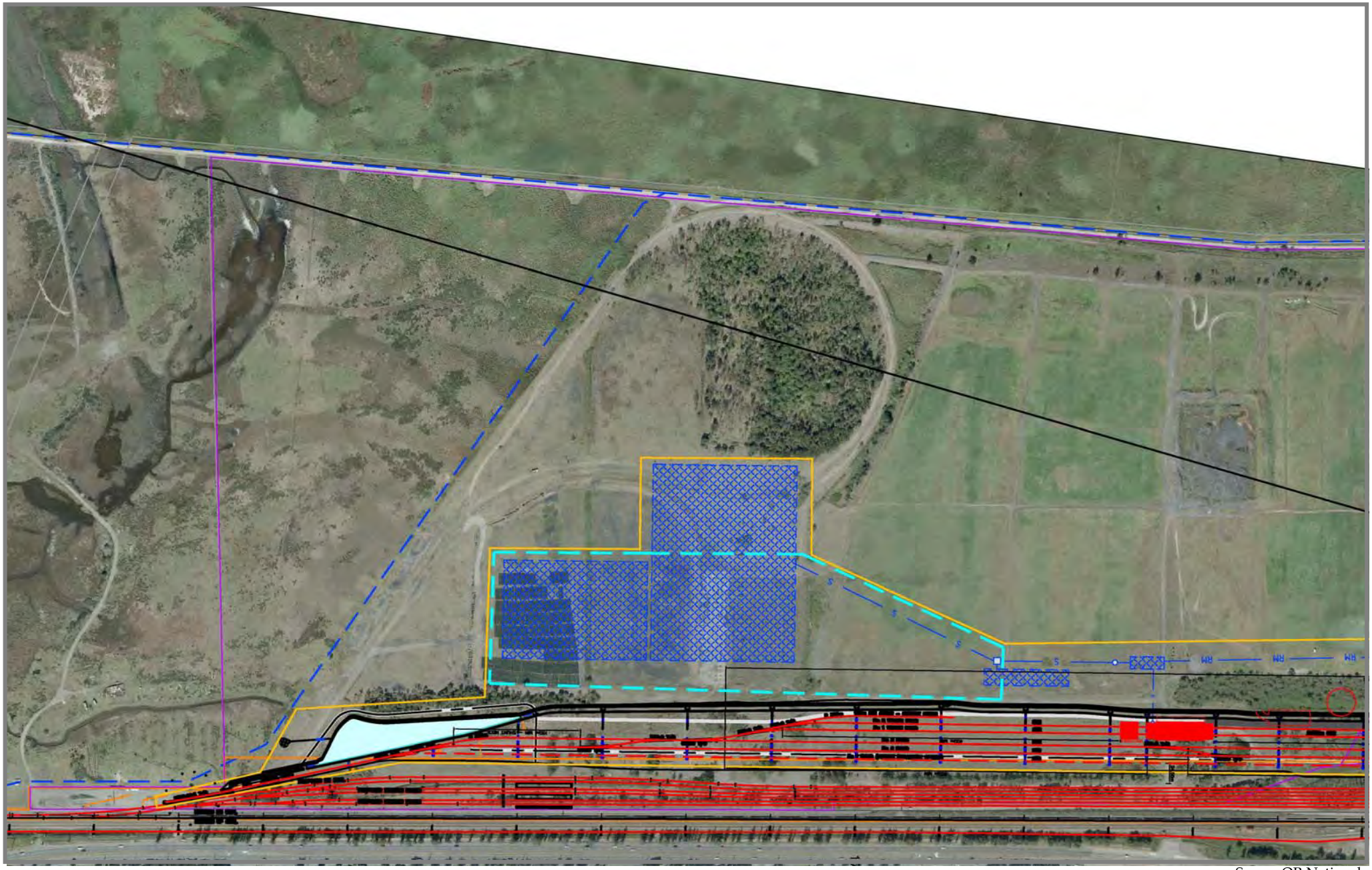


Figure 1.5 Development plan (middle section)

Source QR National

MCH:



Source QR National

Figure 1.6 Development plan (southern section)

1.7 PURPOSE OF THE ARCHAEOLOGICAL ASSESSMENT

The purpose of the assessment is to assess any archaeological constraints to support the QR National Hexham project.

1.8 OBJECTIVES OF THE ASSESSMENT

The objective of the assessment is to identify areas of indigenous cultural heritage value, to determine possible impacts on any indigenous cultural heritage identified (including potential subsurface evidence) and to develop management recommendations where appropriate.

The assessment employs a regional approach, taking into consideration both the landscape of the study area (geomorphology, landforms, water resources, soils, geology etc), the regional archaeological patterning identified by past studies as well as cultural knowledge.

1.9 PROJECT BRIEF/SCOPE OF WORKS

The following tasks were carried out:

- a review of relevant statutory registers and inventories for indigenous cultural heritage including the NSW Department of Environment and Heritage (OEH) Aboriginal Heritage Information Management System (AHIMS) for known archaeological sites, the NSW State Heritage Inventory, the Australian Heritage database and the Newcastle Local Environmental Plan;
- a review of local environmental information (topographic, geological, soil, geomorphological, flora and fauna descriptions) to determine the likelihood of archaeological sites and specific site types, prior and existing land uses and site disturbance that may effect site integrity;
- a review of previous cultural heritage investigations to determine the extent of archaeological investigations in the area and any archaeological patterns;
- the development of a predictive archaeological statement based on the data searches and literature review;
- identification of human and natural impacts in relation to known and recorded archaeological sites and predicted archaeological potential of the study area;
- consultation with the registered Aboriginal stakeholders as per OEH Aboriginal Cultural Heritage Consultation Requirements for Proponents (2010);
- undertake a site inspection with the participation of the registered Aboriginal stakeholders; and
- the development of mitigation and conservation measures.

1.10 STATUTORY CONTROLS

Land managers are required to consider the affects of their activities or proposed development on the environment under several pieces of legislation. Indigenous cultural heritage in NSW is protected and managed under both Commonwealth and State legislation. The appropriate legislation is summarised below.

- *New South Wales National Parks and Wildlife Act* 1974, Amendment 2010

The National Parks and Wildlife Act (1974), Amended 2010, administered by the OEH is the primary legislation for the protection of Aboriginal cultural heritage in New South Wales. Part 6 of the Act provides protection for Aboriginal objects and declared Aboriginal places through the establishment of offences of 'harm' to these objects and places. Under the Act, it is an offence to knowingly harm or desecrate an Aboriginal object or Aboriginal place. If harm to an object or place is anticipated, an Aboriginal Heritage Impact Permit (AHIP) must be applied for and OEH may issue and AHIP under the s90 of the Act.

Previously, the NPW Act required two permits for the majority of activities and included one for test excavations (s87) and one for the activity itself (s90). The new provisions collapse these requirements into a single regulatory provision. A permit is no longer required to undertake test excavations (providing the excavations are in accordance with the Code of Practice for Archaeological Investigations in NSW).Where an AHIP s90 is required, they can now be issued in relation to specific parcels of land, deal with multi stage developments, and there are clear provisions for variation, transfer, suspension and revocation.

Linked to the NPW Act (amendment 2010) are the Due Diligence Code of Practice and the Archaeological Code of Practice. The Due Diligence Code of Practice explains and provides guidance about what due diligence means. It also provides steps in which individuals or organisations that own, use or manage land can identify if Aboriginal objects are or likely to be there, determine if their activities will harm Aboriginal objects and determine of an AHIP is required. The code enables people to take reasonable steps or precautions to consider if Aboriginal objects may be present and avoid harm to them. If harm cannot be avoided, then an AHIP is required. The Code of Practice for Archaeological Investigations of Aboriginal Objects in NSW assists in establishing the requirements for undertaking test excavations as part of an archaeological investigation without an AHIP and to establish the requirements that must be followed when undertaking an archaeological investigation in NSW where an AHIP application is likely to be made.

- *Environmental Planning and Assessment Act* 1979, (EP&A Act, NSW)

Consideration of potential impacts of a development on Aboriginal heritage is a key component of the environmental impact assessment process under the EP&A Act. In NSW the Environmental Planning and Assessment Act (EP&A Act) is the principal law overseeing the assessment and determination of development proposals which are considered under the different parts of the Act (DoP 2010) including Part 3, 4 and 5. The standards of the OEH Due Diligence Code may be used or adapted by proponents to inform the initial assessment of the environmental impacts of an activity on Aboriginal heritage. An environmental assessment that meets all the requirements of the Due Diligence Code will satisfy the Due Diligence test.

- *The Heritage Act* 1977 (NSW)

The Heritage Act 1977 protects the natural and cultural history of NSW with emphasis on non-indigenous cultural heritage through protection provisions and the establishment of a Heritage Council. While Aboriginal heritage sites and objects are protected primarily by the

NPW Act 1974, if an Aboriginal site, object or place is of great significance it can be protected by a heritage order issued by the Minister on the advice of the Heritage Council.

- *The Aboriginal and Torres Strait Islander Heritage Protection Act* 1984, Amendment 1987 (Commonwealth)

The Aboriginal and Torres Strait Islander Heritage Protection Act 1984 protects areas and/or objects which are of significance to Aboriginal people and which are under threat of destruction. A significant area or object is defined as one that is of particular importance to Aboriginal people according to Aboriginal tradition. The Act can, in certain circumstances override state and territory provisions, or it can be implemented in circumstances where state or territory provisions are lacking or are not enforced. The Act must be invoked by or on behalf of an Aboriginal or Torres Strait Islander or organisation.

- *The Australian Heritage Commission Act* 1975 (Commonwealth)

The Australian Heritage Commission Act 1975 established the Australian Heritage Commission, which assesses places to be included in the National Estate and maintains a register of these places, which are significant in terms of their association with particular community or social groups for social, cultural or spiritual reasons. The Act does not include specific protective clauses.

1.11 QUALIFICATIONS OF THE INVESTIGATOR

Penny McCardle: Principal Archaeologist & Forensic Anthropologist has 12 years experience in Indigenous archaeological assessments, excavation, research, reporting, analysis and consultation. Eight years in skeletal identification, biological profiling and skeletal trauma identification.

- BA (Archaeology and Palaeoanthropology), University of New England 1999
- Hons (Archaeology and Palaeoanthropology: Physical Anthropology), University of New England 2001
- Forensic Anthropology Course, University of New England 2003
- Armed Forces Institute of Pathology Forensic Anthropology Course, Ashburn, VA 2008
- Analysis of Bone trauma and Psedu-Trauma in Suspected Violent Death Course, Erie College, Pennsylvania, 2009
- Currently undertaking a PhD, University of Newcastle, 2012

1.12 REPORT STRUCTURE

The report includes *Chapter 1* which outlines the project, *Chapter 2* provides the consultation, *Chapter 3* provides the environmental context, *Chapter 4* presents ethno historic context, *Chapter 5* provides the archaeological background, *Chapter 6* provides the results of the fieldwork, analysis and discussion; *Chapter 7* presents the significance assessment, *Chapter 8* provides the development impact assessment, *Chapter 9* presents the mitigation strategies and *Chapter 10* presents the management recommendations.

2 CONSULTATION

The Director-General's requirements issued on 13 February 2008 and the revised Director-General's requirements issued on 22 March 2010 direct QR National to the Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation which sets out the appropriate methodology for assessing and reporting on potential impacts of a project on Aboriginal Cultural Heritage. All correspondences in relation to consultation are provided in *Annex A*.

In relation to cultural significance, MCH recognises and supports the Indigenous system of knowledge. That is, that knowledge is not 'open' in the sense that everyone has access and an equal right to it. Knowledge is not always definitive (in the sense that there is only one right answer) and knowledge is often restricted. As access to this knowledge is power, it must be controlled by people with appropriate qualifications (usually based on age seniority, but may be based on other factors). Thus, it is important to obtain information from those that hold the appropriate knowledge of those sites and/or areas relevant to the project.

If knowledge is shared, that information must be used correctly and per the wishes of the knowledge holder. Whilst an archaeologist may view this information as data, a custodian may view this information as highly sensitive, secret/sacred information and may place restrictions on its use. Thus it is important for MCH to engage in affective and long term consultation to ensure knowledge is shared and managed in a suitable manner that will allow for the appropriate management of that site/area. Archaeologists do not have the capability nor the right to adjudicate on the spirituality of a particular location or site as this is the exclusive right of the traditional owners who have the cultural and hereditary association with then land of their own ancestors. For these reasons, consultation forms an integral component of all projects and this information is sought form the registered stakeholders to be included in the report in the appropriate manner that is stipulated by those with the information.

2.1 STAGE 1: NOTIFICATION OF PROJECT PROPOSAL & REGISTRATION OF INTEREST

The aim of this stage is to identify, notify and register Aboriginal people and/or groups who hold cultural knowledge that is relevant to the project area, and who can determine the cultural significance of any Aboriginal objects and/or places within the proposed project area. In order to do this, the sources identified by OEH (2010:10) and listed in *Table 2.1*, to provide the names of people who may hold cultural knowledge that is relevant to determining the significance of Aboriginal objects and/or places were contacted by letter on 13 December 2010. As the project was urgent, a reply was requested no later than 20 December 2010 and it was stipulated that if no response was received, the project and consultation will proceed (as per advice from OEH).

Table 2.1 Sources contacted

Organisations contacted	
Office of Environment and Heritage	National Native Title Tribunal
Awabakal LALC	Native Title Services Corporation Limited
Newcastle City Council	Catchment Management Authority
Registrar Aboriginal Land Rights Act 1983	

Information included in the correspondence to the sources listed in *Table 2.1* included the name and contact details of the proponent, an overview of the proposed project including the location and a map showing the location.

Following this, MCH compiled a list of people/groups to contact (Refer to *Table 2.2*). It is recognised that these lists also provide groups not from the traditional boundaries from which the study area is located and that this is very offensive to the traditional owners of the area. Unfortunately some Government departments written to requesting a list of groups to consult with do not differentiate groups from different traditional boundaries and provide an exhaustive list of groups from across the region including those outside their traditional boundaries. And as per the OEH Aboriginal cultural heritage consultation requirements for proponents (April 2010), archaeologists and proponents must write to all those groups provided asking if they would like to register.

Table 2.2 ***List of people/groups to contact***

Groups	
Awabakal Traditional Owners Aboriginal Corporation	Hunter Valley Cultural Surveying
Awabakal Descendants Traditional Owners Aboriginal Corporation	Kayaway eco-Cultural and Heritage Services
Awabakal Newcastle Aboriginal Co-Op	Valley Culture
Arwarbukarl Cultural Resource Association	Hunter Valley Natural & Cultural Resources
Koompahtoo LALC C/O Awabakal LALC	Wonnaruah Elders Council
Hunter Traditional Owner	Wonn 1 Contracting
Culturally Aware	Cultural Heritage Officer
Ungooroo Cultural & Community Services Inc.	Lower Hunter Wonnarua Council Inc
Lower Wonnarua Tribal Consultancy Pty Ltd	Wonnarua Culture Heritage
Cacutua Cultural Consultants	Muswellbrook Cultural Consultants Pty Ltd
Upper Hunter Wonnarua Council	Black Creek Aboriginal Corporation
Ungooroo Aboriginal Corporation	Hunter Valley Aboriginal Corporation
Wanaruah Aboriginal Custodians Corporation	Bullen Bullen
Aboriginal Native Title Elders Consultants	Gidawaa Walang & Barkuma Neighborhood Centre Inc.
Hunter Valley Cultural Consultants	Wanaruah Nations Aboriginal Corporation
Upper Hunter Heritage Consultants	YarraWalk
Mingga Consultants	Yinnar Cultural Services
Giwiirr Consultants	St Clair Singleton Aboriginal Corporation
Carrawonga Consultants	Widescope Indigenous Group Pty Ltd
Wattaka Wonnarua Traditional Owner	

MCH wrote to all parties identified in *Table 2.2* on 20 December 2010, and an advertisement was placed in The Star on 15 December 2010. The correspondence and advertisement included the following information:

- the name and contact details of the proponent;
- an overview of the proposed project including the location of the proposed project;
- a statement that the purpose of community consultation with Aboriginal people is to assist the proposed applicant in the preparation of an application for an AHIP and to assist the Director General of OEH in his or her consideration and determination of the application

should an AHIP be required;

- an invitation for Aboriginal people who hold cultural knowledge relevant to the proposed project area and who can determine the significance of Aboriginal object(s) and/or place(s) in the area of the proposed project to register an interest in a process of community consultation;
- the closing date for the registration of interests (5 January 2011: an additional 5 days was added due to the Christmas and New Year period);
- that unless otherwise specified that those who are registering their interest that their details will be provided to OEH and the LALC;
- that LALC's who hold cultural knowledge relevant to the proposed project area that is relevant to determining the significance of Aboriginal objects and/or places within the proposed project area who wish to register must do so as an Aboriginal orginisation not an individual;
- where an Aboriginal organisation representing Aboriginal people who hold cultural knowledge relevant to the proposed project area and that is relevant to determining the significance of Aboriginal objects and/or places within the proposed project area who wish to register must nominate a contact person and provide written confirmation and contact details of this person or persons; and
- to nominate the preferred option for the presentation of information about the proposed project: an information packet or a meeting and information packet (Refer to Stage 2).

The registered parties are listed in *Table 2.3*.

Table 2.3 ***List of registered parties***

Registered parties
Awabakal Descendants Traditional Owners Aboriginal Corporation
Awabakal LALC
Awabakal Traditional Owners Aboriginal Corporation

2.2 STAGE 2: PRESENTATION OF INFORMATION ABOUT THE PROPOSED PROJECT

The aim of this stage is to provide the registered Aboriginal parties with information regarding the scope of the proposed project and the cultural heritage assessment process.

As the registered parties opted for an information packet to be forwarded to them with no request for a meeting, the following information was provided to each party:

- an outline of the project details including the nature, scope and methodology, as well as any impacts;
- an outline of the impact assessment process;
- an outline of critical timelines and milestones for the completion of the assessment and delivery of reports;
- to clearly define agreed roles, functions and responsibilities of the OEH, proponent, the registered Aboriginal parties and the LALC;

- to allow for opportunities for the registered Aboriginal parties to identify, raise and discuss their cultural concerns, perspectives and assessment requirements (if any); and
- requested the preferred option for the gathering of information about cultural significance (Stage 3): information packet with questions and options and/or a meeting.

This pack also stipulated that consultation was not employment, and requested that in order to assist the proponent in the selection of field workers, that the groups provide information in relation to two of the criteria as set out in the OEH Interim Community Consultation Requirements for Applicants (January 2005). This included:

- the ability to assist in communicating the results of the survey back to the stakeholders for the assessment of cultural significance and returning advise on their response to MCH (asked to provide details on their ability to discuss results of field work, ability to effectively represent the Aboriginal stakeholders and provide a cultural heritage report in an appropriate time frame); and
- experience in field work and in providing cultural heritage advise (asked to nominate at least two individuals who will be available and fit for work (physically able to undertake field work) and their relevant experience.

This pack also asked the registered groups to provide a CV and insurance details for MCH to pass onto the client.

2.3 STAGE 3: GATHERING INFORMATION ABOUT CULTURAL SIGNIFICANCE

The aim of this stage is to facilitate a process whereby the registered Aboriginal stakeholders can contribute to culturally appropriate information gathering and the research methodology, provide information that will enable the cultural significance of any Aboriginal objects and or/places within the proposed project area to be determined and have input into the development of any cultural heritage management options and mitigation measures.

In order to do his, included in the information pack sent for Stage 2, was information pertaining to the gathering of cultural knowledge. This included the following information;

- MCH noted that information provided by registered Aboriginal parties may be sensitive and MCH and the proponent will not share that information with all registered Aboriginal parties or others without the express permission of the individual. MCH and the proponent extended an invitation to develop and implement appropriate protocols for sourcing and holding cultural information including any restrictions to place on information, as well as the preferred method of providing information;
- request for traditional/cultural knowledge or information associated with ceremonial, spiritual, mythological beliefs, traditions and known sites from the pre-contact period;
- request for traditional/cultural knowledge or information regarding sites or places with historical associations and/or cultural significance which date from the post-contact period and that are remembered by people today (e.g. plant and animal resource use areas, known camp sites); and

- request for traditional/cultural knowledge or information in relation to any sites or places of contemporary cultural significance (apart from the above) which has acquired significance recently.

The registered Aboriginal stake holders did not disclose any specific traditional/cultural knowledge or information of sites or places associated with spiritual, mythological, ceremonies or beliefs from the pre contact period within the investigation area or surrounding area. The stakeholders did not disclose any information pertaining to sites or places of cultural significance associated with the historic or contemporary periods within the study area or surrounding area. However, general statements regarding the cultural significance of the Hexham Swamp area were made.

2.4 SURVEY

All groups were invited to participate in the survey on 9 February 2011. Kerrie Brauer (ATOAC), Shane Frost and James frost (ADTOAC) and MCH archaeologist undertook the survey accordance with the proposed methodology provided to the stakeholders for review and approved.

During the survey, the Aboriginal representatives were also asked of their traditional knowledge and of any areas of cultural significance within the study area and if they felt comfortable in sharing that information. Discussions centred on places associated with ceremonial, spiritual, mythological beliefs, traditions and known sites that date from the pre-contact period. Sites or places with historical associations and/or significance which date from the post-contact period and that are remembered by people today (e.g. plant and animal resource use areas, known camp sites) were discussed as well as sites or places of contemporary significance (apart from the above) which has acquired significance recently. The Aboriginal stakeholder field representatives made general statements regarding the cultural significance of the Hexham Swamp area to the Awabakal people.

2.5 STAGE 4: REVIEW OF DRAFT CULTURAL HERITAGE ASSESSMENT

A copy of the DRAFT report was forwarded to all registered Aboriginal parties (those listed in *Table 1.3*) for their review and were asked to provide a written or verbal response no later than 31 March 2011. Following the comments from the registered Aboriginal parties, all comments were considered and integrated in the final report. These included:

- The high cultural significance of the Hexham Swamp area;
- Links to ancestry and the local area as documented in historical documents and through oral traditions; and
- The northern portion, although disturbed may have subsurface deposits and would like it to be identified as a PCD based on the significance of Hexham Swamp and known past occupation in the Hexham area.

All submissions from the registered Aboriginal parties were responded to, the draft report altered to include their comments, and all parties were provided a copy of the final report.

MCH consulted with all groups identified who registered an interest in the project and all documentation regarding the consultation process is presented in *Annex A*.

2.6 *SITE MEETING*

Following the results of the AMBS assessment as part of their work on the AERTC relief roads project, all registered stakeholders were invited to a site meeting to be held on 2 April 2012 to discuss the site identified by AMBS and its implications for the QR TSF project. Kerrie Brauer (ATOAC) and Shane Frost (ADTOAC) e-mailed and rang MCH that afternoon to apologise for not attending the meeting as they has other commitments and requested more notice for meetings.

Given that the surface expression of site HS1 may be impacted on by the proposed QR TSF access road, no changes are required in management strategies or recommendations. Additionally, as the subsurface potential of HS1 is within the PCD and will be impacted on by the access road, subsurface test excavations are still warranted and these are discussed in the mitigation options and recommendations.

2.7 *DEPARTMENT OF PLANNING AND INFRASTRUCTURE ADEQUACY REVIEW*

The Department of Planning and Infrastructures' (DOP&I) adequacy review of the Environmental Assessment report (EA), (this assessment was an appendix to the EA), requested clarification of the legislative framework, additional information regarding the consultation process and an outline of the Aboriginal Cultural Heritage Management Plan. These areas have been clarified and this report updated to include the additional information. Copies of the updated report have been provided to the registered stakeholders for their records.

3 LANDSCAPE CONTEXT

3.1 INTRODUCTION

The nature and distribution of Aboriginal cultural materials in a landscape are strongly influenced by environmental factors such as topography, geology, landforms, climate, geomorphology, hydrology and the associated soils and vegetation (Hughes and Sullivan 1984). These factors influence the availability of plants, animals, water, raw materials, the location of suitable camping places, ceremonial grounds, burials, and suitable surfaces for the application of rock art. As site locations may differ between landforms due to differing environmental constraints that result in the physical manifestation of different spatial distributions and forms of archaeological evidence, these environmental factors are used in constructing predictive models of Aboriginal site locations.

Environmental factors also effect the degree to which cultural materials have survived in the face of both natural and human influences and affect the likelihood of sites being detected during ground surface survey. Site detection is dependent on a number of environmental factors including surface visibility (which is determined by the nature and extent of ground cover including grass and leaf litter etc), the survival of the original land surface and associated cultural materials (by flood alluvium and slope wash materials). Others include the exposure of the original landscape and associated cultural materials (by water, sheet and gully erosion, ploughing, vehicle tracks etc), (Hughes and Sullivan 1984). Combined, these processes and activities are used in determining the likelihood of both surface and subsurface cultural materials surviving and being detected.

It is therefore necessary to have an understanding of the environmental factors, processes and activities, all of which affect site location, preservation, detection during surface survey and the likelihood of subsurface cultural materials being present. The environmental factors, processes and disturbances of the surrounding environment and specific study area are discussed below.

3.2 TOPOGRAPHY

The topographical context is important to identify potential factors relating to past Aboriginal land use patterns. Story *et al* (1963) divided the Hunter Valley into eight main sub-regions including the Southern Mountains, Central Goulburn Valley, Merriwa Plateau, Liverpool and Mt Royal Ranges, Barrington tops, North-Eastern Mountains, Central lowlands and the Coastal Zone.

The study area is located within the most southern border of the Central Lowlands, (a broad lowland belt of lowlands approximately 15 kilometres wide) which lies at the centre of the region, from Singleton to Scone and Murrurundi (Storey *at al* 1963: 91). It is bounded on all sides by steep rugged country except in the far west where the Cassilis Gate provides access to the interior. To the south is dissected plateau country; to the north and west are the Liverpool Range and Barrington Uplands. This area contains much alluvial land consisting of open undulating grassland and level alluvial plains. Formerly rural, open cut mining has developed on a large scale around Singleton and Muswellbrook.

The specific study area is situated on the Hunter River flood plain with the Hunter River located approximately 200 metres to the east and Hexham Swamp immediately to the south and west. The northern portion of the study area is situated on swamp/low lying flats prone to flooding with few natural drainage lines, a man made drainage to the north and east, has been subject to low to moderate disturbances. The southern portion of the study area is highly disturbed with none of the original landform remaining (Refer to *Figure 3.1*).

3.3 GEOLOGY

The geology of a region is not only reflected in the environment (landforms, topography, geomorphology, vegetation, climate etc), it also influences past occupation and its manifestation in the archaeological record.

The nature of the surrounding and local geology along with the availability and distribution of stone materials has a number of implications for Aboriginal land use and archaeological implications. The implications for past Aboriginal land use mainly relate to location of stone resources or raw materials and their procurement for manufacturing and modification for stone tools. Evidence of stone extraction, and manufacture, can be predicted to be concentrated in the areas of stone availability. However, stone can be transported for manufacture and/or trading across the region.

The Hunter Valley consists of four major geological provinces: the New England Geosyncline in the northeast, the Sydney Basin in the centre and south, the Great Artesian Basin in the northwest, and the eastern Australian Tertiary Volcanic Province in the north and west (Hughes 1984). The Central Lowlands are situated on the Sydney Basin, on Permian rocks that are folded and consist of shales, tuffs, sandstone, mudstones, and conglomerate, with some lava beds in the basal portion, and contain the extensive coal measures that are mined throughout the region. Generally, the Permian rocks are only moderately resistant, consequently forming the lowlands.

The specific study area is situated on Quaternary gravels, sand, silt, clay "waterloo rock, fresh water and marine deposits (Newcastle Geological Map 1966). Materials most dominant in stone tool manufacture throughout the Central Lowlands are indurated mudstone/tuff and silcrete and are commonly found in creek line deposits, such as those observed at Black Hill and Woods Gully (Kuskie and Kamminga 2000:183). No raw materials suitable for stone tool manufacture are located within the study area.

3.4 GEOMORPHOLOGY

The study of the evolution of the landscape within the Hunter Valley demonstrates that certain land systems, landforms and soil types can be considered as having higher archaeological potential and research value. Geomorphology is the study of landscapes, their evolution and the processes operating within earth systems. Cultural remains are part of these systems, having being deposited on, and in part, resulting from interactions within landscapes of the past. An understanding of geomorphological patterning and alterations is therefore essential in assess and interpreting the archaeological record.

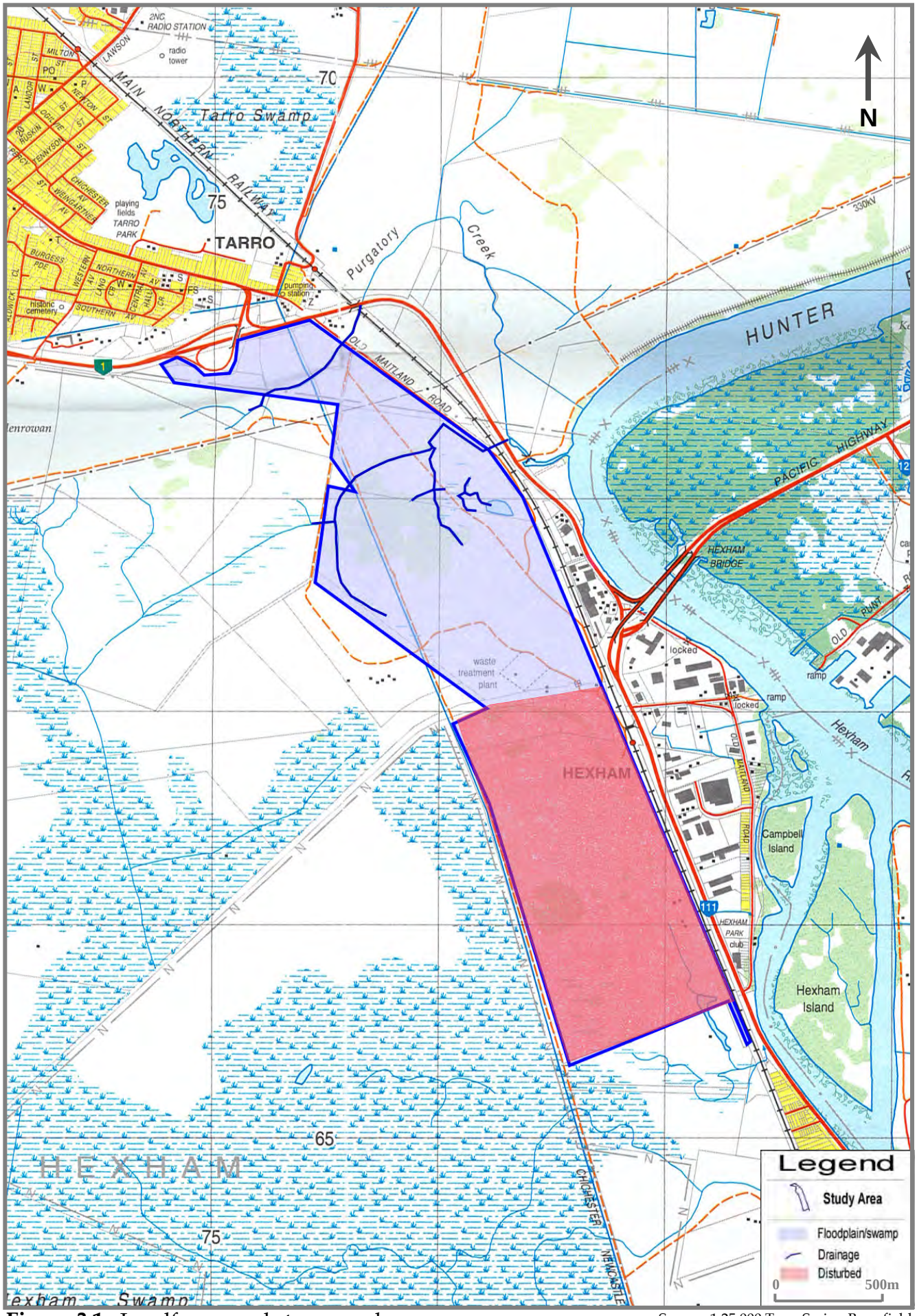


Figure 3.1 Landforms and stream orders

Source: 1:25 000 Topo Series: Beresfield

The geomorphology of the Hunter Valley is complex. A broad summary is provided below and derived from Galloway (1963), and Hughes (1984).The Hunter Valley contains a variety of landforms ranging from rugged mountains to plains and varying in elevation from sea level to over 1500 metres (AHD). It is surrounded on all sides by mountainous terrain with the exception of the western portion where a low rise divides it from the Darling River drainage area and the south eastern zone where it is bounded by the Pacific Ocean.

Four major elements are distinguished in the drainage pattern. The western half of the valley is drained by the Goulburn River and its tributaries that flow east to Denman. The north-eastern part is drained by the upper Hunter River, which flows southwest to unite with the Goulburn River at Denman. The combined rivers then flow east-south-east as the lower Hunter River, opening to the ocean at Newcastle. The Williams and Paterson Rivers drain the high country of the Barrington Tops in the east and join the Hunter River near its mouth. The watershed of the Goulburn River coincides with the Great Dividing Range, where it swings west in a vast loop.

Ramage (1994) also describes an additional significant drainage pattern: that of the smaller valley of Ironbark Creek (under Hexham swamp). The environmental context of Hexham Swamp has been dominated by the development of the Hunter floodplain, estuary and coastline in response to sea level changes. A general discussion regarding the wider geomorphology of the Newcastle Bight coastal area (that includes the Hexham area) is provided. Following this a detailed discussion of Hexham Swamp geomorphology is provided as this has significant implications for the likelihood of cultural materials being present, and the geomorphology of the region is illustrated *in Figure 3.2*.

The Newcastle Bight sand barrier system incorporates both inner (Pleistocene: c. 1.8 million to 10 000 years ago) and outer (Holocene: 10 000 years ago to today) coastal barriers as well as the inter barrier system. Sediments include marine, estuarine aeolian and paludal deposits. Although there is a long history of geomorphic study of the barrier systems in this region dating back to Thom (1965) and their evolution determined, it is important to note that in recent years the Pleistocene/Holocene coastal chronology has been substantially modified and therefore the conventional model of inner and outer barriers needs to be reconsidered. The conventional understanding of the geomorphic evolution of the coast in this region is that the inner Pleistocene barrier was deposited during the last Inter Glacial period of high sea level (approximately 120,000 years ago) and was later modified by wind erosion and the development of transgressive sand sheets and freshwater swamps on its western margin. The inner barrier blocked off several valleys to form extensive swamps including the former Grahamstown Swamp that is now beneath the artificial Grahamstown Lake.

At the height of the Last Glacial, sea level was at minus 120 metres AHD (Australian Height Datum), and the shoreline was about 30 kilometres seaward of its present position. At the end of the last Glacial (circa 18,000 years before present [BP]), the sea level rose rapidly sweeping shelf sand before it to form the parallel sets of beach ridges and swales of the outer Holocene barrier. It is usually accepted that sea level reached its present height about 6,000 years BP and that this date marks the beginning of Holocene sand accumulation. In addition to

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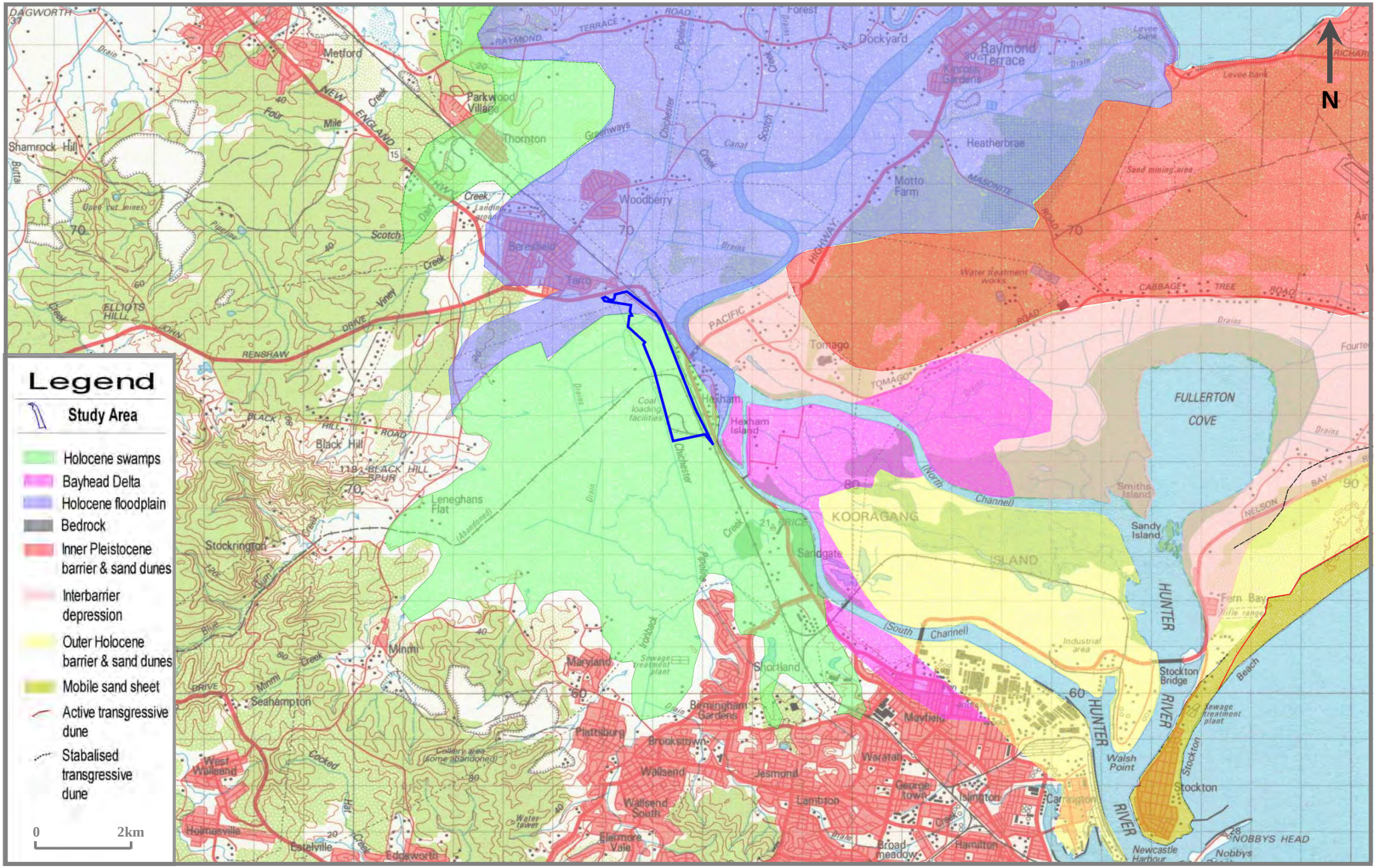

Figure 3.2 Regional geomorphology

Source: 1:100 000 Topo Series: Newcastle

the beach ridges behind Stockton Bight there are three sets of transgressive dunes, two of which (landward) have been stabilised by natural vegetation, and the third (coastward) remains transgressive (Robson *et al.,* 1993: 7).

Between the inner and the outer barrier is a large inter-barrier depression that is followed by Tilligerry Creek and was originally an extensive lagoon. It is now filled with either estuarine or fresh water swamp deposits, mud and clay (Robson *et al* 1993: 7).

Periods of active dune movement may either re-work and effectively destroy archaeological sites or bury older land surfaces and potentially preserve sites. Although there is a good potential for in-situ sites in stable dune areas (both in Holocene and Pleistocene dunes), a range of other preservation factors including wind and water erosion, groundwater fluctuation and European disturbance may have influenced localised site patterning.

Young *et al.,* (1993) seriously questioned the conventional model of coastal barrier development and suggested an alternate interpretation with four important elements:

1. that the sea level was at its present height by 7,000 years BP and that it rose another two metres until about 1,500 years BP;
2. Holocene transgressive dune activity varies from place to place and was a consequence of climate variation rather than sea level change;
3. that there was a fall of 2°C in sea surface temperature after 3,000 years BP and this coincided with the onset of the present phase of barrier erosion; and
4. that there is evidence of the effects of at least three tsunami on the NSW south coast in the last 3,000 years.

In later work, several of the same authors (Bryant *et al*., 1997; Haworth *et al*., 2002) confirmed that barrier formation on the NSW coast extended over 250,000 years with several phases of development and destruction. They also found evidence of remnants of the 'inner barrier' on the south coast with a peak phase of development at about 125,000 years BP when sea level was slightly higher than present. Their suggested explanation of the general absence of the inner barrier on the south coast is that such deposits were destroyed by tsunami, particularly one that occurred between 100,000-110,000 years BP.

Murray-Wallace (2002) provided additional support for a prolonged history of barrier development in reporting sea levels for the New South Wales coast at Oxygen isotope Stage 5 (last interglacial, 125,000 years BP) as being consistently about four metres above present sea level. This is within the range of sea levels reported in many other parts of Australia for the last eleven inter-glacials.

Applying these points to the Newcastle Barriers and to the study area it should be noted that:

- the landward parts of the inner barrier may be substantially older than previously appreciated;
- that a mid-Holocene higher sea level could have an important influence on erosion and deposition of the outer barrier and on sediments and features in the Hunter estuary;

- that the ages of transgressive dune sheets need not be coincident from place to place; and
- that evidence of tsunami may also occur on the north coast.

The Hunter River Estuary is typical of the larger NSW estuaries that have evolved over the millennia through various geological developments, climatic periods and sea level variations to the present day. The present-day estuary is a drowned river valley with an extensive floodplain delta where the river meanders to the sea.

The relevant period of environmental history for Aboriginal occupation strategies of the Hexham Swamp area is the last 50,000 years with the critical time being the last 20,000. At the last glacial maximum (20,000ya) the sea level was about 120 metres lower than present. Sea levels then rose rapidly from about 17,000ya until 10,000ya, with sea level rates tapering until the present level that was reached at 6,000ya. Sea levels have remained unaltered since this time and this is referred to as the Holocene stillstand. However, there is some evidence of slightly higher levels (1-2m higher) in the early part of the stillstand (Flood and Frankel 1989; Bryant *et al* 1992). This indicates that the western and southern shorelines of Hexham Swamp would have been subject to active marine processes during the last interglacial and early Holocene. The evolution of the Hunter estuary in response to these sea level changes are summarised below. Detailed discussions may be found in Roy *et al* (1995), Roy and Boyd (1996) and Walker (1999).

Last Interglacial – 120,000 years ago

The sea level at this time is estimated to have been about 4-5 metres higher than it is today and the raised estuarine shell beds at Largs were deposited at this time. The inner coastal barrier was formed and an extensive deltic floodplain (alluvial deposit at the mouth of a river) (similar to today) formed in the lower valley. Isolated remnants of the Pleistocene terrace deposits remain today in the lower Hunter Valley indicate that the Pleistocene floodplain was up to 10 metres higher than the Holocene floodplain.

Last glacial – 18,000 years ago

As the sea level fell in the lead up to the last glacial maximum, coastal rivers, including the Hunter River gradually incised their valleys. At the height of the Glacial, the coastline was displaced abut 25 kilometres to the east and during this time, most of the old Pleistocene floodplain was eroded and the sediment transported out beyond the glacial coastline.

Post glacial transgression – 18,000 – 6,500 years ago

The post glacial sea level rise and marine transgression included the repeated landward migration of sand bodies, possibly in the form of a series of short lived proto barriers.

Commencement of the Holocene stillstand – 6,500 years ago

When sea levels stabilised a new stable sand barrier formed seaward of the old Pleistocene barrier and a new cycle of estuarine and deltic sedimentation started in the lower Hunter Valley. The barrier of the Hunter estuary is distinctive due to the high sediment supply and multiple phases of dune transgression that started between about 5,000ya and 500ya and continues to the present.

Infilling of an estuary involves two processes. One is the build up of tidal delta marine sands in the lower estuary and fluvial estuarine sedimentation in the upper estuary. Roy and Boyd (1996) note that the Hunter estuary filled rapidly with sediment and that from 6,500ya until 4,000ya the estuary would have been similar to Lake Macquarie or Wallis Lake in form with an open lake lying behind the barrier and a narrow shallow mouth that restricted tidal ranges.

The tidal delta of the Hunter River has a maximum depth of 20 metres, extends up to Hexham (15km inland), and underlies part of Kooragang Island. The delta sand bodies were deposited at the end of the Holocene transgression (sea levels still rising) but the extent of added sand to the tidal delta during the stillstand is unknown.

Deposition since 4,000ya

Over time the river delta extended seaward over the estuarine sediments and eventually the river will start to deliver fluvial sand directly to the sea. The delta front is currently mid way down Koorangang Island and Fullerton Cove and represents the last remnant of the former estuarine mud basin. Roy and Boyde (1996) note that at the time of European settlement in 1797, the lower estuary was a complex if intersecting tidal channels, tidal flats and mangrove swamps.

The upper part of the estuary has been infilled by fluvial sands and mud that were deposited as the fluvial delta moved towards the coastline. The river channel is bounded by a wide floodplain comprising of overbank alluvium that was deposited over the top of estuarine muds. The floodplain deposits are eight metres deep at Maitland and taper down to four metres at Hexham. Organic muds and peats are present in back swamps on the floodplain and commonly removed from the active channel. A radio carbon date has been obtained of 7,750BP from a buried back swamp deposit near Maitland that was 9.5 metres below the present flood plain surface (Roy and Boyd 1996). This suggests a rapid rate of floodplain pro-gradation over the last 2,000 years (7 metres vertically and up to 20 kilometres laterally).

Numerous palaeo channels are also present across the floodplain surface, although their age is unknown. Whatever the age of these channels (which must be no older than mid Holocene) it is clear that the development of the floodplain over the last 4,000 years has involved significant local landform variations with associated changes in fauna and flora.

3.4.1 Hexham Swamp geomorphology and implications for occupation

Based on the Hexham Swamp geomorphology, two periods of major change have been identified in the Late Pleistocene and Holocene that had significant changes to the landscape and resources for past Aboriginal people over the period from 20,000 years ago to European contact.

- 18,000BP to 10,000BP

  This period is when the sea level was rising rapidly and marine sands and temporary coastal barriers were rapidly moving landward. Towards the end of this period it is likely that the area now known as Hexham Swamp was an open bay, dominated by marine processes and tidal delta deposition.

- 10,000BP to 2,000PB

  This period is when the fluvial deposition of floodplain sediments dominated the estuary. The stratigraphy indicates the deposition of alluvium up to 7 metres of on the floodplain adjacent to the upper part of the estuary with an overbank of alluvium deposited downstream at Hexham. Deposition of flood deposits in Hexham Swamp also accelerated during this time.

The analysis undertaken by Walker (1998) and Roy and Boyd (1996) suggests that extended periods of open estuarine bay/lake from 600 years ago to the last 2,000 years with a gradual encroachment of fresh water wetland habitats along the tributaries to the western part if the swamp. The change to freshwater habitats accelerated within the last 200 years.

The Ironbark Creek floodgates were installed between 1970 and 1971, dramatically changing the character of the wetlands. Some of the changes that occurred as a result of the floodgate installation is the significant lowering of the water table below the gates to below mean water, stagnation of water behind the flood gates and the elimination of saline waters entering the swamp. Mangrove and salt marsh were replaced by meadow and reed communities in some areas following installation of the floodgates. The topography of the study area today includes a large wetland area with a significantly lower natural water table, the interface between wetland and aquatic landscapes and the shoreline of Hexham Swamp.

3.5 SOILS

The nature of the surrounding soil landscape also has implications for Aboriginal land use and site preservation, mainly relating to supporting vegetation and the preservation of organic materials and burials. The northern portion of the project area is situated within the Millers Forest soil landscape which is an extensive alluvial plain on recent sediments in the Lower Hunter Plain region. Generally, this landscape consists of an A_1 (topsoil) of brownish black silty clay loam up to 45 centimetres in depth (soil pH 5.5 – 6.0) that overlays the B Horizon that consists of brown silty clay that is up to 120 centimetres deep and has a soil pH range of 5.5 to 9.5 (Matthei 1995: 194-196).

The southern portion, approximately south from the abandoned rail line is a disturbed landscape which is characterised by level plain to hummocky terrain. This landscape has been extensively disturbed by human activity including complete disturbances, removal or burial of soil, the original vegetation has been completely removed and replaced with turf or grassland and soils are highly variable (Matthei 1995).

3.6 CLIMATE

Climatic conditions would have affected the likelihood of the occupation of an area and also impacted upon the soils, vegetation and associated cultural materials. The area typically has a minimum average temperature of –3°C to 5°C and maximum average of over 28°C. The climate of the area is typically warm with warm to hot and humid summers and cool to mild winters. In summer the average minimum temperature is 24°C and the average maximum is 29°C. In winter the average minimum temperature is 4°C and the average maximum is 18°C.

During late autumn and winter the water storage capacity of soils is exceeded, resulting in prolonged runoff. Runoff and rain splash result in the occurrence of erosion and the associated movement of cultural materials.

3.7 WATERWAYS

The availability of water (and the associated faunal and floral resources) is one of the most important factors influencing patterns of past Aboriginal land use. This assertion is undisputedly supported by the regional archaeological investigations carried out in the Hunter Valley.

Stream order assessment is one way of determining the reliability of streams as a water source. Stream order is determined by applying the Strahler method to 1:25 000 topographic maps. The Strahler method dictates that upper tributaries do not exhibit flow permanence and are defined as first order streams. When two first order streams meet they form a second order stream. Where two-second order streams converge, a third order stream is formed and so on. When a stream of lower order joins a stream of higher order, the downstream section of the stream will retain the order of the higher order upstream section (Anon 2003; Wheeling Jesuit University 2002).

Based on the climatic analysis (see *Section 2.5*), the study area will typically experience comparatively reliable rainfalls under normal conditions and thus it is assumed that any streams above a third order classification will constitute a relatively permanent water source.

The study area is approximately 200 metres west of the Hunter River (6th Order Stream) and Purgatory Creek (2nd Order) running through the north of the study area and numerous 1st and 2nd order streams to the west of the study area and Hexham Swamp to the west and south west *(Figure 3.1)*. The Hunter River and its associated resources are well known to be a reliable source of water for past occupation.

The study area itself has been an open estuarine bay/lake from 600 years ago to the last 2,000 years with a gradual encroachment of fresh water wetland habitats along the tributaries to the western part if the swamp. It is therefore inferred that the study area itself is considered well resourced in terms of water availability and associated resources though not suitable for camping. Areas suitable for camping would have been the elevated landforms overlooking the swamp and flood plain areas.

3.8 FLORA AND FAUNA

The availability of flora and associated water sources affect fauna resources, all of which are primary factors influencing patterns of past Aboriginal land use and occupation. The preservation and detection of surface cultural materials from of past Aboriginal land uses are also influenced by flora and fauna.

European settlers extensively cleared the original native vegetation in the 1800's. Little information is available regarding the flora and fauna resources of Hexham swamp in pre-European times. Thus, it is difficult to reconstruct vegetation communities and habitats that

would have formed the landscape for Aboriginal people prior to European settlement. Added to this, is the instillation of the Ironbark Creek floodgates dramatically altered the flora and fauna and water levels of the area from 1971 when they were installed. Presently, the specific study area is constantly waterlogged and predominantly covered in improved pasture grasses with a sparse scattering of trees in some areas.

Typically, due to vegetation cover, most artefacts identified through surface inspection are identified when they are visible on exposures created by erosion or ground surface disturbances (Dean-Jones and Mitchell 1993; Kuskie and Kamminga 2000). The extensive pasture grass ground cover throughout the study area, as well as localised water logging are expected to result in limited visibility, hence reducing the detection of surface cultural materials.

3.9 PAST LAND USES AND DISTURBANCES

Based upon archaeological evidence, the occupation of Australia extends back some 40,000 years (Mulvaney and Kamminga 1999) whilst Aboriginal people have been present within the Hunter Valley for at least 20,000 years (Koettig 1987). Although the impact of past Aboriginal occupation on the natural landscape is thought to have been relatively minimal, it cannot simply be assumed that 20,000 years of land use have passed without affecting various environmental variables.

The practice of 'firestick farming' whereby the judicious setting of fires served to drive game from cover, provide protection and alter vegetation communities significantly influenced seed germination, thus increasing diversity within the floral community. Following European settlement of the Hunter Valley in the 1820s, the landscape has been subjected to a range of different modifactory activities including extensive logging and clearing, agricultural cultivation (ploughing), pastoral grazing, residential developments and mining (Turner 1985). The associated high degree of landscape disturbance has resulted in the alteration of large tracts of land and the cultural materials contained within these areas.

The specific study area has been cleared and primarily used for pastoral purposes (grazing), involving the wholesale clearance of native vegetation, the introduction of pasture grass and the construction of fencing and drainage and a waste water facility in the northern portion of the study area. The southern portion has been highly disturbed by past excavation and utilised as a coal storing area and currently consists of coal tailings throughout. Additionally, the Ironbark Creek floodgates were installed between 1970 and 1971.

Although pastoralism is a comparatively low impact activity, it does result in disturbances due to vegetation clearance and the trampling and compaction of grazed areas. These factors accelerate the natural processes of sheet and gully erosion, which in turn can cause the horizontal and lateral displacement of artefacts. Furthermore, grazing by hoofed animals can affect the archaeological record due to the displacement and breakage of artefacts resulting from trampling (Yorston *et al* 1990). Pastoral land uses are also closely linked to alterations in the landscape due to the construction of dams, fence lines and associated structures.

As a sub-set of agricultural land use, ploughing typically disturbs the top 10-12 centimetres of topsoil (Koettig 1986b) depending on the method and machinery used during the process. Ploughing increases the occurrence of erosion and can also result in the direct horizontal and vertical movement of artefacts, thus causing artificial changes in artefact densities and distributions. In fact, studies undertaken on artefact movement due to ploughing (e.g. Roper 1976; Odell and Cowan 1987) has shown that artefact move between one centimetre and up to 18 metres laterally depending on the equipment used.

Ploughing may also interfere with other features and disrupt soil stratigraphy (Lewarch and O'Brien 1981). Ploughing activities are typically evidenced through 'ridges and furrows' however a lengthy cessation in ploughing activities dictates that these features may no longer be apparent on the surface. Impacts from drain construction would have included the disturbance and possible destruction of cultural materials as these activities typically require mechanical equipment for their construction, resulting in loss of vegetation and erosion to some extent.

The flood gates have dramatically changing the character Hexham Swamp including the lowering of the water table, stagnation of water behind the flood gates and the elimination of saline waters entering the swamp. Mangrove and salt marsh were replaced by meadow and reed communities in some areas following installation of the floodgates.

As fence construction requires the removal of sols for postholes, this would also have resulted in the disturbance and possible destruction of any cultural materials. Excavation and pipe works associated with the construction of the water plant would have disturbed or destroyed any cultural materials that may have been present. The coal tailings area is heavily disturbed from past construction works and coal tailings. The original landform has gone and replaced by coal tailings fill. Re-vegetation would also have impacted upon any cultural materials present through laying adequate ground cover, planting of shrubs and maintaining stability of the vegetation.

Whilst the impacts of vehicular movements on sites have not been well documented, based on general observations it is expected that the creation of dirt tracks for vehicle access would result in the loss of vegetation and therefore will enhance erosion and the associated relocation of cultural materials. The construction of the power lines and fences involves the excavation and fill resulting in sites and cultural materials being disturbed.

3.10 NATURAL DISTURBANCES

It must be recognised that the disturbance of cultural materials can also be a result of natural processes. The patterns of deposition and erosion within a locality can influence the formation and/or destruction of archaeological sites. Within an environment where the rate of sediment accumulation is generally very high, artefacts deposited in such an environment will be buried shortly after being abandoned. Frequent and lengthy depositional events will also increase the likelihood of the presence of well-stratified cultural deposits (Waters 2000:538,540).

In a stable landscape with few episodes of deposition and minimal to moderate erosion, soils will form and cultural materials will remain on the surface until they are buried. Repeated and

extended periods of stability will result in the compression of the archaeological record with multiple occupational episodes being located on one surface prior to burial (Waters 2000:538-539). If erosion occurs after cultural material is deposited, it will disturb or destroy sections of archaeological sites even if they were initially in a good state of preservation. The more frequent and severe the episodes of erosional events, the more likely it is that the archaeological record in that area will be disturbed or destroyed (Waters 2000:539; Waters and Kuehn 1996:484). Regional erosional events may entirely remove older sediments, soils and cultural deposits so that archaeological material or deposits of a certain time interval no longer exist within a region (Waters and Kuehn 1996:484-485).

Within the Hexham Swamp area, the geomorphic history has shown that the Hexham area has been subject to extensive formation processes. These include extended periods of Hexham being open estuarine bay/lake from 600 years ago to the last 2,000 years. There was also a gradual encroachment of fresh water wetland habitats along the tributaries to the western part if the swamp and an accelerated change to freshwater habitats within the last 200 years. The landscape has altered significantly again in 1970-1971 with the instillation of the Ironbark Creek floodgates resulting in the significant lowering of the water table and changes in vegetation and fauna.

The severe rain and flooding in recent times has had a significant impact of soils and cultural materials within the soils. MCH have noted that throughout the Hunter Valley previously recorded sites have been completely moved with nothing remaining or a significant reduction in artefacts numbers as well as erosion. Thus, the archaeological record had been greatly altered in some areas along with the soils and landscapes.

The role of bioturbation is another significant factor in the formation of the archaeological record. Post-depositional processes can disturb and destroy artefacts and sites as well as preserve cultural materials. Redistribution and mixing of cultural deposits occurs as a result of burrowing and mounding by earthworms, ants and other species of burrowing animals. Artefacts can move downwards through root holes as well as through sorting and settling due to gravity. Translocation can also occur as a result of tree falls (Balek 2002:41-42; Peacock and Fant 2002:92). Depth of artefact burial and movement as a result of bioturbation corresponds to the limit of major biologic activity (Balek 2002:43). Artefacts may also be moved as a result of an oscillating water table causing alternate drying and wetting of sediments, and by percolating rainwater (Villa 1982:279).

Experiments to assess the degree that bioturbation can affect material have been undertaken. In abandoned cultivated fields in South Carolina, Michie (summarised in Balek 2002:42-43) found that over a 100 year period 35% of shell fragments that had been previously used to fertilise the fields were found between 15 and 60 centimetres below the surface, inferred to be as a result of bioturbation and gravity. Earthworms have been known to completely destroy stratification within 450 years (Balek 2002:48). At sites in Africa, conjoined artefacts have been found over a metre apart within the soil profile. The vertical distribution of artefacts from reconstructed cores did not follow the order in which they were struck off (Cahen and Moeyersons 1977:813). These kinds of variations in the depths of conjoined

artefacts can occur without any other visible trace of disturbance (Villa 1982:287). However, bioturbation does not always destroy the stratigraphy of cultural deposits. In upland sites in America, temporally-distinct cultural horizons were found to move downwards through the soil as a layer within minimal mixing of artefacts (Balek 2002:48).

3.11 DISCUSSION

The regional environment provided resources, including raw materials, fauna, flora and water, that would have allowed for sustainable occupation of the area. The Hexham Swamp area evolved from an open estuarine bay/lake from 600 years ago to the last 2,000 years, with a gradual encroachment of fresh water wetland habitats and an acceleration of freshwater habitats within the last 200 years. From 200 years ago to 600 years ago, the Hexham Swamp area gradually formed into the present landform, a waterlogged floodplain of the Hunter River.

Based on the geomorphology of the region and local area, the Hexham swamp/floodplain landform itself would not have been suitable for occupation but rather provide the resources for seasonal hunting and gathering. Elevated areas closer to the Hunter River and/or elevated landforms on the margins of the swamp/floodplain overlooking the swamp/floodplain would have been more favourable for camping. Therefore, no evidence of past occupation is expected within the swamp/floodplain areas within the specific study area but rather on the surrounding elevated landforms.

In addition to this, the significant alterations to the landscape following European settlement would have disturbed and/or destroyed any evidence of past occupation in the study area. In relation to modern alterations to the landscape, the instillation of the flood gates significantly altered the landscape. The use of the northern portion of the study area for agricultural land uses such as clearing, grazing, ploughing, drain building and the construction of fences are expected to have had low to moderate impacts upon the archaeological record. These impacts are expected to have displaced any cultural materials that may have been present.

The use of the southern portion of the study area for previous coal works including excavation, storage and the resulting fill of coal tailings can be expected to have had high impacts upon the archaeological record in the form of destruction. Vegetation cover across the study area consists of extensive pasture grass and bunches of trees in some areas. This will affect visibility and thereby reduce the potential for identifying archaeological evidence. Typically, due to vegetation cover, most artefacts identified through surface inspection are identified when they are visible on exposures created by erosion or ground surface disturbances (Kuskie and Kamminga 2000).

Because of the natural and cultural processes discussed above, site integrity cannot be assumed for the study area and it is highly likely to be a significantly disturbed landscape.

4 ETHNO-HISTORIC & CULTURAL BACKGROUND

Unfortunately, due to European settlement and associated destruction of past Aboriginal communities, their culture, social structure, activities and beliefs, little information with regards to the early traditional way of life of past Aboriginal societies remains. This is not an exhaustive account of the Awabakal people, their culture or occupation but provides a strong indication of their links to country and the importance of the Hexham area.

4.1 USING ETHNO-HISTORIC DATA

Anthropologists and ethnographers have attempted to piece together a picture of past Aboriginal societies throughout the Hunter Valley. Although providing a glimpse into the past, one must be aware that information obtained on cultural and social practices were commonly biased and generally obtained from informants including white settlers, bureaucrats, officials and explorers. Problems encountered with such sources are well documented (e.g. Barwick 1984; L'Oste-Brown *et al* 1998). There is little information about who collected information or their skills. There were language barrier and interpretation issues, and the degree of interest and attitudes towards Aboriginal people varied in light of the violent settlement history. Access to view certain ceremonies was limited. Cultural practices (such as initiation ceremonies and burial practices) were commonly only viewed once by an informant who would then interpret what he saw based on his own understanding and then generalise about those practices.

4.2 AWABAKAL ETHNO-HISTORIC ACCOUNTS

Historic documents indicate that the Pambalong (also known as Bambalong) Tribe occupied the Hexham Swamp area (Gunson 1974:30). It is unclear whether the Pambalong were a sub-group of the Awabakal Tribe or a group in their own right. Gunson (1974:30) states that the Awabakal were the largest clan of a tribe in the Lake Macquarie region but due to Threlkeld's (an early missionary) studies in the area, Awabakal became the name which represented the entire tribe.

The most detailed information regarding early Aboriginal people comes from Threlkeld. Through his daily contact with the Awabakal, coupled with his pressing desire to learn their language, traditions and customs, he was in a unique position to observe their ways of life. Although his primary focus was on learning the Awabakal language in order to be able to evangelise the Awabakal, in providing translations of their language and grammar, he consequently gathered substantial ethnographic data.

In a letter to the editor of the Sydney Gazette, Threlkeld describes the burial of an elderly Awabakal woman, who he believes died, at least in part, from starvation after being deprived of traditional lands and foods. He notes that men dug a hole and placed sticks in to raise the deceased's head. The hole was then covered with green boughs. Three men stood in the grave, whilst an old woman bent to the bark-wrapped corpse and whispered into the ear "stand up, stand up, speak to us, kiss, kiss, kiss, whenever we pass this place." The body was then placed in the hands of the men in the grave for burial whilst the mourners wailed, which

continued until the grave was filled. Once filled, a man then carefully swept over the grave with a branch, and the dead woman's walking stick was placed upright at the head of the grave, for her use when she rose from the dead (Threlkeld, 1826).

Ethnographic information is also extrapolated from Threlkeld's vocabulary lists. For example, Threlkeld gives the English definition of the Awabakal word, "Yarro", as "an egg", but adds that in the "mystic" sense, it refers to either fire or water, whichever element was assigned to an initiated one during initiation. Threlkeld elucidates by describing the initiation:

> "…takes place every three to four years as young lads arrive at the age of puberty; mystic rings are made in the woods, and numerous ceremonies are gone through before the operation of displacing a tooth from the upper jaw; this is effected by three steady blows with a stout piece of hard wood, in shape like a punch, from the hand of the karakal; after that, the youth may seize a woman; he becomes a member of the tribe, and engages in their fights." (Threlkeld, 1892:50).

Further, for the word "Yulug", Threlkeld states the word as meaning:

> "…the name of the ring in which the tooth is knocked out. The trees are marked near the ring with rude representation of locusts, serpents and other things, on the bark; these are chopped with an axe, and copies of the nests of various quadrupeds are formed on the ground near the spot. The celebrants dance for several days every morning and evening, continuing the whole of the night; no women are allowed to join the ceremony." (ibid).

Another ring used in initiation was called "Porobug", meaning "to drop down; to be born" (ibid:49).

Threlkeld related the custom of duelling and acknowledged that its practice is a matter of great honour amongst the Awabakal. On this occasion, it was Biraban who received the message that he must take part in the duel as an honourable man, despite believing he had done nothing wrong. "Seconds" would arrange a day, place and time (in this case, "a plain in a certain well-known vicinity attached to our dwelling", "when the sun was one quarter high")(ibid), and messengers sent to gather tribes to witness. After all were assembled, a corroboree was held on the evening before the duel. Threlkeld continues:

> "The offending party is the first to stoop and offer his head for his antagonist to strike with his weapon; and if not disabled or killed by the blow, he rises from his bending posture, shaking the streaming blood from his bushy hair, and then his opponent fairly and honourably bends forward his head, and presents it in return to receive his blow; and so this reciprocally continues until the assembled parties and the combatants themselves are satisfied. But should either strike dishonourably at the temple, thus showing an intention to kill, or in any other way than on the fairly offered cranium of his antagonist, a shower of well-directed spears would instantly be sent against the cowardly assailant, who should dare to be guilty of such a breach of the laws of honour." (ibid).

In his efforts to evangelise Biraban, Threlkeld became familiar with some of the spiritual aspects of the Awabakal people. In *An Australian Language as spoken by the Awabakal* (1892), he lists various important ancestral beings, such as Koin (also known as Tippakal or Porrag, an ancestral being perceived mostly by "doctors" attending at initiation ceremonies, to whom Koin says, "fear not, come and talk") , Koyorowen (a fearsome ancestral being who tricks men into duels they cannot win – his call can sometimes be heard at night). More include Kurriwilban (Koyorowen's wife, also known as Yaho, with horns on her shoulders, which she

uses to impale unwary men – unwary women become property of Koyorowen), Puttikan (an ancestral being in the form of a horse, with a tail like a cutlass, that moves like a kangaroo – if seen, a man must show his tooth has been removed so that Puttikan will not attack, otherwise he kills and eats them) and Tilmun (an ancestral being in the shape of a small bird, believed by women to be either the maker of women, or a woman transformed after death – these birds are venerated by the women only, whilst the men venerate the bat) (Threlkeld, 1892:47-49).

Threlkeld also recorded a number of items used by the Awabakal, both sacred and profane. Of the sacred, he notes the "Murramai", a piece of gemstone shaped like a cricket ball and wrapped in "yards" of possum yarn, kept hidden under in a small net bag suspended from their "girdles", out of the sight of women. It was forbidden for a woman to see the object. He notes that after being given a small piece, it scratched glass, but did not effervesce in acid. These Murramai travelled great distances, sent from tribe to tribe. The Murramai that Threlkeld examined came from Moreton Bay, shown to him in his study by one of the Awabakal men, anxious that no women would see it. It was clear, like "sugar-candy". Two other specimens are mentioned by Threlkeld, one of an agate, and another was a milky, white quartz. The Murramai were worn as a talisman against illness, and small pieces broken off and swallowed. Threlkeld also notes the "gakon" as a piece of bone pierced through the septum (Threlkeld, 1892:48).

Everyday items included the "kokei" or "wimbi" which is a bowl, or basket, made from the bark of trees, "kirika", "mipparai", "nukkug" and "mikal" all words for honey, depending on which tree it came from, four words for "hair", depending whether it is on the head, the body, an animal or, "yirrig", meaning the hair of the opossum tribe, various names for fish, plants, animals, snakes, and other nouns. There are also placenames and their descriptions, such as kurra-kurran, a place described as being "almost a forest of petrifications of wood, of various sizes, extremely well defined". It is described as being in a bay in the north-western extremity of Lake Macquarie (Threlkeld, 1892:51). This appears to correspond with the Fossil Pine Forest at Fennell Bay, Lake Macquarie.

Threlkeld's vocabularies, as well as providing an insight to the linguistics of the Awabakal, and information regarding religious and ceremonial beliefs, also provide an insight to the complexities of the Awabakal culture and language.

4.3 THE PEOPLE OF HEXHAM SWAMP

To the local Aboriginal people referred to Hexham Swamp as Burraghihnbihng (Dangar 1826 in Hartley 1995:87). Ethno historic accounts in Hartley (1986) provide some accounts of the Hexham Swamp environment before it was cleared and altered by European settlers. Paperbark species surrounded the shallow swamp margins interspersed with reeds, casuarinas were situated on the verges and intermingled with a dense undergrowth of many eucalyptus species. Eels, swans, ibis, egrets, water fowl and ducks were present with numerous other bird species.

The nearby Ironbark Creek, which was a tidal stream known to the Aboriginal people of the area as Toohrnbng, was a great source of food providing fish and small crustaceans. The knob

is also present and is a protuberance that stands above the swamps. There have been many references to the Knob including Hartley 1986:47) states that the area was of great spiritual significance to the local Aboriginal people. The Knob is still highly significant to the Aboriginal people of today.

4.4 AWABAKAL CONTEMPORARY CULTURAL ACCOUNTS

Reviewing of previous reports of the Hexham area and discussions with the registered Aboriginal stakeholders has revealed contemporary accounts of the area as well as the significance of Hexham Swamp. These are discussed below.

In response to Umwelts (2003) assessment for the Hexham Swamp Rehabilitation Project, ALALC have provided information including that the swamp, in its natural condition prior to the flood gates being installed, would have provided Aboriginal people with a variety of flora and faunal resources. Also, that the tributaries in the swamp would have been navigable by canoe and the swamp itself would have provided excellent fishing. The cultural significance of the Hexham Swamp area is also highlighted by ALALC in Umwelts 2002 reports.

The AMBS (2012) assessment also discusses the cultural significance of the registered stakeholders who indicated that the area, including HS1, has special significance to them as a place in the vicinity of Hexham Swamp and the Hunter River which were valuable resources to Aboriginal people of the area and which a connection is still felt today. The Knob is stated to be oh high cultural significance.

During this assessment, the registered Aboriginal stakeholders stated the high cultural significance of the Hexham Swamp area. That there are links to ancestry and the local area as documented in historical documents and through oral traditions. Additionally, the northern portion, although disturbed may have subsurface deposits based on the significance of Hexham Swamp and known past occupation in the Hexham area.

5 ARCHAEOLOGICAL CONTEXT

A review of the archaeological literature of the Central Lowlands, and more specifically the Hexham area and the results of a OEH AHIMS search provide essential contextual information for the current assessment. Thus, it is possible to obtain a broader picture of the wider cultural landscape highlighting the range of site types throughout the region, frequency and distribution patterns and the presence of any sites within the study area. It is then possible to use the archaeological context in combination with the review of environmental conditions to establish an archaeological predictive model for the study area.

5.1 REGIONAL ARCHAEOLOGICAL CONTEXT

The majority of archaeological surveys and excavations throughout the region have been undertaken in relation to environmental assessments for the coal mining and power industries of the Central Lowlands. A review of the most relevant investigations (Dyall 1979, 1980; Davidson et al 1993; Dean-Jones and Mitchell 1993; Koettig and Hughes 1984; McDonald 1997; Haglund 1999; Kuskie 2000; HLA-Envirosciences 2002; AMBS 2002; MCH 2003, MCH 2004a) illustrates consistency in site type and location across the region as well as a possible bias in the results due to a focus on specific landforms. The corpus of recorded sites are described and assessed qualitatively in MCH (2004b) and these findings are summarised and supplemented below.

Based on the available information it is possible to identify a number of trends in site location and patterning within the local area. Open campsites are by far the most common site type with isolated finds also comparatively well represented. A variety of other site types have been identified in the Central Lowlands in far lower concentrations and include grinding grooves, scarred trees, rock shelters, shelters with art and burials. The high representation of sites containing stone artefacts is to be expected due to the durability of stone in comparison to other raw materials.

In relation to stone artefact raw materials, it is important to note that there is a potential for discrepancies in the way in which archaeologists classify lithic materials. This will consequently affect the proportional representation of raw materials within the recorded assemblages. However, as a whole mudstone is the most common lithic artefactual material found in the region, followed by silcrete. Chert, tuff, quartz, quartzite, petrified wood, porcellanite, hornfels, porphyry, basalt, limestone, sandstone, rhyolite, basalt, European glass and other non-specific lithic types also occur in smaller quantities.

Variation in the classificatory definitions employed by archaeologists will again significantly influence the range of artefact types identified within a study area. For example, the distinction between a waste flake, a debitage flake and a flaked piece may be heavily subject to the perspective of the recorder. Thus, it is not productive to attempt to quantify the proportionate representation of artefact types identified in previous studies.

That said, based on the information collated from previous regional studies (refer to MCH 2004b) it is apparent that the most common artefact types are flakes, flake fragments and

flaked pieces. Cores, edge ground axes, millstones, grindstones, hammer stones and backed artefacts including backed blades, bondi points, geometric microliths and eloueras also occur though in lower frequencies.

In general, the stone artefact assemblage in the area has been relatively dated to what was previously known as the Small Tool Tradition (10,000 years BP). On the basis of stone tool technology, the overwhelming majority of Aboriginal open sites within the region are attributed to the Holocene period. However, at Glennies Creek, north of Singleton, based on radiocarbon dated charcoal and geomorphological evidence it is suggested that artefacts found in the B-horizon may have been deposited between 10,000 and 13,000 BP (Koettig 1986a, 1986b).

An analysis of recorded sites according to the number of artefacts present, the distance from water and the landform type of each site allows for the identification of a number of trends. It must be recognised however, that there are various factors influencing these results, including, but not limited to:

- the fact that the landform on which a site area is observed may not necessarily be its origin, for example, artefacts from a crest may be relocated by erosion such that they are recorded further down a slope;
- effects of biased sampling of landforms due to decisions made by archaeologists and as a result of development area boundaries, levels of exposure on different landforms and variable recording by archaeologists. For example, the large percentage of sites found along creek lines may be (at least partially), a result of the biased focus of many cultural heritage surveys towards this landform. In addition, it was not possible to obtain sufficient information from a large number of site cards and reports; and
- artefact counts can be skewed due to factors such as the differing fragmentation levels of discrete stone types and levels of ground surface visibility. Typically, a very large number of sites/artefacts are located on exposures and yet no, or very few artefacts are visible away from these exposures.

Therefore these results are purely indicative of what may be expected in terms of site location and distribution.

Artefact scatters and isolated artefact finds have been divided into three arbitrary artefact volume categories: small (ten or fewer artefacts); medium (11-100 artefacts); and large (over 100 artefacts). Landform divisions were determined from the information included on site cards and reports (refer to MCH 2004b for additional detail).

When assessing sites in terms of distance to water, there is a bi-modal distribution, in that the majority of sites are situated within 50 metres of water and the next highest proportion of sites are over 100 metres from water, with comparatively few sites present in the zone 50-100 metres from water. This contrasts somewhat with the generally accepted theorem that, within the Hunter Valley, site numbers decrease with distance from water. Rather, it appears that there is a distinct pattern whereby site numbers are greatest within 50 metres of water,

becoming scarce 50-100 metres from water before again increasing in number beyond this distance category.

This bimodal pattern is echoed in relation to site size. The bulk of large and medium sites are situated within 50 metres of water, dropping in representation in the area 50-100 metres from water before reaching another lesser peak at distances over 100 metres from water.

Thus, it is apparent that open campsites/isolated finds are most concentrated in number and size within 50 metres of water. A secondary, lesser, peak in site numbers and size occurs at distances over 100 metres from water. This represents a refinement of the generally accepted premise that site numbers and artefact quantities within sites decrease in inverse proportion with distance to water. However, it must also be said that this pattern can be considered indicative only and is by no means conclusively proven.

As is to be expected, the majority of sites within 50 metres of water are present on creek lines whilst slopes and crest/ridge formations are also common site locations. The frequent presence of sites on crest/ridges and slopes is also noticeable for sites located over 50 metres from water.

All grinding groove sites (for which all variables could be assessed) were located within 50 metres of water. Due to the importance of water in the grinding process, it is not surprising that sites of this type are situated close to water.

Unfortunately, due to the very small number of sites of other types (for example, shelter with art, burials and scarred trees) present in the area, it is not possible to reliably discuss patterning in these varied sites.

5.1.1 Discussion

In summary, despite the recognised limitations of utilising previous studies as the basis for generalisations regarding archaeological patterning, the following broad predictions can be made for the Central Lowlands region:

- a wide variety of site types are represented in the study area with open campsites and isolated artefacts by far the most common;
- lithic artefacts are primarily manufactured from mudstone and silcrete with a variety of other raw materials also utilised but in smaller proportions;
- site numbers and artefact volumes are greatest within close proximity to water;
- there appears to be a secondary peak in site numbers and artefact volumes at distances over 100 metres from water; and
- creek lines, crest/ridges and slopes are the most archaeologically sensitive landforms.

These findings are consistent with models developed for the area (see *Section 5.5)*.

5.2 OEH ABORIGINAL HERITAGE INFORMATION MANAGEMENT SYSTEM

It must be noted that there are many limitation with an AHIMS search. Firstly site coordinates are not always correct due to errors and changing of computer systems at OEH over the years that failed to correctly translate old coordinate systems to new systems. Secondly, OEH will only provide up to 100 sites per search. This limits the search area surrounding the study area and enabling a more comprehensive analysis and finally, few sites have been updated on the OEH AHIMS register to notify if they have been subject to a s87 or s90 and as such what sites remain in the local area and what sites have been destroyed is unknown.

In addition to this, other limitations include the number of studies in the local area. Fewer studies suggests that sites have not been recorded and ground surface visibility also hinders site identification. The geomorphology of the majority of NSW soils and high levels of erosion have proven to disturb sites and site contents, and the extent of those disturbances is unknown (i.e. we do not know if a site identified at the base of an eroded slope derived from the upper crest, was washed along the bottom etc: thus altering our predictive modelling in an unknown way). Thus the OEH AHIMS search is limited and provides a basis only that aids in predictive modelling.

A search of the OEH AHIMS register has shown that 93 known Aboriginal sites are currently recorded within a ten kilometre radius of the study area. The recorded sites include 51 open camps, 25 artefact sites, 6 isolated finds, 3 grinding grooves, 3 artefact/PADs, 3 PADs, one scarred tree and one artefact/PAD/grinding groove site. The AHIMs results are provided in *Annex B* and the location of sites is shown in *Figure 5.1*.

5.3 LOCAL ARCHAEOLOGICAL CONTEXT

The following is a review of reports produced during previous archaeological assessments within a ten kilometre radius of the study area. These investigations, although some are not from the Hexham Swamp but surrounding area, do provide an overall indication of past occupation of not only the Hexham swamp area but the wider area also. This allows for comparisons between areas, proximity to water, preferred landforms, site types, raw materials and artefact types in certain areas, thus providing a bigger picture of past occultation. The locations of these investigations are illustrated in *Figure 5.2*.

Kuskie (1997) undertook an investigation for Newcastle City Council ahead of its sale of the property for future development. The study area was 130 ha, and is bounded by the New England Highway and John Renshaw Drive to the north, to the west by Lenaghan's Drive, by Black Hill rural residential community to the south, and Hexham Wetlands to the east.

The property is described as being of low-gradient, undulating terrain, consisting of a broad, low ridge, trending to the north towards Weakleys Flat. In the northeast of the property, a ridge crest fans into Hexham Wetlands as a broad, low spur, descending eastward. Simple slopes associated with ridges and spurs are also on the property. Several 1st order drainage lines are present in the north, north-east and north-west of the study area and runoff from the ridge crest also drains into Hexham Wetland.

MCH:

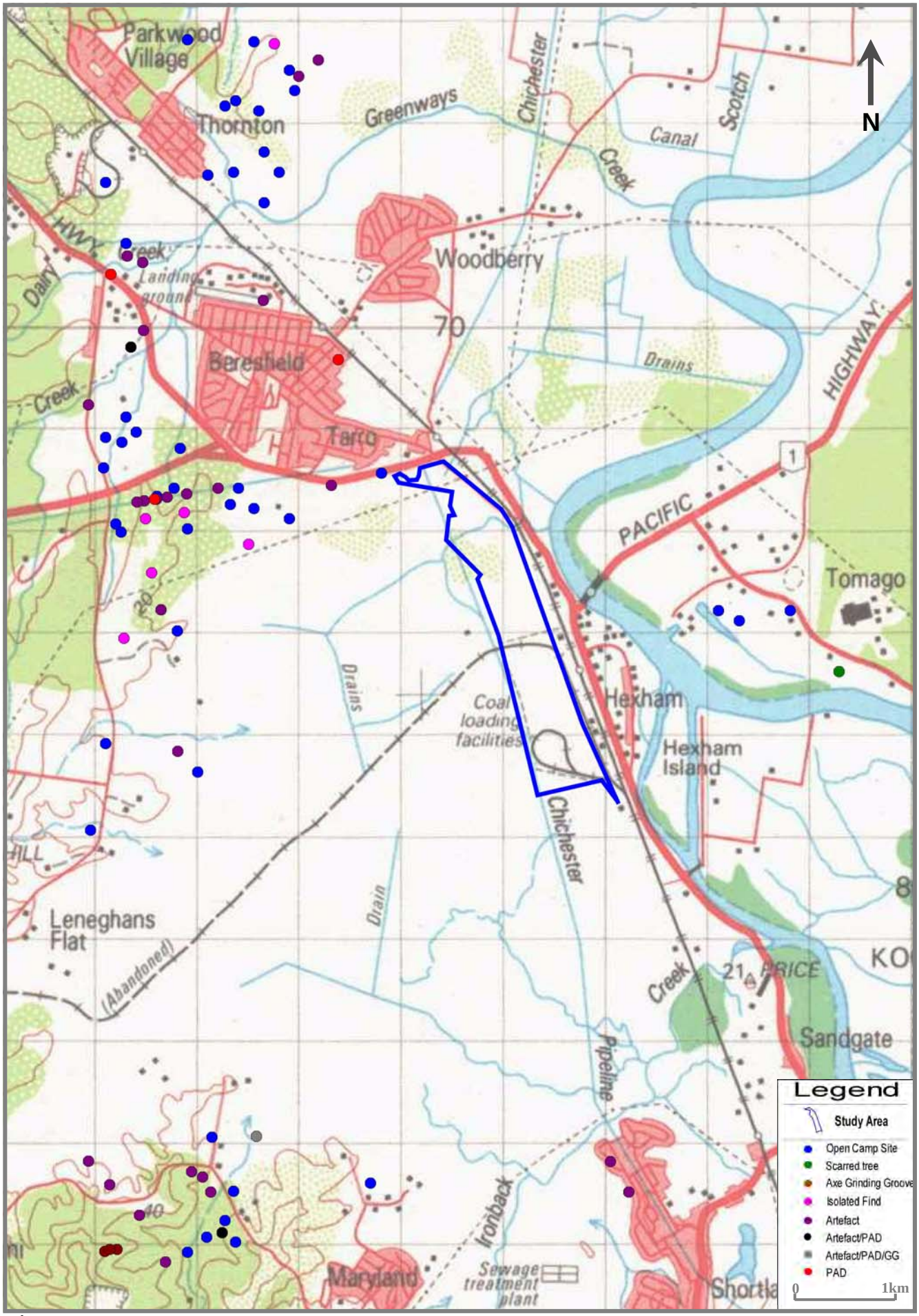

Figure 5.1 Known sites

Source: 1:100,000 Topo Series: Newcastle

MCH:

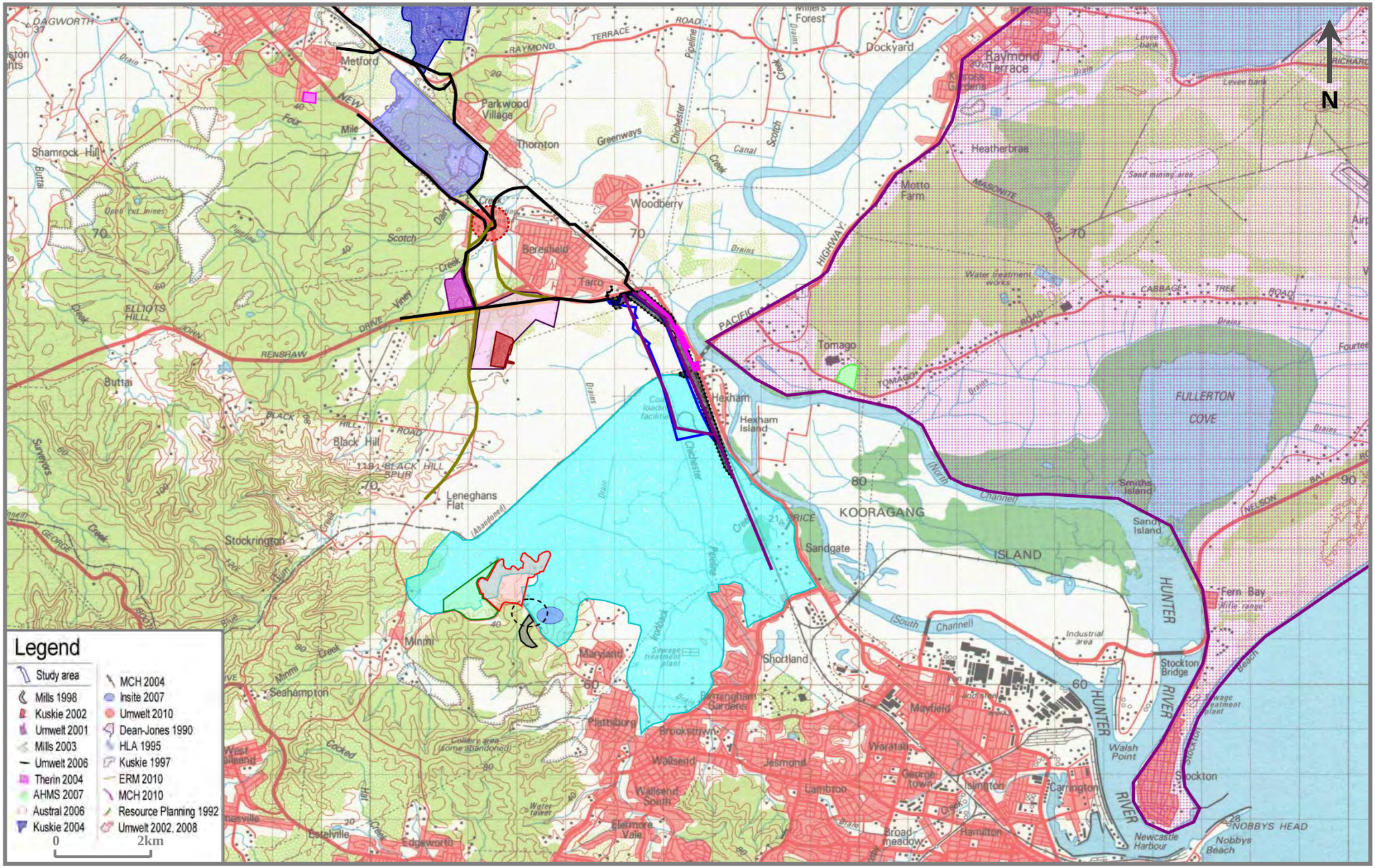

Figure 5.2 Previous studies

Source: 1:100 000 Topo Series: Newcastle

The study area is partially cleared for pastures, vehicle tracks, a 33kV transmission line easement and a water pipeline easement. Most of the old growth vegetation has been cleared, however tall, open eucalypt forest remains over the study area. Dominant species include spotted gum, broad-leaved ironbark, grey ironbark, thin-leaved stringy bark, grey gum and narrow-leaved string bark. Other species recorded include smooth-barked apple, rough-barked apple, white mahogany, red bloodwood and blackbutt. The understorey contains blackthorn, paperbark and wattles, and forest gum occurs on some lower slopes. Along drainage lines, prickly-leaved paperbark, grey myrtle, red ash and lantana are common. Past land use practices have removed larger trees, leaving pasture grasses, although some larger trees are still located on the central ridge crest and eastern portion of the spur crest. The proliferation of pasture grasses significantly reduced visibility across the study area.

Native mammals such as the platypus and water rat are known to occur in the Hunter in wetland regions, as are the black-tailed or swamp wallaby, wombat, grey kangaroo, red wallaby, common kangaroo rat, flying fox, lizards, goanna, pademelon and bandicoot, with possum, ring-tailed possum, flying squirrel and native cats less common. A wide variety of freshwater fish has also been recorded in wetlands in the region. Shellfish would also have been present.

A search of the AHIMS database showed a total of 149 sites within an area of 500 km² of the study area. Of these, 89 are artefact scatters, 21 isolated finds, 29 grinding groove sites, 3 middens, 2 scarred trees, 2 stone arrangements, one fish trap, one shelter with art and grinding grooves and one waterhole/well. Two sites are recorded within the study area, one an artefact scatter, and one isolated find. As a result of previous archaeological investigations and AHIMS data, the following predictive model was developed for the study area:

- Artefact scatters are the most common site type encountered within the vicinity of the study area and increase in numbers and density on low gradient landforms bordering wetlands and watercourses such as simple slopes, basal slopes and ridge crests/spur crests;
- Surface artefact scatters are generally low in numbers and density, but are not an indication of the numbers and density of any subsurface artefacts;
- Subsurface artefacts are typically located in the topsoil and shallow "A" horizons. Because of this, artefacts are particularly subject to post depositional processes, therefore affecting the integrity of a site;
- Isolated finds may be encountered in any landform;
- Middens may be found along the margins of the wetlands, but post-depositional processes may not have been favourable to their preservation. The potential for them to occur in the study area is considered low; and
- Other site types whose potential to occur is low include scarred trees, mythological/traditional sites, quarry sites, scarred trees and stone arrangements.

The survey focused on areas of high visibility, such as unformed, partially formed and formed vehicle tracks. Tree bowls, erosion scours, cattle trails and other areas of disturbance were

also inspected. Surface visibility varied, but averaged at 45%. The twelve sites were identified and are summarised in *Table 5.1*.

Table 5.1 Summary of sites (Kuskie 1997)

Site	Site type	Landform	Distance to water	Order	Site Contents	Disturbance	Potential for subsurface
1	isolated	ridge crest	100-150m	1st	1 artefact	moderate	moderate
2	isolated	ridge crest	100-150m	1st	1 artefact	low	moderate
3	isolated	basal slope	0-50m	Wetlands	1 artefact	low	high
4	artefact scatter	spur crest	0-50m	Wetlands	8 artefacts	low	high
5	artefact scatter	slope	100-150m	1st	3 artefacts	low-moderate	low
6	isolated	slope	50-100m	1st	2 artefacts	moderate	moderate
7	isolated	ridge crest	150-200m	1st	1 artefact	low	moderate
8	isolated	ridge crest	200-250m	1st	1 artefact	low	moderate
9	artefact scatter	basal slope	150-200m	1st	3 artefacts	low	high
10	artefact scatter	basal slope	0-50	Wetlands	3 artefacts	low-moderate	high
11	artefact scatter	slope	0-50	1st	5 artefacts	moderate	moderate
12	artefact scatter	slope	50-100m	1st	2 artefacts	moderate	high

A total of 31 artefacts were recorded within the study area, with 15 whole and broken flakes, nine flaked pieces, two cores, one whole and two broken blades, one blade core and one hatchet head. In addition, there were 19 pieces of heat shatter. The dominant raw material was silcrete (68%), followed by silicified volcanic tuff (29%). The ground edged hatchet was made of greenstone.

Kuskie considered the assemblage insufficient to draw any meaningful conclusions regarding the predictive model, and recommended that further investigation be conducted. It was recommended that test excavations be conducted in areas where research potential and site integrity was indicated. Other options, such as monitoring during ground works, destruction or conservation of the site, were also considered.

Dean-Jones (1990) undertook an extensive study for the NSW National Parks & Wildlife Service and the National Estate Grants Committee to catalogue the nature, distribution and condition of Aboriginal sites recorded in the geographic area known as Newcastle Bight. In particular, a stated object of the investigation was to identify "important sites and site complexes before they are threatened or destroyed by European land use". This included locating new sites.

The investigation comprises a two phased approach. Phase 1 entailed a review of environmental factors in the study area, including previous archaeological investigations and their results. Phase 2 comprised a physical survey and significance assessment of identified sites.

Newcastle Bight is described as the geomorphic unit bounded by the Hunter River in the south, and Port Stephens in the north. It is the southern-most of two barriers, incorporating both an inner (Pleistocene) and outer (Holocene) suite of shoreline sediments. The inner barrier was deposited approximately 120,000 years ago, and parts of the sandy surface changed little since that time, however the environmental context has changed dramatically. The outer barrier was laid down approximately 6,000 years ago, when sea levels stabilised to the current levels at the end of the last Glacial. The modern beach and the transgressive dunes occupy approximately 2880 ha, about a quarter of the area's sand mass. Its proximity to the city of Newcastle and its growing population places considerable stress on the landscape of the barrier system and estuarine shorelines forming its southern and northern borders. In addition, the inner barrier is an aquifer supplementing the water supply of Newcastle area. In order to protect it from any pollutants, the area is under the control of the Hunter Water Board.

Other landform elements include a deflation basin, which separates the modern frontal dune from the windward face of an active, transgressive dune. This is a major landform feature, and extends the entire length of the Newcastle Bight.

Current land use across the study area is varied. Much of the current land use along the foreshore is zoned as public recreational, permitting recreational vehicles. The older, transgressive dunes, however, are zoned as rural. The inner barrier is more complex, being zoned in parts as an environmentally protected water catchment, rural, open space and industrial (near Tomago). Williamstown airbase is zoned as "special use". The larger townships are in the north of the study area at Port Stephens, Anna Bay and Salamander Bay. Sand mining was permitted in some parts of the inner barrier.

Groundcover across the study area was dense, particularly around the freshwater wetlands, where the understorey is so thick as to prohibit access. Because of a higher fire frequency on the higher dunes, there is a tendency for reduced understorey, less ground cover and greater visibility.

Prior archaeological investigations show that at least 70 sites were recorded along the Newcastle Bight, with middens being by far the dominant site type in the region, followed by artefact scatters. However, the total area covered by Environmental Impact Statements in the study area is 750 ha, a fraction of the total land area.

A total of 110 Aboriginal sites were recorded during the survey, with 40-50 additional midden sites noted during reconnaissance survey of the fore dune and swale areas, but not recorded due to time constraints. 74% of the sites contained shell material, although only 12% contained densely packed shells. Thin, sparsely distributed shell scatters contained less than five stone artefacts. Dense concentrations of stone artefacts were typically found in midden complexes associated with late Holocene stable dunes overlooking the deflation basin, in open campsites on Pleistocene dunes associated with freshwater Pleistocene wetlands, and Holocene estuarine wetlands.

A total of 45% of sites identified were located in proximity to the deflation basin and outer margin of active transgressive dunes. Almost all of these sites are middens. However, it should be noted that this result may be skewed because of excellent visibility in the area, as well as active geomorphic changes around the deflation basin exposing subsurface material.

Resource Planning (1992) investigated a proposed interim connection between the F3 freeway and the New England Highway at Minmi. The investigation covered both preferred routes and alternative routes. The study area comprises an area of 2.7525km² and was bounded in the north by the New England Highway from the Brickworks entrance near Thornton Road to 500m past John Renshaw Drive, to the south at Minmi, approximately 8km south of the New England Highway. The eastern and western boundaries comprise arbitrary lines on a topographic map. The orientation of the study area was defined by existing roads, plus 50m and 100m from the roads along proposed routes which became 200m wide survey areas.

The study area is adjacent to Hexham Swamps, which forms part of the eastern and south-eastern boundary. The dominant landforms within the study area are creek lines and gullies, with Scotch Dairy Creek and Weakleys Flat Creek running into the Woodberry Swamp catchment in the northern portion of the study area. Ironbark Creek flows into Hexham swamp in the south-east of the study area.

The study area had been cleared of old growth vegetation to use the timber in the mining industry and creating grazing land for cattle. Quarrying was also undertaking at nearby Minmi Creek. Vegetation across the study area is varied, with spotted gum, forest red gum, grey ironbark and angophora woodland dominate on the upper slopes, with the valley floods dominated by Melaleuca linearifolia. Other species noted were tea-tree, scribbly gum, smooth-barked apple and xanthorrhea spp.

No sites are recorded within the study area. Based on previous investigations, it was predicted that low density artefact scatters may be located close to water sources and on ridges, isolated finds may be found across all landforms, grinding grooves may be present on sandstone outcrops and close to water, scarred and/or carved trees may be present on old growth vegetation, and burials may be located.

The survey area was divided into nine survey units and conducted on foot. Visibility was assessed as low, the survey focussed on areas with exposure. Suitable trees were examined for scars and/or carvings, and rock outcrops were inspected for grinding grooves. Two sites were identified and are summarise din *Table 5.2*.

Table 5.2 Summary of sites (Resource Planning 1992)

Site	Site type	Landform	Distance to water	Order	Site Contents	Disturbance	Potential for subsurface
MB1	isolated	not given	100-150m	dam	1 FGS flaked pieces	track	low
MB2	artefact scatter	not given	0-50m	dam	2 chert flaked pieces	ants nest	low

Both sites were assessed as being of low scientific significance, with low potential for subsurface artefacts. It was therefore recommended that a s90 permit be sought for these sites prior to any road works commencing. However, some landforms within the study area, whilst having no surface artefacts, were considered to be of high archaeological sensitivity. These areas were not described, but rather were indistinct shading on a map. It was recommended that these areas be tested for subsurface artefacts.

Mills and Wilkinson (1994) undertook an assessment for the proposed residential subdivision of Site 12115 of the Glendore Estate, Maryland. The study area comprises three Lots, and in addition, the investigation included the review of site # 38-4-0086 recorded by Brayshaw in 1982, which was to be impacted by the construction of a roundabout. The study area was situated on a knoll, which is adjacent to the Hexham swamp. Mills & Wilkinson state that in "prehistoric times" the knoll would have been close to an abundant food supply from the swamp. Tributaries of Flaggy Creek also occur within the study area and it was noted that little natural vegetation or undisturbed land surface still exists within the development area.

Previous archaeological investigations showed that artefact scatters and isolated finds are the most dominant site types, as well as burials, axe grinding grooves, scarred trees, ceremonial sites and mythological/traditional sites. A search of the NPWS database showed a total of four sites within the study area, consisting of three open camp sites and one set of grinding grooves. Brayshaw (1982) had conducted an earlier survey of the study area and identified an artefact scatter within the study area (site #38-4-0086).

The survey strategy focused on areas with good visibility (i.e., tracks and other areas of exposure). For site # 38-4-0086, an intensive survey was conducted involving random sampling, collection and analysis of lithic material from seven sample areas. *Table 5.3* summarises the 13 sites identified.

Table 5.3 Summary of sites (Mills & Wilkinson 1994)

Site	Site type	Landform	Distance to water	Order	Site Contents	Disturbance	Potential for subsurface
1	artefact scatter	slope	0-50m	1st	9 artefacts	clearing, erosion, road	no
2	isolated	not provided	not provided	not provided	1 mudstone flaked piece	clearing, erosion, gravel road	no
3	isolated	not provided	not provided	not provided	1 FGS flaked piece	clearing, erosion, gravel road	no
4	isolated	not provided	not provided	not provided	1 mudstone flaked piece	clearing, erosion, gravel road	no
5	isolated	not provided	not provided	not provided	1 multi-platformed core	clearing, erosion, gravel road	no
6	isolated	not provided	not provided	2nd	1 multi-platformed mudstone core	clearing, agricultural, tracks, dumping	no
7	isolated	not provided	not provided	2nd	1 multi-platformed mudstone core	clearing, agricultural, tracks, dumping	no

8	artefact scatter	not provided	not provided	2nd	4 artefacts (3 flaked pieces, 1 core)	clearing, agricultural, tracks, dumping	no
9	artefact scatter	not provided	not provided	2nd	12 artefacts	clearing, agricultural, tracks, dumping	no
10	Isolated find	not provided	not provided	2nd	1 FGS flaked piece	clearing, agricultural, tracks, dumping	no
11	isolated	not provided	not provided	2nd	1 single platform FGS core	clearing	no
12	isolated	not provided	Not given	2nd	1 FGS core	clearing	no
13	isolated	not provided	Not given	2nd	1 basalt hammer stone	clearing	no

A total of 25 artefacts were identified and included flaked pieces (17) and cores (17). The dominant raw material types included fine-grained siliceous and mudstone.

With regards to the survey of Site # 38-4-0086, it was confirmed that the site dimensions were extensive. However, it was also ascertained that the site lay outside of the study area, and no permission could be sought to investigate the area outside of the road corridor. Further disturbance was evident at the site in the form of a drainage trench dug 5m from the southern boundary of the road along the entire length of Lot 2. No artefacts were found in the drainage trench. It was noted that the size of the lithic assemblage was contrary to all known assemblages identified in the vicinity of the study area.

The lithic material collected was mainly chert or fine-grained siliceous. Observations in the field state that no diagnostic features could be identified, and that although fractured, no bulb of percussion, platform or impact points could be ascertained. Following a meeting with stakeholders, it was resolved to send the material for examination. Dr D Whitter, Neville Baker and Professor Richard Wright were contacted, who all declared that although the raw material was frequently used by Aboriginal people for tools in the region, the lithics submitted were non-artefactual.

Mills and Wilkinson concluded that due to the disturbance across the study area, there was little potential for subsurface material. All sites were therefore assessed as being of low archaeological significance. It was therefore concluded that there were no archaeological constraints to the project, and no further investigations were necessary.

HLA (1995) undertook an assessment as part of a review of the zoning of the Thornton Industrial Area. The study area was bounded by the main Northern railway in the north, Four Mile Creek to the west, the New England Highway to the south and Thornton Road to the east. This covers an area of approximately 250 ha. The study area is characterised by undulating lowlands with slopes of less than 10%, with wide, alluvial valleys. Four Mile Creek in the west of the study area is typical of such valleys. Two unnamed creeks run east into a large swamp adjoining the study area.

The dominant vegetation type was dry sclerophyll forest, characterised by spotted gum and ironbarks. Pockets of swamp forest would have existed along the margins of the wetlands, however these have been cleared. Most of the current vegetation was regrowth, with large areas of open grassland and bare earth. The area was often subject to bushfire, with the one occurring before the survey in October 1994.

Previous archaeological investigations showed that the most dominant site type are artefact scatters, however it was noted that most of the previous investigations in the vicinity were inconclusive due to small numbers of sites and artefacts. One earlier investigation surveyed the western portion of the study area and identified a scatter of two flakes, and two non-indigenous sites (a fence and a culvert). The predictive model for the study area suggested that open sites (artefact scatters) were the most likely site type to be encountered, that scarred trees were likely to occur in the region, however much of the old growth vegetation had long since been cleared and that rock shelters, grinding grooves, art sites and PAD were unlikely to occur due to the existing geology and terrain.

The survey area was divided into four survey units assessed as representative samples of the study area as a whole. Reasons for these representative samples being designated were not given. An area of 57.94 ha was excluded based on existing development (brickworks, retail area and railway line to colliery), leaving 192 ha surveyed. Visibility across three of the survey units were 75%, with one being 0% and subsequently abandoned. The effective survey coverage was therefore 5.7%. One site was identified and is summarised in *Table 5.4*.

Table 5.4 Summary of sites (HLA 1995)

Site	Site type	Landform	Distance to water	Order	Site Contents	Disturbance	Potential for subsurface
Thorn I	artefact scatter	not provided	not provided	Creek	not provided	nearby railway line,	high

Little discussion was undertaken with regards to the extent of the site or its contents, other than to say that it was extensive, but that no obvious platforms and bulbs of percussion could be discerned on the artefacts. Nonetheless, the site was assessed as being of moderate significance, with good potential for subsurface artefacts to exist. It was therefore recommended that disturbance of the area be avoided, and if that was not feasible, that subsurface investigation of the site be undertaken.

An investigation by Mills (1998) was undertaken for a proposed residential development at Nikkinba Ridge, Minmi. The subsurface investigation followed a survey by Mills in 1995 (not registered on the AHIMS search by OEH), which identified a terrace associated with Wentworth Creek and an ephemeral creek feeding into Wentworth Creek as having a high potential for *in situ* subsurface artefacts. This site was identified as having high potential as Wentworth Creek is a permanent watercourse, feeding into Hexham Wetlands, which in turn has been shown to have been extensively used by Aboriginal people in the past.

Following the 1995 survey, an inspection of the terrace in 1997 (also not registered on the AHIMS search by OEH) showed that a sewer line had been laid along the southern bank of Wentworth Creek, by sinking pylons into the creek bed, and the pipe suspended on the

pylons. Further, the Council required the developer to construct an artificial wetland along the ephemeral creek in order to prevent pollution to Wentworth Creek and subsequently the Hexham Wetlands. In addition, a footpath will be constructed along the southern bank of Wentworth Creek and the eastern bank of the ephemeral creek.

The 1997 assessment also identified five PADs on the terrace. These included a raised terrace on the southern bank of Wentworth Creek, a raised spur within the Wentworth Creek wetland area, an area on the eastern bank of the ephemeral creek at its confluence with Wentworth Creek, an area on the western bank of the ephemeral creek line at its confluence with Wentworth Creek and one raised, flat spur area on the ephemeral creek line approximately 100m upstream from the junction with Wentworth Creek. Areas eliminated as having low potential were the headwaters and western bank sections of the ephemeral creek where slopes are steep, with no gently sloping or flat areas, and sections of the southern bank of Wentworth Creek that were impacted by the construction of the sewer line. All PADs excavated as a part of this investigation, apart from PAD 5, will be impacted by the proposed development.

The area was heavily vegetated, with regrowth sclerophyll forest, including spotted, red and scribbly gums, ironbark and Angophora. The understorey contained tea tree, melaleuca, acacias and heath plants. Few remnant stands remain, reflecting Minmi's coalmining past, resulting in the felling of old growth timber for pit-props and railway sleepers.

Based on previous investigations in the area, it was anticipated that most sites will be low density artefact scatters, and located within 100m of permanent watercourses. Sites in the vicinity of wetlands are often more complex, however as the wetlands would be most likely used for hunting and gathering rather than occupation, there would be little remaining in the archaeological record. Previous investigations further suggest that raised terraces adjacent to wetlands often contain a higher density of subsurface artefacts than other landforms.

The sampling strategy for the study area was to place 5m x 0.5m mechanically excavated trenches using a backhoe and situated at 20m intervals along the selected landforms. All material excavated was wet-sieved through nested sieves of 7mm and 3mm. The results of the subsurface investigations are presented in *Table 5.5*.

Table 5.5 Summary of sites (Mills 1998)

Site	Site type	Landform	Distance to water	Order	Site Contents	Disturbance	Potential for subsurface
1	artefact scatter	creek	0-50m	2nd	31 artefacts	clearing, tracks	low- moderate
2	artefact scatter	creek	0-50m	3rd	3 artefacts	clearing	low
3	artefact scatter	raised spur creek	0-50m	2nd	2 artefacts	clearing	low
4	artefact scatter	creek	0-50m	3rd	10 artefacts	fire trail, creek crossing	low- moderate
5	artefact scatter	creek	0-50m	3rd	58 artefacts	clearing	high

The dominant raw material for all sites was the locally available silcrete, with the most common artefact type being the unmodified flake (49%). The majority of artefacts were recovered from spit 1, with a much smaller percentage retrieved from spit 2.

With respect to the predictive model, the majority of occupation by Aboriginal people in the past appears to have been centred on Wentworth Creek, with less activity taking place along the ephemeral creek. The overall density of artefacts across the five PADs/sites was low, with a slightly higher density closer to Hexham Swamp (PADs/sites 1, 4 and 5), and the prediction of a higher density of subsurface artefacts on raised terraces near wetlands was proven.

The scientific significance of PADs/sites 2-3 were assessed as low, with 1 and 4 assessed as low to moderate, and 5 assessed as high. With PADs/sites 1 and 4, although both sites were considered to possibly have further potential for subsurface material, the Aboriginal stakeholders considered PAD/site 5 a better example of evidence of the area's occupation. The proponents agreed that PAD/site 5 should be preserved, and was designated the area as a public reserve in order to protect the subsurface material.

An ACHMP was developed by Kuskie (1999) for Site #38-4-0410, a scientific and culturally significant site identified in earlier investigations during the construction of the F3 freeway. The scope of this investigation was to undertake mitigative measures under a s90 permit obtained by the RTA from NPWS, in order to provide for the long-term conservation of the site.

The site is located 17km northwest of Newcastle city, within the F3 corridor, adjacent to Lenaghan's Drive and north of Black Hill Road. Hexham wetlands are located to the immediate east, and the Hunter River several km to the north. The site is situated on basal slopes adjacent to Woods Gully. Native vegetation has largely been removed and replaced with pasture grasses.

Throughout the course of previous archaeological investigations, in excess of 25,000 artefacts had been located at the site. It was anticipated that hundreds of thousands, or perhaps millions, of artefacts will occur within a conservation zone to be established surrounding the site. The artefacts represent a range of activities, but predominant represent microliths for hafting onto spears. Because of the size and nature of the site, it was assessed as being of scientific and cultural significance on a regional basis. Kuskie developed a series of management options represented as policies and appropriate action.

Umwelt (2001) undertook an assessment and test excavation investigation for the proposed development of a parcel of land at South Beresfield for light industrial purposes. The study was approximately 46 hectares (ha), and bounded by Weakleys Drive to the east, John Renshaw Drive to the south, Viney Creek to the west and Weakleys Flat Creek to the north.

Past land uses and disturbances included mainly dairy and grazing. Some areas exhibited evidence of disturbance associated with land clearance, such as depressions on the ridge/crest slopes, riparian corridor and spur extension which are interpreted as the burning of tree stumps *in situ*, vegetation cut off just above ground level along the riparian corridor, and a dam

along the south side of the flood plain. In addition, it appears that Weakleys Flat Creek has been diverted to provide water to the floodplain.

The topography of the area is typical of the Central Lowlands of the Hunter Valley, consisting of broad floodplains and low rise. An area in the northern portion of the study area near Weakleys Flat Creek is the steepest, and comprised approximately 6ha of the total study area. The central portion of the study area contains a north-south trending ridge, terminating in the north-west with a reasonably level low spur, and in the north-east gradually dropping away to the floodplain.

The vegetation in the Beresfield area includes numerous eucalypts, such as grey gum, spotted gum, narrow-leaved stringy bark, thin-leaved stringy bark and grey ironbark. Along riparian corridors, grey myrtle, red ash and *melaleuca stypheloides* are found, with native blackthorn, various paperbarks and wattles in the understorey. Much of the native vegetation had been removed through past land uses, and it was considered likely that the timber was used for pit propping. The dominant vegetation of the study area was immature regrowth of spotted gums, ironbark and tea tree on the ridge crests, tea tree on the slopes and acacia, red ash, native blackthorn, grey myrtle, red gum and lantana along the creeks. Fauna observed within the study area included eastern grey kangaroo, red bellied black snakes, ducks, hares, rabbits and foxes.

A search of the AHIMS database showed a total of 67 sites within 6 kilometres of the study area, with artefact scatters (55) being the dominant site type, followed by isolated finds (21), one scarred tree, one grinding groove and one waterhole/well. Of the artefact scatters, an equal number were located either within 100m of a creek (15), or on the top, on the end or edge of a spur overlooking a swamp (15). A high number were also located on the lower slopes of a creek emptying into a swamp (13). A predictive model was developed as follows;

- Higher concentrations of artefacts will occur on lower gradient slopes, most likely within 100m of a creek but possible up to 500m. Areas matching this description were the floodplain of Vineys Creek (at its northern end) and Weakley's Flat Creek, and the lower slope directly adjacent to Weakley's Flat Creek and on the northern end of the spur extension;
- Between areas of artefact concentration, areas of very light artefact scatter (background scatter) should exist;
- Isolated finds are likely to be found within 500m of a creek, but more likely to be found within 100m-200m. These site types are often found in disturbed contexts;
- Artefact scatters are most likely to be found within 100m-200m of a creek, on spur extensions, lower slope and within the floodplain. They are likely to be found in disturbed contexts, except on base of the slope in the Viney Creek riparian zone (southern to central sections), where colluvial and alluvial processes would have buried them, or in the small area of the spur extension that does not appear to have been cleared or affected by past and present land uses;

- Larger watercourses and wetlands were likely to have been inhabited by larger groups during the drier months, with the minor watercourses occupied by smaller groups throughout the year;
- Based on the geology of the area, silcrete would have been available locally and tuff within an easy day's walk. Silcrete is therefore likely to be the dominant raw material used. Flaked pieces are the dominant artefact type, followed by flakes, broken flakes, few retouched flakes and a few cores. Flakes can be up to 40mm, but likely to be around 20mm;
- Artefact numbers will be low (up to three) in areas >100m of creek lines, with up to 100 artefacts in close proximity to the creek line (<100m), and
- Artefacts located in the study area are likely to be dated between the mid to late Holocene period.

The investigation consisted of staged subsurface excavations to determine if there was any evidence of Aboriginal occupation within the study area, and if any connection existed between such evidence and landform units. The landforms identified in the study area for sampling included ridge spur crests, upper and mid slopes of a spur, foot slope/riparian corridor and drainage flat/floodplain.

It was proposed that a series of 29 x 450 millimetre augur holes be drilled across these landform units to compare stratigraphy and artefact content (absence/presence). It included 2 grids on the ridge crests, 4 on the upper and mid slopes of the spur, 10 grids on the riparian corridor upstream of the creek junction, 4 grids on the riparian corridor downstream of the creek junction and 9 grids on the depression flat/floodplain. It was proposed that following the augur testing, mechanical excavation be undertaken in areas with the highest artefact densities. Many of the planned augur holes for the floodplain area were not conducted, as the area was underwater during the fieldwork. As Summarised in *Table 5.6*, a total of 23 augur grids were excavated producing a total of 81 artefacts.

Table 5.6 Summary of sites (Umwelt 2001)

Site	Site type	Landform	Distance to water	Order	Site Contents	Disturbance	Potential for subsurface
1	artefact scatter	Viney Creek	0-50m	2nd	2 artefacts	not provided	nil-low
3	isolated	Viney Creek	0-50m	2nd	1 artefact	not provided	nil-low
6	artefact scatter	Viney Creek	0-50m	2nd	2 artefacts	not provided	nil-low
8	artefact scatter	flood Plain, Weakley's Flat Creek	0-50m	1st	21 artefacts	not provided	moderate-high
9	isolated	flood Plain, Weakley's Flat Creek	0-50m	1st	1 artefact	not provided	nil-low
10	artefact scatter	lower slope	0-50m	1st	19 artefacts	not provided	moderate-high
12	isolated	flood Plain, Weakley's Flat Creek	0-50m	1st	1 artefact	not provided	nil-low
13	isolated	ridge crest	0-50m	1st	1 artefact	not provided	nil-low
15	artefact scatter	gentle spur crest/upper slope	0-50m	1st	3 artefacts	not provided	nil-low
16	isolated	gentle spur crest/upper slope	0-50m	1st	1 artefact	not provided	nil-low

17	artefact scatter	gentle spur crest/upper slope	0-50m	1st	4 artefacts	not provided	nil-low
18	artefact scatter	riparian zone/lower slope	0-50m	1st	6 artefacts	not provided	nil-low
23	artefact scatter	flood plain, Viney Creek	0-50m	2nd	18 artefacts	not provided	moderate-high
24	isolated	flood plain, Viney Creek	0-50m	2nd	1 artefact	not provided	nil-low

The majority of artefacts (82.7%) were located at three separate sites – the floodplain above Weakley's Flat Creek, the floodplain above Viney's Creek and the lower slope above Weakley's Flat Creek. As a consequence, three trenches (Refer to *Table 5.7*) were allocated at each of these areas for hand excavation.

Table 5.7 ***Summary of trenches (Umwelt 2001)***

Trench	Site type	Landform	Distance to water	Order	Site Contents	Disturbance	Potential for subsurface
1	artefact scatter	flood plain, Viney Creek	0-50m	2nd	42 artefacts	not provided	N/A
2	artefact scatter	flood plain, Weakley's Flat Creek	0-50m	1st	90 artefacts	not provided	N/A
3	artefact scatter	lower slope above Weakley's Flat Creek	0-50m	1st	48 artefacts	not provided	N/A

The majority of the artefacts in all three trenches were located in the top 10cm spit. With the exception of Trench 2, all artefacts were located in the top two spits. With trench 2, however, artefacts were located in decreasing densities down to spit 5. Combining the results of the surface and subsurface investigations it was found that silcrete was the most dominant raw material (81%) followed by tuff (12%) and in other types in lesser quantities. Broken flakes accounted for 42.9%, flakes for 30.4%, flaked pieces 22.37%, retouched flakes (4.89), cores (2.44%) and .69% were smaller fragments.

In relation to spatial patterning, Umwelt found that sites were located in all of the landform units within the study area and that the small number and variety of artefact types and raw material from the ridge crests, spur crests and lower slopes associated with Viney Creek suggests only minimal use by past Aboriginal people. The number and distribution are interpreted to represent a general background scatter that would be expected across the area.

The western end of the lower slope above Weakleys Flat Creek and the northern end of the spur at the junction of Weakleys Flat Creek flood plain and the Viney Creek flood plain contained higher numbers of sites. However, the site contents were low density. This location with high numbers of sites was interpreted to represent a camping site for a small number of people and for brief stays. This is based on the lack of any sites used for specialised area such as the production of microblades.

It was concluded that assemblages become small and less complex upstream and larger and more complex downstream and towards the swamps. In relation to artefact types and raw materials, it was concluded that they most closely reflect those form sites near swamps than from the riparian corridor area. In relation to raw materials, it was found that silcrete was the most dominant type and this reflects the Woodbury swamp assemblages rather than the Hexham Swamp assemblages which are dominated by tuff.

An assessment by Kuskie (2002) was undertaken for a proposed development of Lot 2 DP873320 at Black Hill, near Beresfield. It was proposed to develop the study area into 29 rural/residential allotments. The property was dominated by a broad, low ridge trending in a northerly direction to Weakley's Flat, with associated spur crests and drainage depressions down towards Hexham Wetlands and the Hunter River is 3km to the east. Slopes on the ridge and spurs are very gently to gently inclined (<5.45°).

Previous land uses had affected the environment of the study area and had included clearing and grazing. The vegetation was predominantly regrowth, consisting of spotted gum, broad-leaved ironbark, grey ironbark, thin-leaved stringy bark, grey gum, narrow-leaved stringy bark, smooth-barked apple, rough-barked apple, white mahogany, red bloodwood, blackbutt, blackthorn, paperbarks and wattles. The forest floor covered with grasses, resulting in greatly reduced visibility during the survey and the shrub understorey had recently been removed.

Native mammals recorded in the Hexham Wetlands include platypus, water rat and the swamp wallaby. Fish include catfish, short-finned eel and long-finned eel. Others likely to have inhabited the wetlands include wombat, grey kangaroo, wallaroo, red wallaby, common kangaroo rat, flying fox, lizards, goanna, pademelon and bandicoot. Aboriginal people occupying the area would have therefore had access to ample faunal and floral resources. Gentle and flat ground would have been suitable for camping. Based on previous archaeological investigations, the following predictive model for the study area was developed:

- Site types likely to be found in the study area are likely to include isolated finds and artefact scatters;
- Artefact scatters (>2 artefacts within 50-100m of each other) have moderate potential to be located along the low gradient ridge line, and a high potential to occur on the low gradient spur crests bordering Hexham Wetlands;
- Other features may be present within an artefact scatter site, such as hearths, stone-lined fireplaces and heat treatment pits;
- Some quarry sites had been identified along watercourses in the region. The presence therefore of such sites within the study area is assessed as low to moderate; and
- Other site types such as burials, grinding grooves, middens, mythological/traditional sites, scarred trees, stone arrangements are assessed as having a low probability of being located within the study area.

The survey area was divided into 15 units based on geographic location and landform. Visibility across the study area was varied and ranged from 3-80% and the effective survey coverage was assessed at 1.7% of the study area. One site was identified (Refer to *Table 5.8*).

Table 5.8 Summary of sites (Kuskie 2002)

Site	Site type	Landform	Distance to water	Order	Site Contents	Disturbance	Potential for subsurface
BH7	artefact scatter	spur crest	50m	1st	2 red silcrete flakes	low	high

The identified site partially conformed with the predictive model for the study area in that the site was located along a gentle spur crest in close proximity to a water source. Kuskie reassessed the predictive model in terms of the likelihood of quarry sites within the study area to low, and that no sites were located along the low gradient of the ridge line. Kuskie notes that subsurface investigation would be necessary to further confirm the accuracy of the predictive model. Although Kuskie notes that the small study area limits the conclusions that can be drawn regarding Aboriginal occupation of the area, he acknowledges that the results of this survey in combination with other investigations in the area led to the conclusion that the area was suitable for Aboriginal occupation, particularly for seasonal camping and repeat visits for hunting and gathering.

Umwelt (2002) undertook an investigation for the proposed residential development of "Bluegum Vista Estate" that included Lot 2 DP1009255 and it was proposed that the 119 ha parcel be developed into 700 residential lots. Approximately 67% of the land was to be affected by the development, with the remainder providing for natural and cultural heritage protection areas, parklands, water quality management structures and community services. This area excluded from development includes the ridge crest and drainage lines of the study area.

The study area was described as a long, low ridge extending from Minmi Road in the west, to the south west margin of Hexham Wetlands, which forms part of the Hunter River estuary. The ridge crest extending from Minmi Road had deeply incised drainage lines that extend to the wetlands margin. The margin of the wetlands are characterised by an abrupt break of slope, often delineated by an outcrop of sandstone. Until Landcom's acquisition of the land, it had been a working farm for approximately 150 years.

Common vegetation found in the area of Hexham Wetlands includes the common reed, bulrush, water ribbons and water primrose. Riparian rainforest species found on the margins of the wetlands includes rusty fig, red ash, grey myrtle and boobialla. Plentiful faunal and fish species would also have been utilised from the wetlands, as well as water birds and lizards.

No predictive model was developed for the study area. However, following a review of previous investigations and a search of the AHIMS database it was noted that the he most common site type in the area as artefact scatters (61.5%), followed by isolated finds (26.3%). Both artefact scatters and isolated finds were more commonly found in the riparian corridors than around swamps, and the lower slopes associated with creek lines. Specialist technologies such as heat treatment, microblade production and quarrying activities are found within sites close to swamps, and that sites are often found within 600m of a permanent water source, but sites in the vicinity of the study area are most likely found within 100m of a permanent water source.

This investigation followed an earlier excavation conducted by Bessant and Richardson (1999: not registered on the AHIMS search by OEH), which investigated a single spur crest within the study area to test site types, contents and distribution. Bessant and Richardson's investigation was referred to as Stage 1, with Umwelt's investigations referred to as Stages 2A and 2B.

With Stage 2A, excavation trenches were located across the landform units to test the presence/absence of artefactual material across the landscape of the study area, as well as continuing to evaluate and analyse site contents and distribution. Seven landform units were represented and included a gentle spur crest, gentle side slope, hillock, flat, valley fill, moderate spur crest, ridge crest, moderate side slope and drainage line. Trenches 5m long were mechanically excavated using a backhoe equipped with a 0.5m bucket. Spits of approximately 10cm at a time were excavated down to the B horizon.

Following the results of this stage of the excavation (i.e. if significant deposits were located, or if it were assessed that a particular landform may contain artefacts not yet located following the first stage of the excavation), then the next stage of the investigation (Stage 2B) was triggered. This stage involved the targeted manual excavation of specific areas of interest by way of 2m x 1m trenches, excavated in 5cm spits. These trenches would be extended to 2m x 2m should any further features be uncovered.

A total of 3,001 artefacts were identified across the study area as a result of the three stages of the investigation. This figure includes 645 artefacts identified by Bessant and Richardson. A total of 1,919 artefacts were recorded as a part of the Stage 2A mechanical excavations, and a further 407 as part of Stage 2B investigations. It should be noted, however, that Stage 2A covered an area of 222.5m², resulting in an average of 8.6 artefacts/m², whereas Stage 2B covered an area of just 8m², giving a density of 50.9 artefacts/m². The results of the excavations of Stage 2A are in *Table 5.9*.

Table 5.9 Summary of sites (Umwelt 2002)

Site	Site type	Landform	Distance to water	Order	Site Contents	Disturbance	Potential for subsurface
1	artefact scatter	hillock	50-100m	Swamp	404 artefacts (32.3/m²)	clearing, grazing bioturbation, European refuse in trenches; possible site of a 19th century village	yes
2	artefact scatter	spur slope	50-100m	Swamp	76 artefacts (6.1/m²)	clearing, grazing stump extraction & burning,	no
3	artefact scatter	spur crest	not provided	not provided	71 artefacts (5.7/m²)	clearing, grazing stump extraction & burning,	no
4	artefact scatter	spur crest	not provided	not provided	340 artefacts (27.2/m²)	clearing, grazing stump extraction & burning,	yes
6	artefact scatter	flat	not provided	not provided	Not noted.	clearing/cultivation	no
7	artefact scatter	flat	100-150m	Swamp	134 artefacts (10.7/m²)	clearing/cultivation	no

8	artefact scatter	slope	0-50m	Swamp	30 artefacts (2.4/m²)	clearing, grazing, cultivation, stump extraction & burning, bioturbation	no
9	artefact scatter	slope	not provided	not provided	78 artefacts (6.2/m²)	clearing, grazing, cultivation, stump extraction &burning, bioturbation	no
10	artefact scatter	drainage line	200m+	2nd	3 artefacts (0.2/m²)	bioturbation, stump burning	no
11	artefact scatter	Crest	200m+	Swamp	71 artefacts (5.7/m²)	bioturbation, dumping of road base.	no
12	artefact scatter	drainage line	200m+	Swamp	6 artefacts (0.5/m²)	bioturbation, stump burning	no
13	artefact scatter	spur crest	not provided	not provided	248 artefacts (19.8/m²)	clearing, grazing, cultivation	yes
14	artefact scatter	spur crest	200m+	Swamp	98 artefacts (7.8/m²)	clearing, grazing, cultivation	no
15	artefact scatter	spur crest	not provided	not provided	33 artefacts (3.3/m²)	clearing, grazing, cultivation	no
16	artefact scatter	spur crest	0-50m	Swamp	109 artefacts (8.7/m²)	clearing, grazing, cultivation	no
17	artefact scatter	spur crest	200m+	Swamp	75 artefacts (6/m²)	clearing, grazing, cultivation	yes
19	artefact scatter	spur crest	not provided	not provided	51 artefacts (4.1/m²)	clearing, grazing, cultivation	no
20	artefact scatter	spur crest	200m+	Swamp	71 artefacts (5.7/m²)	clearing, grazing, cultivation, stump extraction	no
21	artefact scatter	crest	not provided	not provided	17 artefacts (2.3/m²)	bioturbation, dumping of road base	no

Note: Transects 5 and 18 not excavated – outside study area.

Although the distance between sites and the nearest water source was not always given, it was noted that the entire study area was within 300m of the swamp margin. The results of the manual excavations of Stage 2B are presented in *Table 5.10*.

Table 5.10 Summary of excavation (Umwelt 2002)

Site	Site type	Landform	Distance to water	Order	Site Contents	Disturbance	Potential for subsurface
1	artefact scatter	hillock	See above	not provided		N/A	N/A
4	artefact scatter	spur crest	See above	not provided		N/A	N/A
13	artefact scatter	spur crest	See above	not provided		N/A	N/A
17	artefact Scatter	spur crest	See above	not provided		N/A	N/A

The dominant raw material of the assemblage was fine-grained siliceous (66%), followed by silcrete (29%). It is noted that of the fine-grained siliceous artefacts, the majority was tuff. The dominant artefact type was flakes (1,529), followed by broken flakes (961), flaked pieces (235)

and retouched flakes (190) respectively. A total of 80 cores were also noted, and four hammer stones, both predominantly of silcrete.

The significance of the sites were varied, and based upon landform and artefacts identified. None of the sites were assessed as low. Sites 1, 3, 4 and 13 were assessed as being of very high scientific significance, sites 2, 8, 14, 15, 16 and 17 were assessed as moderate to high and sites 6, 7, 9, 10, 11, 12, 19, 20 and 21 were assessed as moderate. In addition, previous investigations and consultation with stakeholders representatives identified a rocky protuberance known as "the Knob" as a culturally significant site, with possible burials nearby.

Umwelt considered the effect of heat through wildfire as opposed to heat treatment on artefactual material. It also considered the geomorphology of the swamp and whether any effect could be deduced relating to occupation patterns as a result of the evidence retrieved through this investigation. With respect to the effect of heat treatment versus wildfire on artefactual material, Umwelt concluded that it is possible that site integrity was compromised by heat from wildfire and that some of material may therefore be non-artefactual. With respect to the geomorphology of the swamp, Umwelt postulates a possible early to mid Holocene bay to the north of the swamp, although it does not provide any evidence for this.

It was therefore concluded that the large sample size was responsible for the complexity of evidence retrieved. It also concluded that whilst there was no direct correlation between density of artefacts and landform, the evidence suggests that its position adjacent to the swamp meant that the study area was used intensively by Aboriginal groups over a long period of time.

Umwelt (2003) undertook an Aboriginal Cultural Heritage Assessment of Hexham Swamp in relation to the proposed Hexham Swamp Rehabilitation Project. The project proposed to restore tidal circulation into parts of Hexham Swamp by opening the Ironbark Creek floodgates. This was to restore wetland landscape and values. The Hexham Swamp area was a large wetland area approximately ten kilometres long (north to south) and five kilometres wide (east to west). It was located between Beresfield and Wallsend. The floodgates were installed between 1970 and 1971, dramatically changing the character of the wetlands. Some of the changes that occurred as a result of the floodgate installation were a lowering of the water table below the gates to below mean water, stagnation of water behind the flood gates and the elimination of saline waters entering the swamp. Mangrove and salt marsh were replaced by meadow and reed communities in some areas following installation of the floodgates.

The topography of the study area included the large wetland area, the interface between wetland and aquatic landscapes and the shoreline of Hexham Swamp. Dark brown loose loamy sand and sandy clay loams were noted in the study area. Outcrops with raw materials for artefact manufacture were largely absent except for deeply weathered small outcrops of sandstone with low quartz content. The swamp area was part of the estuary of the Hunter River. Creeks in the area included Ironbark Creek, Fishery Creek, Shelley Creek and Dark Creek.

Diverse vegetation was noted throughout Hexham Swamp, including such species as casuarina, melaleuca, saltmarsh, sedges, ficus, spotted gum, ironbark, cabbage tree palm and swamp mahogany. Fresh meadow and wet grassland were also noted. Economic plants that may have been located in the vicinity of the swamp during the past included bracken fern, bulbine lily, bulrush, bungwall, common appleberry vine, common reed, corkwood, devil's vine, dianella, fringe lily, geebung, grass tree and headache vine. Others included kangaroo grass, kurrajong, lily pilly, mat rush, macrozamia, milkmaids, mistletoe, mountain devil, native cherry, native flax, native geranium, native grape, native long yam, nodding greenhood, pale ballart, peach heath, pink fingers orchid, pink swamp lily, rats tail grass, red ash, rusty fig, sandpaper fig, water ribbon, wombat berry vine and wonga vine.

The AHIMS search results and a review of past surveys in the vicinity of the study area informed a predictive model for site types that may have occurred within the swamp. Isolated finds and background scatter had been identified in the vicinity in previous surveys. No physical evidence of past occupation was known within Hexham Swamp. It was stated that there was no archaeological signature for the swamp area. Site types predicted as potentially occurring in context with past swamp activities included isolated artefacts, artefact scatters, burials, stone arrangements, shell middens, grinding grooves, quarries, ceremonial grounds, scarred or carved trees, waterholes, wells and fringe camps. It was noted that the preservation of timber and fibre implements might have been possible in the anaerobic sediments of Hexham Swamp. Artefact scatters and isolated finds in shoreline areas were predicted as the most likely sites types and location.

The bund area which was proposed to be impacted by earthworks was surveyed in full. One highly disturbed site was identified, which is summarised in *Table 5.11*. Ground surface visibility was low (10%) and disturbance high in the bund area due to tracks, cultivation, cattle trampling and fences. No PADs were identified. The site type located corresponded to the predictive model.

Table 5.11 Summary of sites (Umwelt 2003)

Site	Site type	Landform	Distance to Water	Stream Order	Artefacts/ Features	Disturbance	Subsurface potential
Shortland Site 3	artefact scatter	alluvial flat	40m	Ironbark Creek	1 silcrete flaked piece, 1 tuff retouched flake & 1 tuff flake	high (earthworks, cultivation & cattle track)	not noted

It was recommended that Hunter Catchment Management Trust submit a consent to destroy application for Shortland Site 3 and that the site be buried beneath imported clean fill as per an ALALC request. ALALC were supportive of the proposed rehabilitation project.

Mills (2003) undertook an assessment for the rezoning of land on Minmi Road, Fletcher. Part of Mills' brief was to analyse, interpret and assess the implications of the findings of Umwelt's (2002) subsurface investigation of an adjacent 119 ha property to be developed as Bluegum Vista Estate. The investigation also included a survey. The study area was a parcel of land

measuring 80 ha and was bounded by Minmi Road to the south, Hexham wetlands to the north and the Landcom area investigated by Umwelt (2002) to the east.

Past land use of the study area has been predominantly agricultural with old growth forest bulldozed in the 1930s, ripped, fertilized and sown with grass for grazing. The flat tops and shoulders of the spurs within the study area had been ploughed and sown for grazing since that time. On the eastern boundary of the study area, a dam was constructed. Its use by cattle has resulted in heavy sheet and gully erosion. In addition, the western corner of the study area has been used for clay target practice by the Newcastle Shooters' Club, resulting in some traffic in the area. Lot 2 of the study area had also been impacted by the construction of a farm house and associated buildings, and a horse training track in the south of that Lot.

It was anticipated that future land use would include the construction of roadways, cycleways, houses and driveways, installation of services such as electricity, gas, water, sewerage and telephone, surface water drainage outlets and overflow points, as well as indirect impact on the swamp margins through pedestrian use and general population use. The entire study area is likely to be affected by these activities, with the exception of those areas set aside for conservation and/or recreation use. Vegetation included grasses, riparian species such as rusty fig, red ash, grey myrtle and boobialla. Species in the wetlands include common reed, bulrushes, water ribbons and water primrose. Faunal species along tributary lines include possum, wallaroo, kangaroo, swamp wallaby, swamp rat, sugar gliders, squirrel gliders and bandicoot. Various fish and water birds would also have been available in the swamp areas.

A search of the AHIMS database showed 112 sites, with artefact scatters (69) being the dominant site type, followed by isolated finds (30). There was also one scarred tree, a series of 11 grinding grooves, a waterhole/well and a stone procurement site. The majority of the artefact scatter sites were located within riparian corridors (55%) and swamp areas (31%), with isolated finds chiefly located in riparian corridors (76.6%), with a much smaller number found in swamp areas (23%). No sites were located within the study area.

Landform units across the study area were identical to those in the Umwelt 2002, and were referred to as such to allow for comparative analysis over the two study areas. They included a crest, moderately sloping spur crest, gently sloping spur crest, flat low level spur line, moderate side slope to swamp margin and open depression – drainage line. One additional landform unit was added, low terraces adjacent to swamp.

Following analysis of previous archaeological investigations and nearby site data, a predictive model was developed for the study area. It was suggested that low density "background scatter" was likely across the entire study area, that larger sites would be focussed on crests/ridgelines in the southern portion of the study area and on crests and shoulders of spur lines in the vicinity of the swamp margins, and that scarred trees are possible in areas of old growth timber.

Visibility was low due to grass cover. However, some areas of visibility existed, such as a 40m x 50m crest area along Minmi Road used as a horse training track (visibility 90%), animal tracks along fence lines and edges of spur lines along the swamp margins (visibility 60%), and the

edges of a dam located on the shoulder of an eastern spur. Effective coverage of the study area was assessed at between 0.04% and 2%. Four sites were identified and are summarised in *Table 5.12*.

Table 5.12 Summary of sites (Mills 2003)

Site	Site type	Landform	Distance to water	Order	Site Contents	Disturbance	Potential for subsurface
MR-OS-1	artefact scatter	ridge/crest	not provided	not provided	17 artefacts	clearing, grazing	no
MR-OS-2	artefact scatter	spur crest	0-50m	2nd	6 artefacts	clearing, grazing	yes
MR-OS-3	artefact scatter	spur crest	0-50m	2nd	3 artefacts	clearing, grazing	no
MR-OS-4	artefact scatter	ridge crest	not provided	not provided	7 artefacts	clearing, grazing	no

A total of 33 artefacts were recorded at each of the four sites. Indeterminate artefacts were the dominant artefact type (27.27%), followed by flakes (18.18%), cores (15.15%) and scrapers (15.15%). Other artefact types recorded included retouched flakes (9.09%), broken flakes/flaked pieces (6.06%), block fractured fragments (6.06%) and a lower millstone (3.03%). The dominant raw material was fine-grained siliceous (63.6%), followed by silcrete (18.18%). These figures are broadly comparable to those found at Bluegum Vista Estate by Umwelt.

With respect to MR-OS-1, although it yielded the greatest number of artefacts, it was concluded that the site integrity was lost due to disturbance, and that all artefacts were redeposited. It was therefore assessed as being of low scientific significance. Sites MR-OS-3 and MR-OS-4 were also both assessed as having little integrity due to disturbance, and extremely low potential for further research. Conversely, it was concluded that whilst the integrity of MR-OS-2 had been compromised, it still retained enough potential for *in situ* subsurface artefacts to exist. The entire spur crest was therefore designated a PAD. Mills recommended subsurface testing for this landform.

Kuskie (2004) undertook an investigation for the proposed residential development of a parcel of land at Raymond Terrace Road, Thornton North. The residential development was part of Maitland Council's "Urban Settlement Strategy", and comprises part of Lot 12 in DP 603613, Lots 463 and 464 in DP 870019, Lot 64 in DP 651132 and Lot 469 in DP 881116.

Landforms included spur crests, simple slopes and drainage depressions descending from a locally dominant ridge crest along the eastern boundary west to broad flats and former wetlands associated with Four Mile Creek. Slopes are described as gentle to very gentle. Watercourses are typically 1st and 2nd order streams, draining west into Four Mile Creek and the Hunter River is approximately 3km north of the study area. Earlier researchers identified Pleistocene terraces within the study area, which were remnants of the Last Interglacial floodplain. It is possible that evidence of human occupation from the Pleistocene era may still survive in these terraces.

Previous land uses include clearing, pastoral activities, the establishment of four turkey farms (including the construction of sheds, buildings and road), agriculture, the installation of

essential services such as power, gas, water, sewerage and telephone lines, erosion control works (i.e. contour banks) and the construction of roads, dams, housing and buildings for the "Hunterfield" rural property. The old growth vegetation of the study area had largely been cleared, with much of the study area covered with grasses. Some stands of spotted gum and narrow-leaved ironbark were present, however these were mainly mature regrowth.

Kuskie mentions a search of the AHIMS database and notes that artefact scatters and isolated finds are the dominant site types within the area, but does not discuss numbers or ratios of sites. Following a comprehensive review of previous archaeological investigations in the region, Kuskie developed the following predictive model for the study area:

- Artefact scatters have a high potential to occur along the very gentle to gentle gradient spur crests, ridge crest, simple slopes and drainage depressions;
- Higher densities of artefacts are likely to occur near wetlands and drainage depressions;
- If remnant terraces occur, these may contain evidence of human occupation from the Pleistocene era;
- Whilst the probability of a burial occurring on the site is considered very low, it cannot be discounted;
- If any suitable bedrock exists within the study area, the probability of grinding grooves being present is moderate;
- The presence of silcrete cobbles in the immediate area suggests that the possibility of quarrying or reduction sites being present within the study area is moderate; and
- The possibility of the presence of other site types such as scarred trees, mythological/traditional sites and stone arrangements is considered low.

The survey area was divided into 28 survey units (archaeological terrain units), and particular attention was paid to areas of erosion and exposure on higher ground. Five survey units comprising the former turkey farms were assessed as having negligible archaeological potential based on the level of disturbance. Effective coverage was low and a total of seven sites were identified as a result of the survey and are summarised in *Table 5.13*.

Table 5.13 Summary of sites (Kuskie 2004)

Site	Site type	Landform	Distance to water	Order	Site Contents	Disturbance	Potential for subsurface
TN2	isolated +PAD	slope	50-100m	1st	1 silcrete flaked piece	clearing, pastoral	high
TN8	isolated +PAD	slope	0-50m	wetlands	1 silcrete flake	clearing, pastoral	high
TN 9	artefact scatter	drainage depression	0-50m	1st and 2nd	42 artefacts	clearing, pastoral, dam & farm	high
TN20	isolated +PAD	drainage depression	0-50m	1st	1 silcrete flake	dam construction	high
TN21	artefact scatter	slope	50-100m	1st	5 artefacts	vehicle track	high

TN26	artefact scatter	spur crest	0-50m	2nd	5 artefacts	clearing, pastoral	high –on Pleistocene terrace
TN27	isolated +PAD	drainage depression	0-50m	1st	1 tuff flake	clearing, pastoral, erosion	high

A total of 56 artefacts were identified, with flakes being the dominant artefact type (25), followed by flaked pieces (11). Silcrete (38) followed by tuff (16) were the dominant raw materials. In addition, 69% of the silcrete artefacts exhibited signs of heat treatment. Other artefact types identified in the assemblage included one each of a bondi point, core, core fragment, microblade, retouched/utilised piece and utilised flake. In addition to the 56 artefacts identified, a further 15 non-diagnostic lithic fragments were retrieved from sites TN9 (11) and TN21 (4). Although the sample size was relatively small, Kuskie makes the following observations regarding spatial patterning of the sites:

- Sites occur on three of the four identified landforms (i.e., simple slopes, spur crests and drainage depressions). No sites occurred on the ridge crest, however as this comprised only a small portion of the study area, this reflects the small nature of the sample;
- The largest survey unit (TN9 – 1st and 2nd order drainage depression) comprised the largest site. However, the sample unit is insufficient in size to draw any conclusions regarding preferential occupation;
- Most of the sites are recorded within 150-300m of water; and
- All of the sites recorded were on gentle slopes.

With respect to the reassessment of the predictive model, Kuskie notes the following:

- As a result of the survey, no evidence exists as a result of the survey to contradict the prediction that the potential for burials, scarred trees, stone arrangements and mythological/traditional sites is low to very low;
- The potential for quarry sites within the study area was not confirmed, and is downgraded from moderate to low;
- Bedrock was inspected during the survey, but no grinding grooves were identified. Whilst potential for them to occur still remains, it is downgraded from moderate to low;
- The prediction that artefact scatters have a high potential to occur on gentle to very gentle spur crests, simple slopes and drainage depressions was confirmed. No evidence was confirmed for sites to occur on ridge crests, but Kuskie maintains that this is due to the small sample size; and
- Whilst remnant Pleistocene terraces were tentatively identified in three locations, the potential for them to contain evidence of human occupation is considered to be low due to post depositional impacts and the presumed lower intensity of occupation.

Whilst the study area had been affected by previous land uses, Kuskie assessed the integrity of the identified sites as sufficient to warrant further subsurface investigation. It was therefore assessed that all seven sites were considered to be of moderate to high scientific significance in a local context. It was recommended that further subsurface investigations be undertaken.

An investigation by MCH (2005) was undertaken for a proposed upgrade of sewer facilities between Tarro and Shortland. The proposed works included the replacement of above ground pipe to underground pipe within the boundaries of Hexham Wetlands. The study area was approximately 8 kilometres long and follows the existing pipeline from Tarro in the north, along the margins of Hexham Wetlands in a southerly direction for approximately 4.5 kilometres, then continues in a south-westerly direction through Hexham Wetlands to Ironbark Creek, then south east through Shortland. The alignment of the pipeline roughly follows the adjacent Hunter River. The works were to include minor excavation and fill for supporting structures and an access road.

Vegetation across the study area was largely cleared and heavily grassed. Prior to clearance, the dominant vegetation communities would have included spotted gum, various ironbark species, stringy bark and grey gum. The understorey would have included blackthorn, paperbarks, wattles, grey myrtle and red ash. A search of OEH AHIMS database showed a total of 71 sites located within 5 kilometres of the study area and included open camps (39), 17 grinding grooves, artefact sites (4), middens (4), isolated finds (2) and one each of a scarred tree, stone arrangement, quarry and PAD.

Based on previous archaeological investigations, the predictive model developed stated that artefact scatters and isolated finds are the most likely site types to be encountered in the study area and that sites with greater artefact densities are typically found on areas of elevation, possibly with views over the wetlands and low slope gradient. The survey focused on areas with increased visibility and visibility ranged from very poor to excellent. The effective coverage was calculated at 30%. No sites were identified during the survey and one PAD was identified on both sides of Ironbark Creek (Refer to Table *5.14*). It was recommended that the area not be disturbed until test excavations had been undertaken.

Table 5.14 Summary of PAD (MCH 2004)

PAD	Landform	Distance to water	Water source	Size	Disturbance
PAD 1	Creek bank	0-50m	Ironbark Creek	dimensions not given	land clearing, grazing, railway

Therin's report (2004) is a permit granting permission to conduct preliminary test excavations of two PADs associated with two artefact scatters at the study area comprising the proposed Ashtonfield Public School at Ashtonfield, NSW. The permit contains background information and a proposed methodology associated with the permit application.

The Department of Public Works proposed to construct a school at Ashtonfield, NSW. Two artefact scatters were identified during the initial survey and each site consisted of two artefacts. Based on the distribution of sites across the area and the relative lack of disturbance, the areas associated with the sites were designated as PADs. A predictive model argued that

there is a moderate probability of scarred trees being present but is depending on survival of old growth trees, that low density artefact scatters may be present in areas greater than 200m from permanent water, and that moderate to high density artefact scatters may be present less than 200m from permanent water.

The methodology developed for the investigation involved the mechanical excavation of 36 x 1m² over a standard 20m grid. All pits were to be excavated using a backhoe, and all excavated material was to be wet-sieved through 3mm and 6mm nested sieves. Any artefacts recovered were to be bagged for analysis, particularly with respect to function, residue, and use wear. If available, a sample of 100 artefacts will be examined for this purpose under a low-powered microscope for use-wear and residue. From this sample, a further sample of 30 artefacts were to be examined in further detail under a low-powered microscope to determine the function of the tool, with a view to determining the materials that the tool was used to process. Any suitable organic material retrieved from the excavation was to be submitted to the Waikato Radio Carbon Dating Laboratory for dating.

Austral Archaeology (2006) undertook an assessment for the proposed development of the study area to construct a retail facility and car park. The study area is located at Fletcher, about 10km west of Newcastle, and 1km southwest of Hexham swamp. The purpose of the investigation was to conduct test excavations on an artefact scatter and associated PAD identified in an earlier survey of the study area. The study area is adjacent to Wentworth Creek, a 3rd order stream that flows into Hexham swamp. The topography of the study area is described as gently undulating, with a westward incline that increases with proximity to Wentworth Creek. The study area is also bounded by Minmi Road, which runs in along a roughly north-west to south-east alignment along the eastern boundary.

The study area had been cleared of its natural vegetation, and exotic grasses were present along the south western borders of the property. The remainder was covered with young, native vegetation, interspersed with the odd mature eucalypt. Prior to the clearance of old growth vegetation, it was believed that the area supported species such as spotted gum on the rises, and rainforest species on the watercourses down to the swamp. Faunal resources would have included possum, wallaroo, kangaroo, swamp wallaby, swamp rat, sugar glider and bandicoot, in addition to abundant fish and lizard species. Whilst the general area had been affected by timber getting, the more obvious impact on the current study area included the installation of services such as sewerage, electricity and telephone, as well as water detention areas and previous geotechnical investigations.

A search of the AHIMS database showed a total of 21 registered archaeological sites within a 25km radius of the study area. The dominant site types are artefact scatters (52%), unspecified artefact sites (28%), axe-grinding groove (15%) and isolated find (5%). One site, an artefact scatter, is registered within the subject area, and the investigation of its associated PAD is the subject of this report. The following predictive model was developed:

- Substantial subsurface deposits are likely to occur close to the creek and in areas where little ploughing has taken place;

- Areas closest to the creek banks around permanent water courses are considered to hold the greatest archaeological potential;
- Open camp sites and isolated finds are likely to be found in relatively undisturbed contexts within the study area;
- Sites will be concentrated close to permanent water, although still likely to exist with smaller, with less density, further away from permanent water;
- Artefacts are likely to be made of fine-grained siliceous, silcrete and quartz;
- Charcoal and faunal remains may also remain, depending on the acidity of the soil; and
- Scarred trees are possible with mature, old growth trees.

The objective of the test excavations was to establish whether the PAD contained any archaeological material, as well as the extent and significance of any such material. It was proposed that a total of sixteen 1m x 1m trenches were excavated, four each 20m apart along four transacts, also spaced 20m apart. All trenches were excavated by mattock and shovel, in arbitrary 10cm spits down to the clay horizon. All excavated material was wet sieved through 3mm and 5mm nested sieves. The results are summarised in *Table 5.15.*

Table 5.15 Summary of sites (Austral 2006)

Site	Site type	Landform	Distance to water	Order	Site Contents	Disturbance	Potential for subsurface
A0	artefact scatter	not provided	not provided	3rd	5 artefacts	clearing, ploughing	N/A
A10	artefact scatter	not provided	not provided	3rd	6 artefacts	clearing	N/A
A30	isolated	not provided	not provided	3rd	1 artefact	clearing	N/A
B10	artefact scatter	not provided	not provided	3rd	4 artefacts	clearing	N/A
B20	artefact scatter	not provided	not provided	3rd	3 artefacts	clearing	N/A
B30	artefact scatter	not provided	not provided	3rd	4 artefacts	clearing	N/A
B40	artefact scatter	not provided	not provided	3rd	2 artefacts	clearing	N /A
C20	isolated	not provided	not provided	3rd	1 artefact	clearing	N/A
C30	artefact scatter	not provided	not provided	3rd	4 artefacts	clearing	N/A
C40	artefact scatter	not provided	not provided	3rd	2 artefacts	clearing	N/A
Z10	artefact scatter	not provided	not provided	3rd	7 artefacts	clearing	N/A
Z20	artefact scatter	not provided	not provided	3rd	21 artefacts	clearing	N/A

A total of 60 artefacts were identified as a result of the test excavations. The artefact types included flakes (86.7%), retouched flakes (8.3%) and flaked pieces (3.3%). The dominant raw material was silcrete (76.7%), followed by fine grained silicous (11.7%) and quartz (8.3%). A low core to flake ratio was noted (1:59). It was concluded that the assemblage was consistent with those typically identified in the region and no further investigation was recommended.

Umwelt (2006) compiled a Permit application to undertake archaeological test excavations ahead of the implementation of the Beresfield Electricity Supply Augmentation Project. Energy Australia proposed to construct seven 33kV feeders between the East Maitland zone substation, the Beresfield sub transmission substation, the Thornton zone substation and the Tarro zone substation. In an earlier survey, a PAD was identified on a low spur crest between Tarro and Woodberry Swamp near Feeder 4, and this report formed part of an application to DEC to conduct subsurface investigations in the PAD.

The spur crest containing the PAD runs in a roughly north-south direction, and divides Tarro Swamp and Woodberry Swamp. The PAD does not comprise the entire spur crest, as some elevated areas have been utilised for residential and industrial development, and the, as well as works associated with the transmission line (radio tower, easement). The area of the PAD is restricted to the elevated land not affected by the development, and measures approximately 100m². It was anticipated that the PAD will be impacted by the sinking of two poles into the area, in addition to the associated impacts by heavy vehicles. Such activities would have a direct and indirect impact on any subsurface material.

No environmental data was provided for the study area and based on previous archaeological investigations, the predictive model suggested that elevated, low gradient landscape units around the margins of the wetlands are likely to have been favoured by Aboriginal groups and that numbers of surface artefacts are not always indicative of the density of subsurface artefacts.

The excavation methodology comprised the hand excavation of two 1m² trenches in four 50cm² quadrants in arbitrary 5cm spits. The two trenches were placed at the proposed sites of the two poles for the 33kV feeder. All excavated material was to be sieved through nested 2mm and 5mm mesh sieves.

AHMS (2007) undertook an assessment for the proposed development of a parcel of land at Tomago, NSW. The proposed development was to include facilities for assembly, maintenance and aftermarket repair of specialised vehicles and accommodation for machinery and equipment used by extractive industries in the area. Administrative facilities and a training centre is also proposed. This investigation was to form the application for a major development pursuant to Part 3A of the *Environmental Planning & Assessment Act 1979*

The study area was situated on a Pleistocene dune and part of the Tomago coastal plain, which in turn is part of the Newcastle Bight system. The study area was dominated by a low gradient landform on undulating terrain. Modifications were made to the landscape during the construction of the Australchem facility, which had been a low crest with a simple slope falling to the south and west. The rest of the study area had been flat and likely to be seasonally waterlogged. The low-lying south-eastern corner of the study area contained a swamp which has been partially formed by the embankment of the adjacent Tomago Road. Prior to the formation of this modern swamp, it was likely that this area was once a tidal flat, estuarine swamp and freshwater swamp at different times in the past.

Original vegetation had been cleared in the centre of the study area as part of the construction of the Australchem facility, and in other parts for fire trails and tracks. Some remnant vegetation remains between these disturbed areas, and comprises dry heath communities on elevated ground, and wet heath plants on the low-lying terrain.

A search of the AHIMS database shows a total of 36 sites and four PAD within a 6km radius of the study area. The dominant site type is the artefact scatter (34), with one midden and one scarred tree. It is observed that this is typical for a Pleistocene barrier dune complex, and notes the absence of any Holocene middens. No sites were situated within the study area. Based on previous archaeological investigations, the predictive model stated that sites likely to occur within the study area included artefact scatters ("open camp sites") across all landforms, isolated finds anywhere within the study area, middens in undisturbed contexts, and burials in aeolian sand deposits.

A survey was undertaken with four survey units devised based on the landforms. Particular attention was paid to areas of ground exposure and erosion due to the higher visibility. Visibility across the study area varied according to landform, and was assessed between 0% in the closed depression, and 8% on the simple slope. Accordingly, the effective survey coverage varied between 0% in the closed depression to 4.8% on the simple slope. No sites were recorded and two areas of the study area were assessed as having archaeological potential (Refer to *Table 5.16*).

Table 5.16 Summary of sites (AHMS 2007)

PAD	Landform	Distance to water	Water source	Size	Disturbance
1	flat	+200m	Hunter River	entire landform	clearing for fire trails
2	simple slope	+200m	Hunter River	entire landform	clearing

Both areas were assessed as having archaeological potential based on the landform and the relatively undisturbed nature of the area. The flat was assessed as having low-moderate potential, while the simple slope was assessed as having moderate to high potential. Recommendations therefore included avoiding impact to those areas, or if not feasible, to conduct a subsurface investigation of the area prior to any construction works.

Insite (2007) undertook an investigation for a proposed residential subdivision at Fletcher, near Newcastle. It was proposed that the 5.642 ha study area be subdivided into 36 residential lots. The study area was part of Bluegums Vista Estate (Umwelt 2002), and part of a site recorded as part of that investigation (AHIMS # 38-4-0683) was located on the present study area. The landforms within the study area were described as being broad crests (250m – 400m) and long side slopes (350m – 700m), with extended foot slopes (up to 2000m). Slope gradients are 3-15%. The study area was located on a low spur which juts into Hexham swamp.

Past use of the study area included clearing and a dairy farm. Much of the native vegetation had been cleared for grazing, leaving the majority of the vegetation cleared pasture with some native vegetation including tall open forest of spotted gum, broad-leaved ironbark, grey gum and narrow-leaved stringy bark, with an understorey of paperbark, blackthorn and wattles.

Forest red gum has been noted on some lower slopes, with grey myrtle, red ash and some lantana occurring along drainage lines. No watercourses occured within the study area, with the closest water source being located approximately 500m to the south west. Hexham swamp is adjacent to the study area to the north, north-east and south-east boundaries .

A search of the AHIMS database identified 20 sites within a 12km radius of the study area. No information regarding site types or locations was given. Based on previous investigations in the vicinity of the study area, the following predictive model was developed:

- A spiritually significant site, "the Knob", is located approximately 300m from the study area, and therefore Aboriginal archaeological material is likely to be identified;
- Wetlands traditionally provided an extensive array of material for exploitation by Aboriginal people in the form of food, fibre and timber. It is therefore expected the study area would contain evidence of occupation/exploitation close to the swamp margins, particularly toward the 10m contour;
- Surface artefacts are not indicative of the size and/or density of subsurface artefacts in the area. The finds by Umwelt (2002) on the adjacent property are indicative of this;
- Open spur site overlooking swamps/wetlands are likely to contain a higher density of artefactual material than other landforms in the study area; and
- The dominant raw material of any artefacts is likely to be fine-grained siliceous.

The survey was aimed at identifying any archaeological material and assessing the impact of the proposed development on such sites. The survey focussed on areas of exposure, areas of break of slope and track. No further sites were identified which in itself is consistent with part of the predictive model, in that subsurface deposit often exists without any surface expression. Therefore, based on the location of part of an identified site within the study area, its proximity to "the Knob" and Hexham swamp and the high density of subsurface artefacts identified in excavations on an adjacent property and landform, the area was identified as a PAD (Refer to *Table 5.17*) and it was recommended that subsurface investigation be undertaken.

Table 5.17 Summary of PAD (Insite Heritage 2007)

PAD	Landform	Distance to water	Water source	Size	Disturbance
1	spur	0-50m	wetland	not given	clearing, pastoral

Indigenous Outcomes (2008) undertook an investigation for the proposed development for a train servicing facility, development and future intermodal and industrial subdivision at 67 Maitland Road at Hexham. The study area was located 12 km north-west of Newcastle, and was 121 ha. The property was bounded in the east by the main Northern railway line, in the west by the Chichester Water Supply Pipeline and Hexham Wetlands. The northern and southern boundaries adjoined grazing land, a private airstrip and wetlands.

Previous land uses of the study area was evidenced by the Coal & Allied coal tailings stockpile and washer facility, and the eastern section of the former Richmond Vale railway line. The

railway operated between 1856 and the 1980s. The Coal & Allied operation closed in 1987, and whilst most infrastructures have been removed, some tailings remain. Vegetation across the study area was described as regrowth, having been cleared for earlier development. Further environmental data for the study area and its surrounds was not provided.

A search of the AHIMS database showed no sites previously recorded within the study area and the AHIMS data was not provided. A review of previous archaeological investigations showed that the dominant site type in the Newcastle area were small (<10), low density artefact scatters, located close to watercourses. Other site types located along the coast include middens, axe grinding grooves, ceremonial sites, burials, scarred trees, stone arrangements, rock shelters with art, fish traps and traditional sites. Silcrete and tuff are cited as the most frequent raw material used, with most artefacts relating to general or non-specific knapping activities, and to a lesser extent, microblade production. Based on previous investigations, the following predictive model was developed:

- Artefact scatters and isolated finds may be present and visible in erosion features;
- There is potential for shell middens, and
- With no rock shelters, there will be no art sites;
- There is no potential for scarred/carved trees, rock engravings, grinding groove, intact occupation deposits, mythological sites, stone quarries, bora rings or stone arrangements to occur site; and
- There will be no visible evidence of burials on the site.

A survey was undertaken and the report described visibility as moderate due to grass cover. No archaeological sites or PADs were identified and it was concluded that there were no archaeological constraints to the development.

An ACHMP was developed by Umwelt (2008) for Bluegum Vista Estate, a 119 ha residential development proposal at Minmi Road, Fletcher. This investigation follows from Umwelt's earlier (2002) excavation program of the same parcel of land. Following Umwelt's earlier studies (2002), three Aboriginal Heritage Conservation Areas were designated in order to protect areas of cultural sensitivity from the impacts of the proposed development. These three areas comprise 4.2 ha of the 119 ha Estate, and have been set aside from development in perpetuity. During construction works, these areas were to be fenced off to protect them from heavy machinery and accidental damage. In addition, the proponents undertook to develop an Aboriginal Cultural Heritage Information package to be distributed to all new landholders, outlining the results of previous archaeological investigations and cultural values of the Estate. Awabakal names were also proposed for place names within the Estate.

The ACHMP was developed in two stages. The first, as a condition for an AHIP granted in 2006, to cover the civil works as a result of the development. The Stage 2 ACHMP, which amends and updates the Stage 1 ACHMP to address cultural heritage issues as a result of both civil and residential construction works, as well as form part of an overarching s90 permit application to cover destruction of sites to be impacted by both civil and residential works.

The preparation of the Stage 2 ACHMP included review of the implementation of the Stage 1 ACHMP to assess scope for improvement, ensure all stakeholders have access to all background information regarding the cultural heritage investigations undertaken within the study area over the previous 10 years and obtain comments and feedback from stakeholders.

Prior to commencement of ground-breaking works on the Estate as a result of Stage 2, an Aboriginal Cultural Heritage Liaison committee was to be implemented, and continue to operate for all subsequent stages of the operation. The purpose of the committee was to discuss, plan and review cultural heritage management options at various stages of the project. It was anticipated that the Estate would be in development for a period of approximately ten years.

The ACHMP also makes allowances for monitoring of ground-breaking works during residential construction. Umwelt notes that any subsurface cultural heritage material is likely to be in the topsoil and "A" horizon. Excavation works for the residential development were to be done on a "cut and fill" basis, with no material being taken off-site. This means that any artefactual material will stay on the site, but that their distribution and vertical context will change. These observation and collection activities will take place approximately two weeks before heavy machinery is used for ground-breaking, and by site officers appointed by the Aboriginal cultural Heritage Liaison committee. Recovered artefacts will be bagged and labelled and subject to a Care and Control Agreement to be determined by the committee. All contractors and workers are to undertake cultural heritage awareness training prior to commencing work on the site.

ERM (2010) undertook an investigation for the Stage 2 upgrade and replacement of a section of the Chichester Trunk Gravity Main near Beresfield. The study area was located along John Renshaw Drive to the northern termination of the Sydney to Newcastle freeway, an area of approximately 30m wide and 3.6 km in length and includeed the 1923 water pipeline and an unsealed vehicle access track. A transmission line crosses the central portion of the study area.

The Beresfield area is characterised by low, undulating hills and abuts lowlands associated with swamps and floodplains of the Hunter Valley. The landscape contains low rises and slopes with open depression of the primary waterways. The study area is located on the periphery of a network of high order streams and large swamps with the main waterways being two 3rd order creeks, Weakleys Flat Creek, which drains in a northerly direction into Woodberry Swamp, and Viney Creek which drains in a northerly direction into Weakleys Creek. Other smaller 1st order tributaries both drain from the south west portion of the study area into Hexham Wetlands. An unnamed area of swamp exists along the route of the study area. Three major wetland systems are located close to the study area: Hexham Wetlands, located 1 km to the south, Tarro swamp located 1.5km to the northeast and Woodberry swamp, 1.5km to the north. These wetland systems were a major source of Aboriginal resource exploitation.

Vegetation within the study area comprised medium to heavy density ironbark forest. Native vegetation had been stripped in areas such as transmission easements, vehicle access tracks

and for agricultural practices. Vegetation to the west of the F3 was noted to be regrowth, and can be linked to historic timber-getting projects in association with mining.

A search of the AHIMS database showed a total of 35 recorded sites within a 4km x 3km area of the study area. These comprised 21 artefact scatters, fourteen isolated finds, and one PAD. There appears to be a strong association between site location and water sources, and swamp margins. Two previously recorded sites (one artefact scatter and one isolated find) were located within the study area. Based on previous archaeological investigations, a predictive model was developed and stated that artefact sites (scatters and isolated finds) are the most likely site type to be encountered in the study area, and can be found on any landform (though crests and mid-low slopes seem preferred), and that water sources also seem to be a focus for Aboriginal activity. Sites are also likely to be located near reliable water sources.

The survey revealed that visibility was limited by ground cover, reducing the effective coverage, which was 25% along one transect, but varied between 56% and 90% in all others. Five sites were identified and are summarised in *Table 5.18*.

Table 5.18 Summary of sites (ERM 2010)

Site	Site type	Landform	Distance to water	Order	Site Contents	Disturbance	Potential for subsurface
WP-IF-1	isolated find	slope/ crest	not provided	not provided	1 artefact	clearing	low
WP-IF-3	isolated find	slope	not provided	not provided	1 retouched flake	clearing	low
WP-IF-4	isolated find	slope	not provided	not provided	1 silcrete core	clearing	low
WP-AS-1	artefact scatter	slope	0-50m	swamp	3 artefacts	Low	moderate to high
WP-AS-2	artefact scatter	slope	not provided	not provided	15 artefacts	Erosion	low

Of the 21 artefacts identified, 19 artefacts comprised flakes, with the remainder being cores. The dominant raw material was silcrete, followed by tuff. ERM concluded that the sites identified conformed to the predictive model. The scientific significance of the isolated find sites and WP-AS-2 were assessed as low, whereas WP-AS-1 was assessed as moderate scientific significance due to its higher integrity. One previously recorded site, 38-4-0486 was relocated during the survey and similarly assessed as being of moderate significance with high potential. It was recommended that no further action was required with regards to the sites assessed as low scientific significance other than collection of the artefacts. With the sites assessed as being of moderate scientific significance, it was recommended that as they would be impacted by the proposed works, test excavations would be required.

MCH (2010) undertook an investigation for Transport Express JV on behalf of Australian Rail Track Corporation ahead of various proposed works designed to enhance freight and passenger rail services between Maitland and Brisbane. Included in these works is a proposed rail crossing loop at Hexham, NSW. The study area comprises an approximately 2 km section of the rail corridor on the Great North Railway, immediately north of the junction of the Pacific Highway and the New England Highway, at Hexham. The New England Highway runs

parallel with the rail corridor. The Hunter River is located approximately 100-150m to the east of the study area.

A search of the Aboriginal Heritage Information Management System (AHIMS) showed a total of 70 known Aboriginal sites within 5km of the study area. The majority of sites were artefact scatters and isolated find sites. Based on previous archaeological investigations in the vicinity of the study area and the results of the AHIMS search, the following predictive model for the study area was developed:

- Artefact scatters and isolated finds are the most frequent site types found in the area;
- Artefact scatters are likely to be of low to moderate density;
- There is a high potential for archaeological material to be present on level, well-elevated landforms with easy access to low-lying, water-logged areas and its associated resources; and
- Artefact scatters of higher density are likely to be located within 50m of a watercourse.

The survey identified landforms that inlcuded flats and drainage lines, although they had been altered by cut and fill earthworks associated with rail, road and construction. Four main survey units were covered: the rail loop (flat landform), the compound and stockpile area (altered slope/flat landform), the spoil area (altered slope/flat landform) and the assembly area (altered slope/flat landform). All survey units had been subjected to extensive alteration and disturbance, and vegetation reduced visibility. The excavation works had created large exposures, however no raw materials for stone tool production were noted. Effective survey coverage was assessed at 23%.

No sites or potential sites were identified. The study area fits the predictive model in terms of landform and proximity to water, however previous land use and the extensive disturbance renders the survival of any sites unlikely. It was therefore recommended that all workers on the site be familiarised with the statutory requirements protecting Aboriginal sites, and that work should cease should any sites be uncovered during excavation works.

Umwelt (2010) undertook a s90 monitoring and collection as a result of a cultural salvage of Aboriginal stone artefacts as part of construction works associated with the grade-separated interchange at Weakleys Drive and the New England Highway, Beresfield. This salvage incorporated the previously recorded site AHIMS #38-4-0982. Previous test excavations at the site showed a relatively low density background scatter, typical of the local area, comprising stone artefacts and silcrete gravel. It was recommended as a result of that test excavation that no further investigation is required, however Mindaribba Local Aboriginal Land Council (MLALC) requested that they be permitted to monitor further works. This investigation was therefore a cultural salvage rather than an archaeological salvage.

The site was described as being located on a lower slope near Scotch Dairy Creek, Beresfield. The area had been subjected to previous road works, and a rail spur and siding operated by Woodford Coal Company. The general area of the site was therefore described as disturbed. Three low ridges separated the tributary catchments of Woodberry Swamp, located at the

northern boundary of the site. Scotch Dairy Creek, Weakleys Flat Creek and an unnamed tributary all drain into Woodberry Swamp either within or adjacent to the AHIP area. Previous archaeological evidence suggests that Aboriginal people moved through these types of riparian corridors in the East Maitland area. Six representatives of the MLALC conducted the salvage following training by Umwelt archaeologists to use a GPS, as well as to identify and record finds. As this was a cultural salvage conducted at the request of MLALC, no research design was developed. The general methodology followed was:

- Prior to impacting sensitive areas, the RTA contacted MLALC, who sent representatives for topsoil monitoring;
- Once ground disturbance occurred, MLALC representatives were permitted to inspect the disturbance area and locate artefacts. The windrows and soil heaps were likewise inspected; and
- When an artefact was located, it would be recorded using a GPS, collected and bagged. The GPS co-ordinates and artefact details were then recorded on a form.

A total of 594 artefacts were identified as part of the cultural salvage, with an additional 906 pieces of non-artefactual stone. Four major terrain units were noted within the study area: disturbed, gentle slope, riparian corridor, and unknown (where the landform was not recorded). The majority of artefacts were recorded along gentle slopes (78.5%), followed by disturbed areas (17.2%). Fifteen or fewer artefacts were located in riparian corridors and unknown landforms respectively (2.5%, 1.9% respectively). The dominant artefact type included broken flakes (54%), flakes (20.9%) and cores (16.2%). The remaining artefacts in the assemblage were whole and broken retouched flakes, flaked pieces, whole and broken bondi points, backed blade, microliths, flake used as core and heat shatter. The dominant raw material used was silcrete (93.1%), followed by mudstone (4.9%) and tuff (1%). The assemblage was consistent with other deposits found in the vicinity in terms of the range of artefact types and raw materials used, however there was a comparatively higher number of cores, and a higher proportion of silcrete artefacts.

Two extremely large silcrete boulders were also retrieved, one measuring approximately 25cm x 22cm x 7cm (tan and cream, weighing approximately 10kg), and another 58cm x 35cm x 24cm (light yellow, weighing approximately 50kg). Attributes resembling flake scars and cortical surfaces were present on both. However, Umwelt note that local silcrete is more red in colour, and suggest that these boulders were transported a great distance to the study area, and their weight makes it doubtful that Aboriginal people were responsible for this. Umwelt suggests further that the boulders represent imported fill, and that the scars on the boulders were made by machinery, rather than cultural modification. All materials were appropriately bagged, labelled and packaged and as agreed, were sent to MLALC's keeping place.

AMBS (2012) undertook an Aboriginal Heritage Impact Assessment (AHIA) to address potential impacts to Aboriginal cultural heritage arising from the Hexham Relief Roads Project. The proposed works included developing five Relief Roads (tracks) and associated infrastructure at Hexham in the NSW Hunter Valley. The study area was located approximately 16 kilometres north west of the town of Newcastle.

The Great Northern Railway and the Minmi to Hexham Railway occupied the majority of the study area for over 150 years, with a natural gas pipeline also located in the vicinity. A coal preparation plant and additional railway sidings, since demolished, stood within the study area and its vicinity. The northern part of the study area comprised an existing road easement and the Chichester Trunk Gravity Main water pipeline was within the vicinity. There was some disturbed terrain in the southern central part of the study area, in the vicinity of coal mining and railway infrastructure.

This area was swamp landscape comprising broad, swampy, estuarine back plains on the Hunter delta, with elevation up to two metres, local relief of less than two metres and slopes less than one degree. Vegetation consisted of sedgeland with open-woodland on swamp margins. The study area was located between Hexham Swamp and the Hunter River, with Tarro Swamp located approximately 450 metres to the north and Purgatory Creek in the northern section of the study area.

Previously identified sites recorded in closest proximity to the study area were open camp sites and Potential Archaeological Deposits (PADs). The most common sites previously recorded in the local area were artefact sites (open camp sites or isolated artefacts).

The predictive model argues that the most likely site types to be located in the study area were scatters or isolated finds and PADs. The sites assessed as unlikely to be present included: Shell Middens, Modified Trees (Scarred or Carved), Grinding Grooves, Shelter/Art Sites, Quarries, Aboriginal Ceremonial Sites and Burial Sites. On the basis of archaeological site locations, sites were expected to have the following distribution pattern:

- Sites are likely to be located within 200 metres of water sources, and on the margins of Hexham Swamp;
- Some sites are likely to have high numbers of artefacts, particularly if located on the margins of Hexham Swamp; and
- Sites may occur within flat, open depression, simple slope and crest formations.

The majority of the study area, particularly adjacent to the railway and coal mining facilities, had been subject to such extensive land disturbance that evidence of Aboriginal occupation was assessed as unlikely to remain. Any extant sites in such areas were considered likely to have very low integrity, with artefacts no longer resembling in situ deposits. However, there were a few areas, particularly in the north of the study area that had fewer disturbances. Evidence for Aboriginal occupation was therefore considered possible to still be extant in the landscape in these areas. The integrity of deposits was assessed as potentially reasonable in these areas, as the level of ground disturbance may not have affected the archaeological deposits to a great extent.

The survey focussed on areas of ground exposure, mostly along tracks next to the railway line. The areas of Hexham Swamp within the study area were too vegetated and waterlogged to enable any effective coverage, and were therefore not traversed (apart from a section disturbed by vehicles). The area covered during the survey was considered adequate for the purposes of the heritage assessment.

The majority of the study area was found to have been subject to disturbance from construction of the railway, access roads, the coal preparation plant/washery and sidings, and other infrastructure. This disturbance also comprised reclamation/fill of the swampland to build up land for use by the railway and mining. As such, the majority of the study area was considered not to have potential for Aboriginal heritage. There were no trees within the study area of an age suitable to have evidence of Aboriginal cultural scarring, and no stone outcrops suitable for stone quarry sites, axe grinding grooves, stone engravings/art and shelter sites. The majority of the study area was covered with vegetation, comprising swampland grasses and trees, plantings associated with the railway such as palms, and invasive species including lantana. As such, visibility beyond the vehicle tracks was low.

One artefact scatter (HS1) was identified and the report states this site was located on the swamp margin in the northern portion of the study area, however the map supplied shows it is within the low lying swamplands. The report also includes an area of potential subsurface materials in association with the site. However, the justification for the identification of the potential extent of the site is unclear. A site card was submitted that included both the surface area and potential subsurface area. In addition to this, two sites in the south were identified by the Aboriginal field officers and included a possible midden and isolated find. AMBS did not submit site cards for these sites as they were not scientifically identified sites but culturally identified. The sites are summarised in *Table 5.19* and their location shown in *Figure 5.3*.

Table 5.19 Summary of sites (AMBS 2012)

Site	Site type	Landform	Distance to Water	Stream Order	Artefacts Features	Disturbance	Subsurface potential
HS1	artefact scatter	swamp margin (?)	not noted	Hexham Swamp	numerous artefacts, shells	vehicle use, pipe, electricity lines	yes
cultural site	shell	fill	NA	NA	edible size shell, cockle, oyster, periwinkle, whelk	fill	no
cultural site	isolated	fill	NA	NA	possible grindstone	fill	no

The following recommendations were made:

- A program of archaeological test and salvage excavation should be undertaken in the section of site HS1 proposed to be impacted. The scope of any such program would be based on the area of works and the associated potential impacts, and should be undertaken prior to or at the time of enabling works for the project;
- The rise of land near Woodlands Close is not proposed to be impacted. Nevertheless, care should be taken in this area to avoid any inadvertent impacts caused by vehicles and equipment turning from/to Anderson Drive;
- A program of archaeological test and salvage excavation should be undertaken in any section of the cultural PCD (as redefined on the basis of previous disturbance) proposed to be impacted. The scope of any such program would be based on the area

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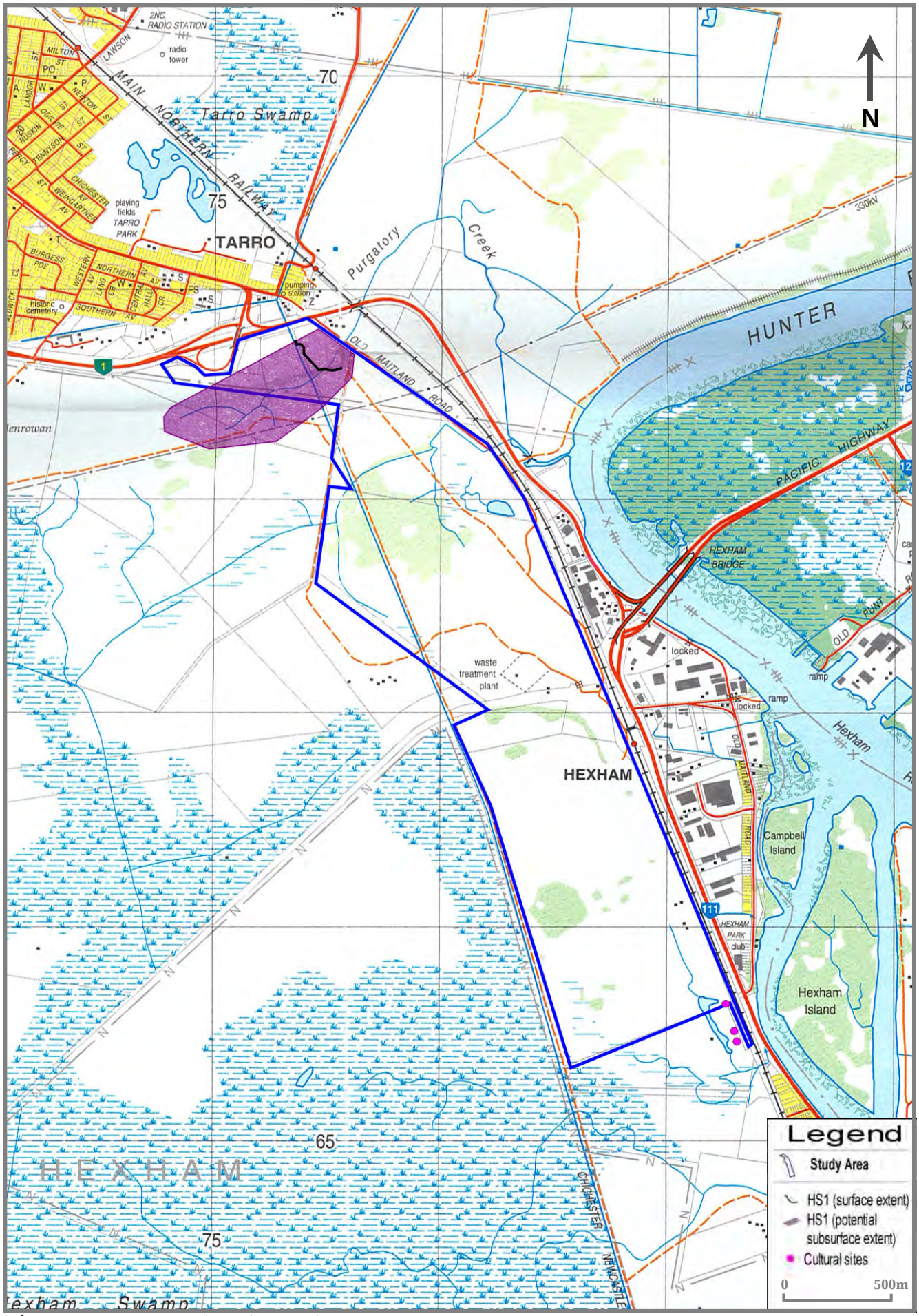

Figure 5.3 Sites within the study area

Source: 1:25 000 Topo Series: Beresfield

of works and the associated potential impacts, and should be undertaken prior to or at the time of enabling works for the project;

- As a mitigation measure, registered Aboriginal stakeholders should be offered the opportunity to collect the rounded stone and the shell material located in fill material near the southern end of the proposed relief roads area, prior to any development works in this area. Any Aboriginal heritage material should be collected and recorded; and

- A keeping place for the Aboriginal heritage material recovered from within the Hexham Relief Roads project area should be nominated in consultation with the registered Aboriginal community stakeholders, and identified in the AHMP.

5.4 LOCAL & REGIONAL CHARACTER OF ABORIGINAL LAND USE & ITS MATERIAL TRACES

The following is a summary and discussion of previous investigations detailed in *Section 5.4*. Of the 97 sites recorded within a 5 kilometre radius of the study area, 54-56 sites contained sufficient information in associated reports to be able to determine their size, distance from water and the landform on which they were located (see *Tables 5.21* to *5.24*). It must be remembered, however, that there are various factors which will have skewed the results shown in *Table 5.20*. These include but are not limited to:

- the landform on which a site area is observed is not necessarily its origin, for example, artefacts which would have originated on a crest may be located eroding down the slope;
- biases due to differential sampling of landforms based on decisions made by archaeologists and as a result of restrictions due to the locations of proposed development areas, levels of exposure on different landforms, and the variable level of reporting by archaeologists will affect the count of sites on each landform type. For example, the large percentage of sites found along creek lines may be, at least partially, representative of how many cultural heritage surveys focused on these landforms, and
- artefact counts can be skewed due to factors such as differing levels of fragmentation of material and levels of ground surface visibility. A very large number of sites/ artefacts were located on exposures with either no or very few artefacts visible away from the exposures.

Therefore these results provide merely an indication of what may be expected in terms of site location and distribution. Based on previous work it is also clear that the majority of sites contain stone artefacts. This is to be expected due to stone's high preservation qualities.

Table 5.20 Site size in relation to landforms and proximity to water

Site Content: No. of artefacts	Site within 50m of water					Sites 50 to 100m from water				Sites more than 100m from water					Total No. of Sites
	Creek	Crests	Slopes	Drainage	Sub-total	Crests	Slopes	Hillock	Sub-total	Crests	Slopes	Flats	Drainage	Sub-total	
≤10	9	9	6	2	26	1	3	-	4	5	2	-	2	9	39
11 to 100	4		2	1	7	-	1	-	1	4	-	-	-	4	12
>100	-	1	-	-	1	-	-	1	1	-	-	1	-	1	3
Total	13	10	8	3	34	1	4	1	6	9	2	1	2	14	54
% of sites within distance from water	38%	30%	23%	9%	62%	16%	68%	16%	12%	64%	14%	14%	8%	26%	100%
% of total sites	24%	19%	15%	5%	62%	2%	7%	2%	12%	17%	3%	2%	4%	26%	100%

Artefact scatters and isolated artefact finds have been classified into 'small' (ten or fewer artefacts), 'medium' (eleven to 100 artefacts) and 'large' (more than 100 artefacts). Please note that these divisions are entirely arbitrary. Slopes include lower, mid and upper and crests include spur crest and ridge crest.

By far, the highest percentage of sites (62%) was located within 50 metres of a water source. However, rather than the numbers of sites decreasing with distance from water, 26% of sites were located more than 100 metres from water while only 12% were between 50 and 100 metres from a watercourse. Away from water (more than 50 metres), sites were relatively evenly distributed on slopes (10%) and crests (19%). Within 50 metres of water sources, 38% of sites were located along creek lines, crests were the next most common landform (30%) with 23% on slopes and 9% on flats.

Artefact densities of sites also appear to have a bimodal pattern (Refer to *Table 5.20*). The highest density of artefacts is located within the 0-50 metres of water with 48% including fewer than 10 artefacts, 12% including 11-100 artefacts and 1% containing over 100 artefacts. In the 50-100 metres from water category, 7% include less than 10 artefact, 1% includes 11-100 artefacts and 1% includes over 100 artefacts. In the more than 100 from water category, 16% include less than 10 artefacts, 7% include 11-100 artefacts and 1% more than 100 artefacts.

Table 5.21 Site size in relation to proximity to water

Distance from water	Artefact numbers		
	<10	11-100	100+
50	48%	12%	1%
50-100	7%	1%	1%
100+	16%	7%	1%

Taking into consideration sites within in all distance to water categories, the majority of small and medium artefact scatters are located within 50 metres of water. Based on previous reports the likelihood of finding sites of any size increases with proximity to water and the likelihood of finding large artefact scatters also increases markedly with proximity to water.

Table 5.22 Site locations in relation to landforms and proximity to water

Site Type	Sites within 50m of water				Sites 50-100m from water			Sites more than 100m from water				Total No. of Sites
	Creek	Crests	Slopes	Drainage	Crests	Slopes	Hillock	Crests	Slopes	Flats	Drainage	
Artefact scatter	9	9	6	1	-	3	1	4	2	1	2	38
Isolated	4	2	1	-	-	1	-	5	-	-	-	13
Isolated/ PAD	-	-	1	2	1	-	-	-	-	-	-	4
PAD	-	-	-	-	-	-	-	-	1	1	-	2
Total	13	11	8	3	1	3	1	9	3	2	2	56

Of the main sites types (artefact scatters and isolated finds) in relation to distance from water and landforms, as indicated in *Table 5.23*, within the 50 metres form water category, artefact scatters are mainly located on creeks and crests (16%), followed by slopes (10%) and drainage lines (1%) and isolated artefact sites have 7% located on creeks, 3% on crests and 1% on slopes. Within the 50-100 metres form water category, artefact scatters are mainly located on slopes (5%) and 1% on hillocks and isolated artefact sites have 1% located on slopes. Finally, within the 100m+ metres form water category, artefact scatters are mainly located crests (7%), followed by slopes (3%), flats (1%) and 3% on drainage lines. The remainder of sites include PADs and isolated/PADS which are not clearly defined and as such not included in the above calculations.

Variations between archaeologists' classifications of raw material types (for example tuff and indurated mudstone) will have an effect on the results of this count. Raw material type was not indicated in most reports and as such general comments are made. Again, this information is presented merely as an indication of what may be expected.

Mudstone, silcrete and tuff are by far the most common raw material types represented at sites in the region. Quartz and chert are the next most frequently in artefact assemblages followed by volcanic materials, porphyry and petrified wood. Siltstone, rhyolite and porcellanite are relatively rare. However it must be remembered that raw materials may have been incorrectly classified, and not all site descriptions provided in reports and on site cards contained detailed information.

Due to differences in recording techniques it is difficult to determine how many of each artefact type is represented across the region though types include flakes, broken flakes, retouched flakes, multi-platform cores, single platform cores, bipolar cores, flaked pieces, 'waste' pieces, 'chips', debitage, 'geometric microliths', 'backed blades', 'bondi points', 'scrapers', 'eloueras', 'burrins', 'blades', 'hatchets', 'unifacial choppers', 'bifacial choppers', 'pebble tools', a 'slice', edge-ground axes, anvils, hammer stones and heat. Due to variations in both the amount of data that is included in reports, and the terms different archaeologists used to describe artefact types, it is not practicable to provide a count of the different artefact types. However, it is evident that flakes, broken flakes and flaked pieces are the most common artefact types recorded.

The vast majority of artefactual material in the region was observed on exposures with good to excellent ground surface visibility. The likelihood of finding artefacts surrounding these exposures is reduced due to poor visibility. The site area is often given as the area of exposure. Hence, it is inappropriate to attempt to draw any conclusions regarding site extent based on current information.

Based on information gained from previous studies within a five to seven kilometre radius of our study area, it can be expected that:

- the likelihood of locating sites increases with proximity to water;
- the likelihood of finding large sites increases markedly with proximity to water;
- in swamp areas, sites are more likely to be found on the elevated margins of the swamp;

- the majority of sites more than 50 metres from a watercourse may contain less than 10 visible artefacts;
- large artefact scatters can occur more than 50 metres from a watercourse but infrequently;
- a variety of raw materials will be represented though the majority of sites will be predominated by mudstone and silcrete;
- a variety of artefact types will be located though the majority will be flakes, flaked pieces and debitage;
- grinding grooves will be located along or near water sources;
- the likelihood of finding scarred trees is dependent on the level of clearing in an area; and
- the majority of sites will be subject to disturbances including human and natural.

These findings are consistent with models developed for the area.

5.5 PREDICTIVE MODEL FOR THE STUDY AREA

Due to issues surrounding ground surface visibility and the fact that the distribution of surface archaeological material does not necessarily reflect that of sub-surface deposits, it is essential to establish a predictive model. Previous archaeological studies undertaken throughout the region, the OEH AHIMS register and the environmental context provide a good indication of site types and site patterning in the area. This research has shown that occupation sites (artefact scatters and isolated finds) are the most frequently recorded site type and are commonly located along or adjacent to watercourses, and on elevated relatively flat to gently sloping topography in close proximity to reliable water. Sites with higher artefact densities are similarly concentrated within fifty metres of watercourses.

Within the local area, previous assessments within a similar environmental context indicate that, within a well-watered context, there is high potential for archaeological material to be present on level, typically well-elevated landforms that provide ready access to low-lying waterlogged areas and the associated resources. The majority of sites within the area appear to contain low-moderate artefact densities. As the northern portion of the study area is a low lying water logged area, it is unlikely that this landform would have been suitable for occupation due to regular flooding. However, as the area would have provided resources enabling the area to be used for hunting and gathering, it is the elevated landforms surrounding the study area would have been more suitable for camping. Therefore, in the northern portion of the study area (floodplain/waterlogged area) it is expected that very limited to no evidence of occupation will be found. If evidence is present, given the unlikely camping in the swamp area, it is expected that only isolated finds and/or very low density artefacts scatters may be found. However, due to the geomorphic processes as well as human and natural disturbances, any cultural materials that may be present are expected to be highly disturbed. The southern portion is highly disturbed through past land uses and it is expected that all cultural materials that may have been present no longer exist.

The refinement of this predictive model will be dependent upon an investigation of the range of landforms and the occurrence of modern disturbances within the study area.

5.6 *ARCHAEOLOGICAL POTENTIAL IN THE STUDY AREA*

Based on archaeological sites registered in the region and the results of past archaeological studies, very limited evidence of past occupation is expected to occur within the waterlogged/swamp/floodplain area. There is a vary low chance that isolated finds and/or very low density artefact scatters may be present within the study area.

- Artefact scatters

Also described as open campsites, artefact scatters and open sites, they include archaeological remains such as stone artefacts, shell, and sometimes hearths, are usually identified as surface scatters in areas where ground surface visibility is increased due to lack of vegetation. Erosion, agricultural activities (such as ploughing) and access ways can also expose surface campsites.

- Isolated finds

Isolated artefacts are usually identified in areas where ground surface visibility is increased due to lack of vegetation. Erosion, agricultural activities (such as ploughing) and access ways can also expose surface artefacts.

5.7 *HERITAGE REGISTER LISTINGS*

The State Heritage Register, the Australian Heritage Database (includes data from the World Heritage List UNESCO, National Heritage List, Commonwealth Heritage List, Register of the National Estate) and the Newcastle Local Environmental Plan. However, not all indigenous places are listed, and the Heritage Commission is consulting with Traditional Owners to gradually include indigenous information. There are no indigenous heritage items within the study area listed on the Newcastle Local Environment Plan (2008). However, the Hexham Redevelopment Project located on the western side of the rail line has been declared a potential State Significant Site (SSS). At this stage no assessments have been open for public exhibition.

5.8 *MODELS OF PAST ABORIGINAL LAND USE*

The main aim of this project is to attempt to define both the nature and extent of occupation across the area. As a result, the nature of the analysis will focus on both the landform units and sites. The purpose of this strategy is to highlight any variations between sites and associated assemblages, landforms and resources across the area treating assemblages as a continuous scatter of cultural material across the landscape. In doing this, it is possible to identify variation across the landscape, landforms and assemblages that correspond with variation in the general patterns of landscape use and occupation. Thus the nature of activities and occupation can be identified through the analysis of stone artefact distributions across a landscape. A general model of forager settlement patterning in the archaeological record has been established by Foley (1981). This model distinguishes the residential 'home base' site with peripheral 'activity locations'. Basically, the home base is the focus of attention and many activities and the activity locations are situated away from the home base and are the focus of specific activities (such as tool manufacturing). This pattern is illustrated in *Figure 5.4.*

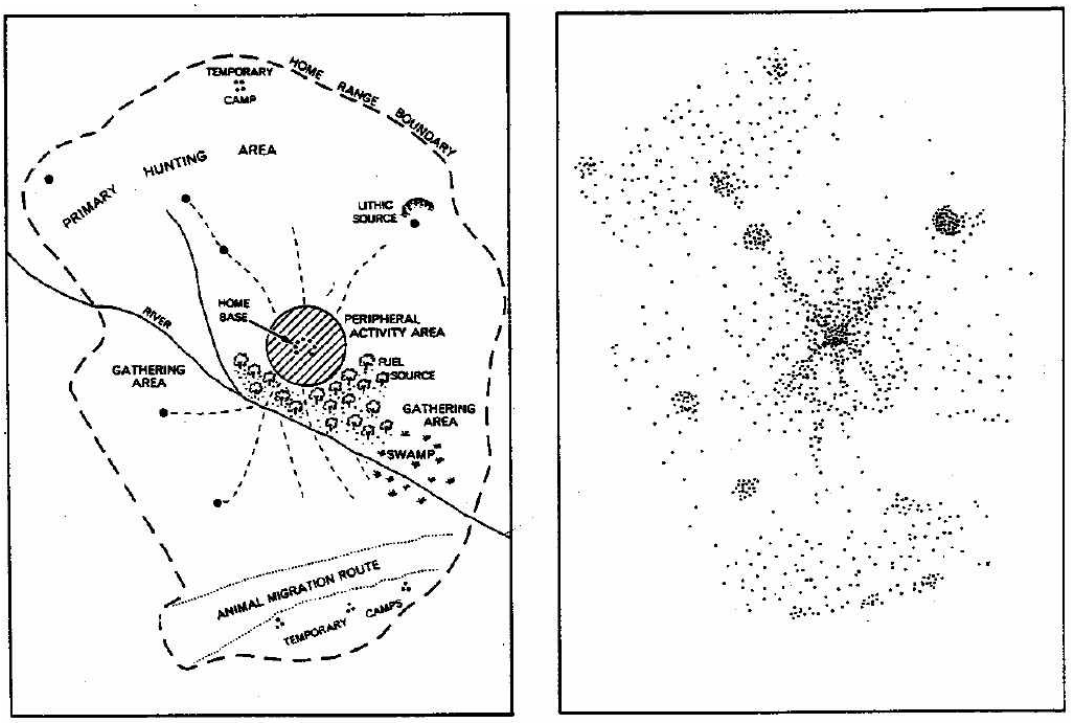

Figure 5.4 Foley's model (left) and its manifestation in the archaeological record (right), (Foley 1981).

Home base sites generally occur in areas with good access to a wide range of resources (reliable water, raw materials etc). The degree of environmental reliability, such as reliable water and subsistence resources, may influence the rate of return to sites and hence the complexity of evidence. Home base sites generally show a greater diversity of artefacts and raw material types (which represent a greater array of activities performed at the site and immediate area). Activity locations occur within the foraging radius of a home base camp (approximately 10 km); (Renfrew and Bahn 1991). Based on the premise that these sites served as a focus of a specific activity, they will show a low diversity in artefacts and are not likely to contain features reflecting a base camp (such as hearths). However, it is also possible that the location of certain activities cannot be predicted or identified, adding to the increased dispersal of cultural material across the landscape. If people were opting to carry stone tools during hunting and gathering journeys throughout the area rather than manufacturing tools at task locations, an increased number of used tools should be recovered from low density and dispersed assemblages.

5.9 MODEL OF OCCUPATION FOR THE HUNTER VALLEY

Work in the Hunter Valley has aimed to understand the nature of Aboriginal occupation and determine the nature of land use. This theme often aims to identify and explain archaeological patterning in site type, content and distribution. General theories have been developed outlining the relationship between land use patterns and the resulting archaeological evidence. A number of models developed for the Hunter Valley have been reviewed (Koettig 1994; Dean-Jones and Mitchell 1993; Rich 1995; Kuskie and Kamminga 2000) and the most commonly accepted model is summarised below.

Kuskie and Kamminga (2000) established a general model of occupation strategies based primarily upon ethnographic research. Used as a starting point, it makes a general set of

predictions for the Hunter that is consistent with other studies (e.g. Nelson 1991, Thomas 1983). The model distinguishes between short-term or extended long-term occupation and makes some predictions about the likely location of different foraging and settlement activities. Combining this information with a general review of assemblage contents from a sample of excavated sites within the Hunter Valley, a baseline of settlement activities may be determined (Barton 2001). The model provides a number of archaeological expectations that may be tested. For example, the presence of features requiring a considerable labour investment such as stone-lined ovens or heat-treatment pits are likely to occur at places where occupation occurred for extended periods of time. The presence of grindstones is also a reliable indicator of low mobility and extended occupation. Seed grinding requires a large investment of time and effort (Cane 1989). In most ethnographic examples, seed grinding is an activity that takes place over a day to provide adequate energetic returns (Cane 1989; Edwards and O'Connell 1995).

Where group mobility was high and campsites frequently shifted throughout the landscape, artefact assemblages are not expected to contain elements such as grindstones, heat-treatment pits, ovens and the diversity of implements frequently discarded at places of extended residential occupation. It may also have been the case that the location of particular activities could not be predicted by tool users, adding to the increased low-density scattering of artefacts over the landscape. Also, if individuals were opting to carry a number of stone tools during hunting and gathering activities and maintaining these tools rather than manufacturing new tools at each task location, the ratio of used tools to unworn flakes in these assemblages should be high. *Table 5.23* has been adapted from Kuskie and Kamminga (2000). To identify the specific activity areas through analysis of the composition of patterning of lithic assemblages is utilised. However, this is applied to excavated materials as they provide more realistic data due to the lesser degree of disturbances, removal and breakages.

Table 5.23 Site descriptions

Occupation Pattern	Activity Location	Proximity to water	Proximity to food	Archaeological expectations
Transitory movement	All landscape zones	Not important	Not important	• Assemblages of low density and diversity • Evidence of tool maintenance & repair • Evidence for stone knapping
Hunting &/or gathering without camping	All landscape zones	Not important	Near food resources	• Assemblages of low density and diversity • Evidence of tool maintenance & repair • Evidence for stone knapping • High frequency of used tools
Camping by small groups	Associated with permanent & temporary water	Near (within 100m)	Near food resources	• Assemblages of moderate density and diversity • Evidence of tool maintenance & repair • Evidence for stone knapping & hearths
Nuclear family base camp	Level or gently undulating ground	Near reliable source (within 50m)	Near food resources	• Assemblages of high density and diversity • Evidence of tool maintenance & repair & casual knapping • Evidence for stone knapping • Heat treatment pits, stone lined ovens • grindstones
Community base camp	Level or gently undulating ground	Near reliable source (within 50m)	Near food resources	• Assemblages of high density and diversity • Evidence of tool maintenance & repair & casual knapping

				• Evidence for stone knapping • Heat treatment pits, stone lined ovens • Grindstones & ochre • Large area >100sqm with isolated camp sites

6 RESULTS

6.1 METHODOLOGY

The survey areas were surveyed on foot by the archaeologist and registered Aboriginal stakeholder representatives in accordance with the proposed methodology provided to the stakeholders for review and approved. The survey included transects at approximately 2 metres apart and focused on areas of high ground surface visibility and exposures (erosional features, creek banks, tracks, cleared areas).

6.2 LANDFORMS

McDonald *et al* (1998) describes the categories of landform divisions. This is a two layered division involving treating the landscape as a series of 'mosaics'. The mosaics are described as two distinct sizes: the larger categories are referred to as *landform patterns* and the smaller being *landform elements* within these patterns. Landform patterns are large-scale landscape units, and landform elements are the individual features contained within these broader landscape patterns. There are forty landform pattern units and over seventy landform elements. However, of all the landform element units, ten are morphological types. For archaeological investigations they divide the landscape into standardised elements that can be used for comparative purposes and predictive modelling. As outlined in *Chapter 2* and illustrated in *Figure 3.1*, the study area includes three main landforms including flats, drainage and disturbed.

6.3 SURVEY UNITS

For ease of management, the study area was divided into two Survey Units (SUs) that were based on landforms (Refer to *Figure 6.1*)

SURVEY UNIT 1: SWAMP/FLATS

This unit includes the northern portion of the study area and includes low lying swamp/flats subject to constant water logging and has been previously cleared and subject to agricultural practices. A water pipeline runs along the west, a waste treatment plant located to the south, three tracks constructed with fill are present, power lines and a large power tower are present as is fencing, spoil heaps, an old stock yard, man made drain and rubbish throughout that included old water pipes, bricks, concrete, fencing, tyres and glass.

This section is predominantly pasture grass with a section of open forest to the south west which contributed to reduced ground surface visibility. Exposures were low and constant water logging is common. The instillation of the Ironbark Creek flood gates had resulted in an altered landscape including the dropping of the water table and flora and fauna. No raw materials usually transported into the area and utilised for stone tool manufacture were present or visible.

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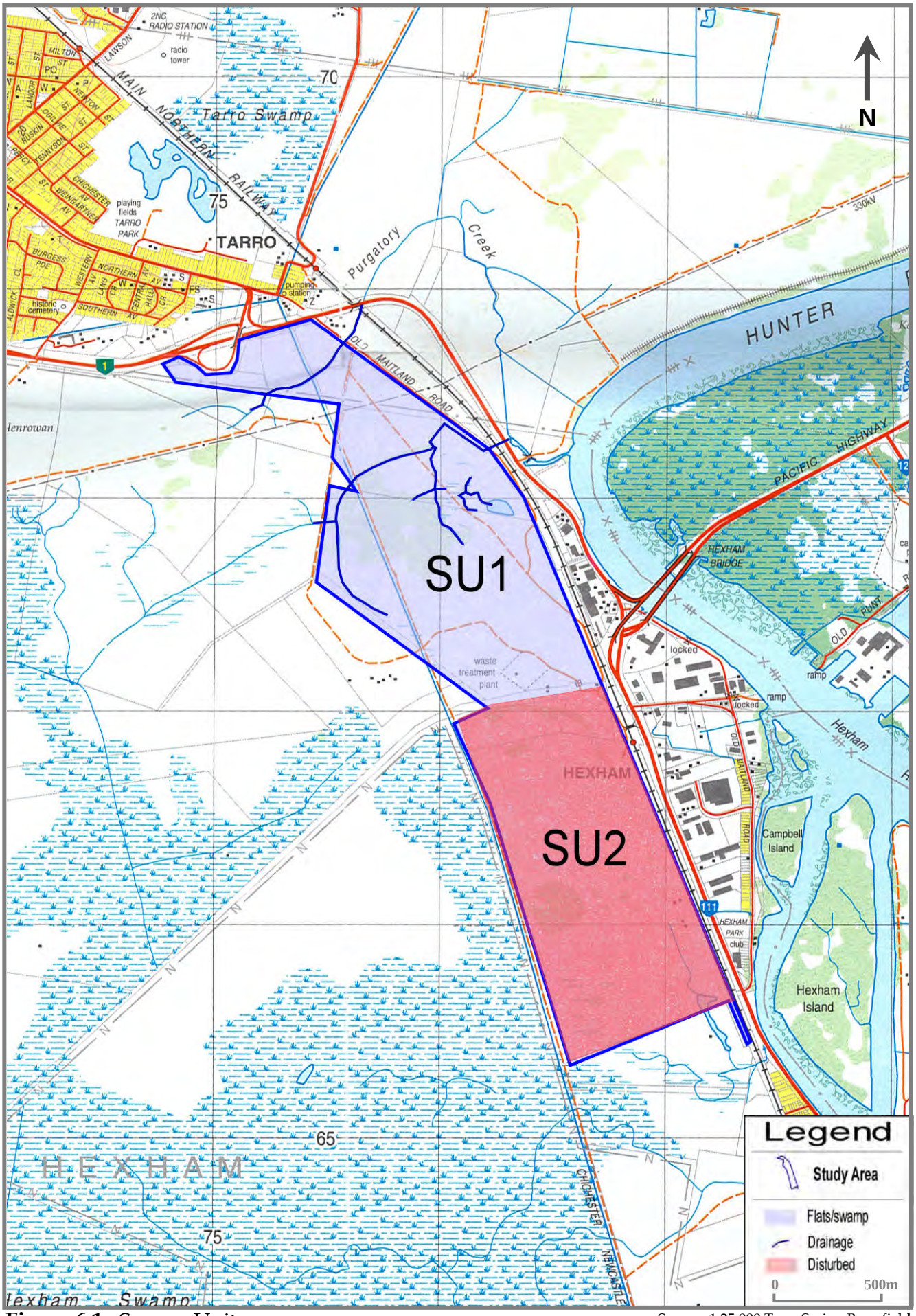


Figure 6.1 Survey Units

Source: 1:25 000 Topo Series: Beresfield

SURVEY UNIT 2: DISTURBED

This unit included the highly disturbed southern portion that was subject to a land use as a previous coal stock pile area and contains remaining coal tailings that has completely altered the original landform.

6.4 EFFECTIVE COVERAGE

Effective coverage is an estimate of the amount of ground observed taking into account local constraints on site discovery such as vegetation and soil cover. There are two components to determining the effective coverage: visibility and exposure.

Visibility is the amount of bare ground on the exposures which may reveal artefacts or other cultural materials, or visibility refers to 'what conceals'. Visibility is hampered by vegetation, plant or leaf litter, loose sand, stony ground or introduced materials (such as rubbish) On its own, visibility is not a reliable factor in determining the detectability of subsurface cultural materials (DECCW 2010/783:39).

The second component in establishing effective coverage is exposure. Exposure refers to 'what reveals'. It estimates the area with a likelihood of revealing subsurface cultural materials rather than just an observation of the amount of bare ground. Exposure is the percentage of land for which erosion and exposure is sufficient to reveal cultural materials on the surface (DECCW 2010/783:37). The effective coverage for the study area was determined for both visibility and exposure ratings and *Table 6.1* details the visibility rating system used.

Table 6.1 Ground surface visibility rating

Description	GSV Rating %
Very Poor – heavy vegetation, scrub foliage or debris cover, dense tree of scrub cover. Soil surface of the ground very difficult to see.	0-9%
Poor – moderate level of vegetation, scrub, and / or tree cover. Some small patches of soil surface visible in the form of animal tracks, erosion, scalds, blowouts etc, in isolated patches. Soil surface visible in random patches.	10-29%
Fair – moderate levels of vegetation, scrub and / or tree cover. Moderate sized patches of soil surface visible, possibly associated with animal, stock tracks, unsealed walking tracks, erosion, blow outs etc, soil surface visible as moderate to small patches, across a larger section of the study area.	30-49%
Good – moderate to low level of vegetation, tree or scrub cover. Greater amount of areas of soil surface visible in the form of erosion, scalds, blowouts, recent ploughing, grading or clearing.	50-59%
Very Good – low levels of vegetation / scrub cover. Higher incidence of soil surface visible due to recent or past land-use practices such as ploughing, grading, mining etc.	60-79%
Excellent – very low to non-existent levels of vegetation/scrub cover. High incidence of soil surface visible due to past or recent land use practices, such as ploughing, grading, mining etc.	80-100%
Note: this process is purely subjective and can vary between field specialists, however, consistency is achieved by the same field specialist providing the assessment for the one study area/subject site.	

As indicated in *Table 6.2*, the effective coverage for study area illustrates that overall effective coverage being 1% with grass being the limiting factor, erosion across the study area is minimal

and sheet wash along the drainage line is evident and is generally low and exposures from cattle are also low.

Table 6.2 Effective coverage

SU	Landform	Area (m2)	Vis %	Exp %	Exposure type	Previous disturbances	Present disturbances	Limiting visibility factors	Effective coverage (m2)
1	flats/ swamp	1,000,000	10%	10%	erosion, tracks	clearing, agriculture, drain, water pipeline	rubbish dumping, erosion, motor bikes	grass	10,000
2	disturbed	800,000	10%	10%	erosion, tracks	clearing, tracks, motorbikes	clearing, excavation, coal stock piling	grass	8,000
Totals		**1,800,000**							**18,000**
								Effective coverage %	**1.00%**

The level and nature of the effective survey coverage is considered satisfactory to provide an effective assessment of the Aboriginal sites identified and those potentially present within the investigation area. The coverage was comprehensive for obtrusive site types (e.g. grinding grooves and scarred trees) but somewhat limited for the less obtrusive surface stone artefact sites by surface visibility constraints that included vegetation cover and minimal exposures.

The disturbances included clearing, fences, power lines, drains, agricultural practices and a waste water plant in the southern section, all of which would have had low to moderate impacts on the landscape and cultural materials. Clearing, excavation and coal tailings have occurred in the southern portion, all of which have greatly impacted upon the landscape and associated cultural materials.

As described in detail in *Chapter 3*, these disturbances result in the lateral and horizontal movement of materials. In particular, the southern portion of the study area has been subject to very high disturbances and as such it is very unlikely that any cultural materials remain in situ under the coal tailings as this are would have been subject to excavation works initially. The northern portion remains moderately disturbed but is a low lying flood prone landform that indicates continued occupation may not have been suitable within the study area but rather in outlying areas with higher elevation. Examples of disturbances and vegetation are illustrated in *Figures 6.2* to *6.4*.

In view of the predictive modelling (*Chapter 5*) and the results obtained from the effective coverage, it is concluded that the survey provides a valid basis for determining the probable impacts of the proposal and formulating recommendations for the management of the identified sites and potential Aboriginal sites.

6.5 ARCHAEOLOGICAL SITES

Sites were labelled according to the project title, e.g. HEXS/1 where HEXS represents Hexham Swamp, and 1 indicates the site number allocated consecutively.

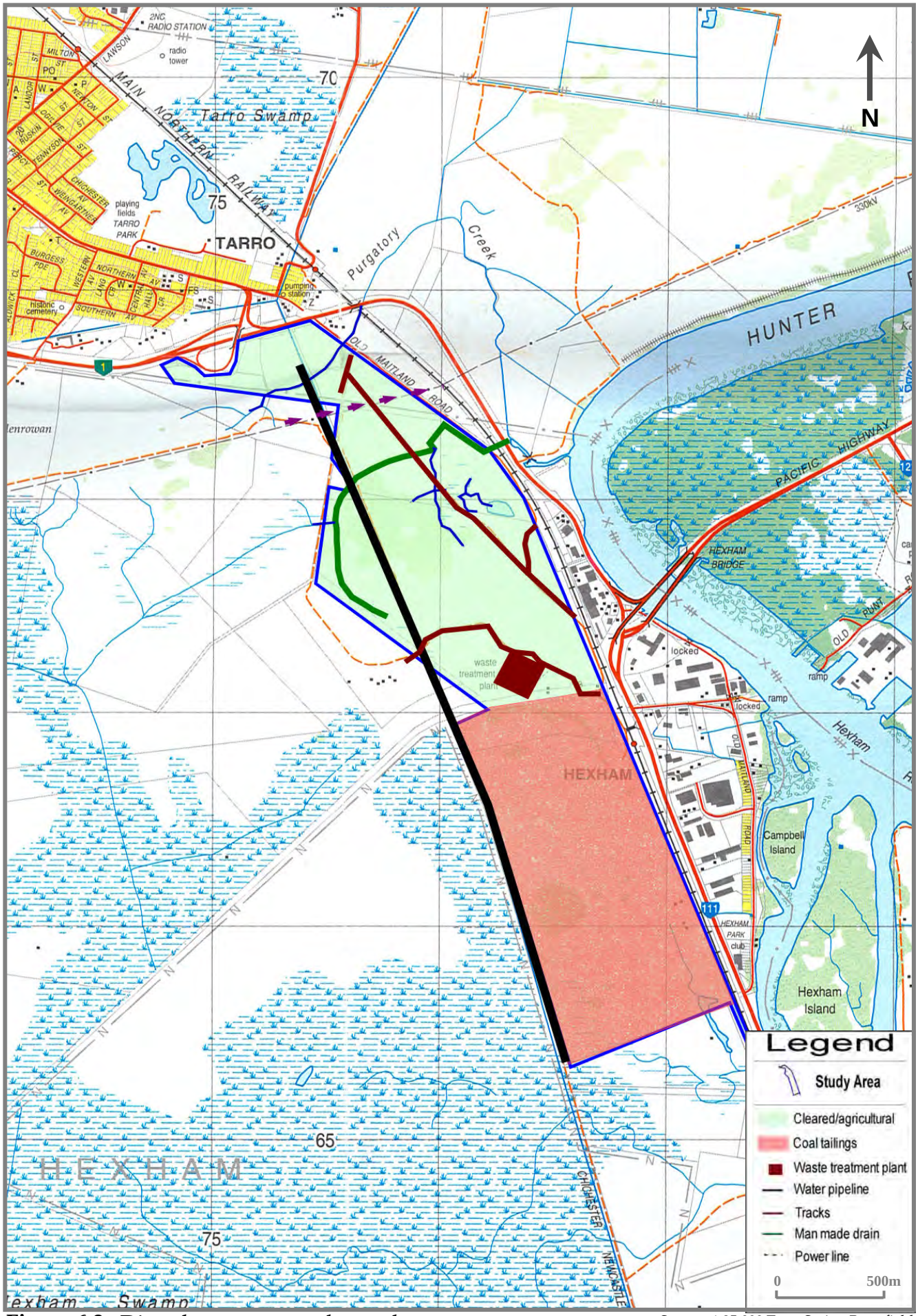
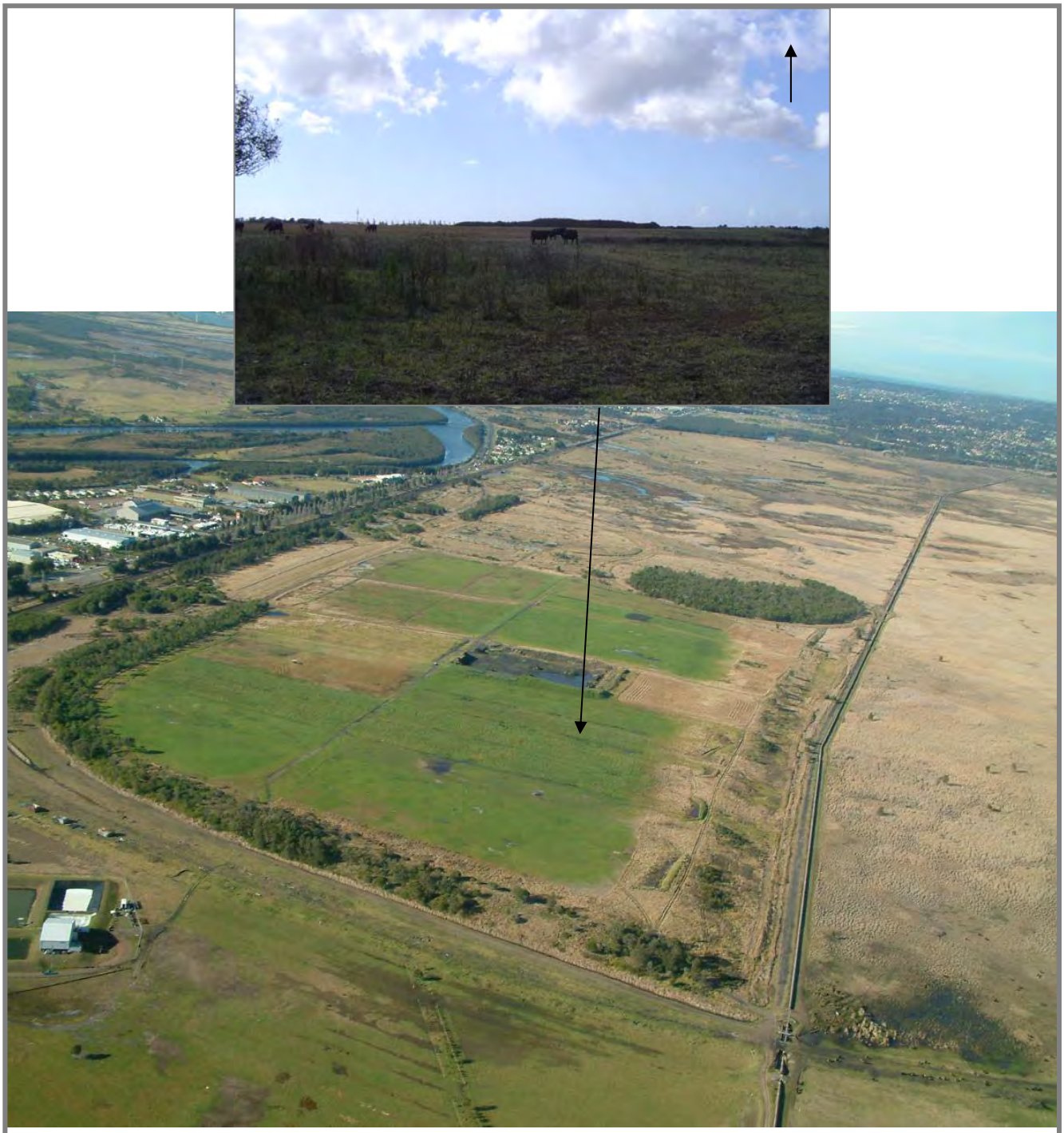


Figure 6.2 Disturbances across the study area

Source: 1:25 000 Topo Series: Beresfield

Figure 6.3 Vegetation of the northern portion



Note: arrows on photographs indicate the direction they were taken.

Figure 6.4 Vegetation of the southern portion

6.5.1 Definition of a Site

A 'site' can be defined by various factors. For this study a 'site' was defined on the combination of the following inter-related factors:

1) landform;
2) exposure and visibility;
3) visible boundaries of artefacts; and
4) a feature identified by the Aboriginal stakeholders on the basis of their own cultural knowledge and significance.

The 'site area' was defined as the area in which artefacts were observed on a landform, though it must be remembered that this may not represent an accurate picture of site size. Visibility of artefacts is affected by differences in vegetation cover and hence ground surface visibility, as well as the degree of natural and human-induced disturbance.

6.5.2 Definition of site complex

Site complex refers to sites that occur in groups. For example, complexes may consist of burial grounds and carved trees, artefact scatters that represent different stages of procurement and manufacture or artefact scatters and shell middens. Complexes may also consist of artefact scatters that are connected across a landscape with the scatters being either specific activity centres (such as tool manufacturing sites) or larger base camp areas (with more artefacts and a variety of artefacts).

6.5.3 Mapping identified sites

MCH use topographic maps with MGA system 1994 (unless they are new maps produced after 1999 that have used the MG94 system) and our hand held Global Positioning System (GPS) units use MGA.

It is important to note that the Global Positioning System is operated by the United States and is subject to changes that may affect the accuracy and performance of all GPS equipment. At present, the hand held unit operated by MCH have an estimated error of approximately 5-10 metres though this is also dependant on the number of satellites available and detected and other factors such as tree coverage/interference.

6.5.4 Sites identified

No sites were identified during the survey. This may be due to a number of reasons including geomorphic processes that indicate the area would not have been suitable for camping, poor visibility, disturbances and the low lying flood prone landform that may not have been suitable for continued occupation. While the study area may have been utilised for hunting and gathering, resulting in reduced evidence of occupation, the disturbances in the northern portion would have disturbed that evidence. The disturbances in the southern section would have destroyed any such evidence.

The site identified by AMBS (HS1) was not re-located during a second site visit following its identification by AMBS. However, a third site visit with AMBS, MCH and a registered surveyor did re-locate the site. AMBS stated that the site was overgrown with reduced visibility. The surface expression of the site at this time included few shell fragments. The site was mapped by the surveyor according to present exposures and AMBS previous assessment. AMBS also included a subsurface extension of this site (PAD) that appears to have been based on a 50 metre buffer around Purgatory Creek and its upper tributaries (*Figure 6.5*).

Additional cultural objects were identified by the registered Aboriginal stakeholders during the AMBS assessment in the far south of the study area. AMBS stated they were not archaeological sites but culturally identified by Aboriginal site officers and as such the site officers would submit a site card to OEH. These objects were not given a designated site name but for the purpose of clarification they will henceforth be named COHS/1 (Cultural Objects/Hexham Swamp/1). It appears this has not been undertaken to date.

6.6 POTENTIAL CULTURAL DEPOSIT (PCD)

The term 'Potential Cultural Deposit (PCD), is used to describe areas that are likely to contain sub-surface cultural materials. These sensitive landforms or areas are identified based upon the cultural knowledge.

Given the extent of disturbances in the southern portion, and the low lying flood prone flats of the northern portion along with the disturbances in that area, no *in situ* cultural materials are expected to be present. However, Shane Frost provides details of the significance of the Hexham and Ash Island area;

> The landforms and resources of the study area fulfilled not just the basic needs that underpinned our Peoples subsistence but also satisfied the many other aspects that made up what can be described here as being part of the very Cultural foundations of our People.
>
> Our people have had a long history within this area including an association with the Hexham Swamps which is unsurpassed. This area is of very high significance to our People and therefore it would be expected that there would be many areas that contain evidence of this connection through occupation on varying levels by our people being on the Hunter River and adjacent to Hexham Swamps. Traditionally these areas where the supply of rich resources of which our people have depended on for thousands of years. There can be also physical reminders left by our Ancestors, some in the form of stone tools (artefacts) which provide us as Descendants of the Awabakal People an opportunity to make a connection through time with our Ancestors. This connection is brought about in a variety of ways, one is through the physical senses such as touch, knowing we are holding something our Ancestors touched and made into something useful, possibly many thousands of years previously. This connection is one of those avenues that produce in us the sense of perception, appreciation, familiarity and recognition of who we are and where we belong as Awabakal Descendants.

Kerrie Brauer also provides written documentation that states that the structure and context of the landscape of the surrounding project area relates to distinctive factors that are associated to Aboriginal inhabitancy. Further, that determining the spirituality of a particular

MCH:

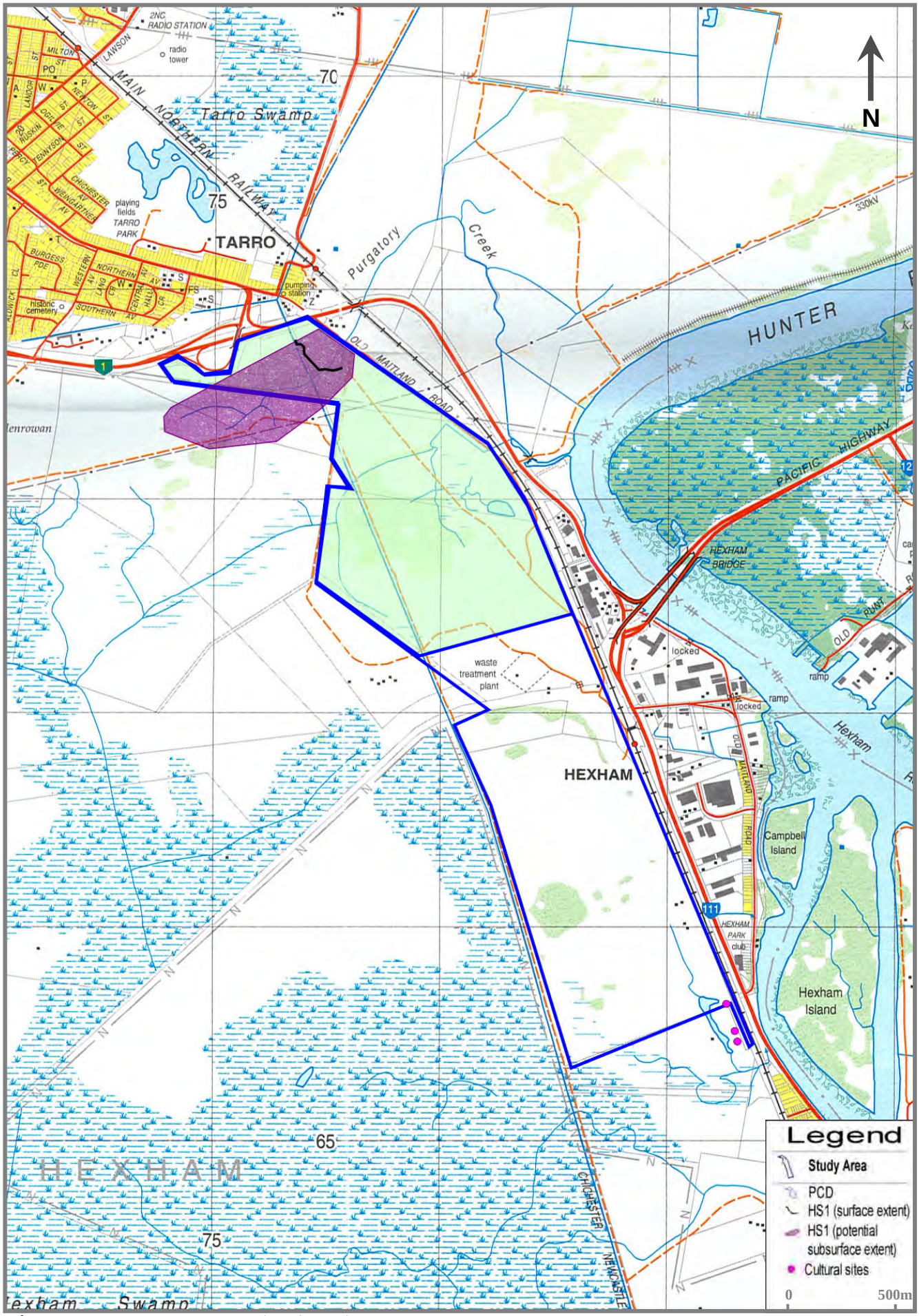


Figure 6.5 PCD, PAD and cultural sites

Source: 1:25 000 Topo Series: Beresfield

location or site can only be undertaken by the Awabakal Traditional Owners and the Hexham area is of great significance to the Traditional Owners (*Annex A*).

David Ahoy also writes that the Hexham swamp being of very high cultural significance due to the high degree of recent Aboriginal activity in the area (*Annex A*).

Due to the high significance of the Hexham area to the Awabakal people, the northern portion of the study area, has been identified as a Potential Cultural Deposit (PCD) (*Figure 6.5*).

6.7 POTENTIAL ARCHAEOLOGICAL DEPOSIT (PAD)

The terms 'Potential Archaeological Deposit (PAD)' and 'area(s) of archaeological sensitivity' are used to describe areas that are likely to contain sub-surface cultural deposits. These sensitive landforms or areas are identified based upon the results of fieldwork, the knowledge gained from previous studies in or around the subject area and the resultant predictive models. Any or all of these attributes may be used in combination to define a PAD.

The likelihood of a landscape having been used by past Aboriginal societies and hence containing archaeologically sensitive areas is primarily based on the availability of local natural resources for subsistence, artefact manufacture and ceremonial purposes. The likelihood of surface and subsurface cultural materials surviving in the landscape is primarily based on past land uses and preservation factors.

Given the extent of disturbances in the southern portion, and the low lying flood prone flats of the northern portion along with the disturbances in that area, no *in situ* cultural materials are expected to be present.

However, a PAD was identified by AMBS following this assessment and appears to be based on the surface scatter of HS1 and a subsurface extension of this site (PAD) that appears to have been based on a 50 metre buffer around Purgatory Creek and its upper tributaries.

6.8 DISCUSSION

The results of the investigation are discussed below in terms of site integrity, the nature of the evidence (integrity), local and regional contexts, occupation models (interpretation) and predictive modelling.

6.8.1 Integrity

The integrity of the investigation area can mainly be assessed only for surface integrity through the assessment of past and present land uses and their impacts. Subsurface integrity can only be assessed through controlled excavation that allows for the examination of both the horizontal and vertical distribution of cultural materials (caused by natural and/or human impacts) and by conjoining artefacts.

Land uses and their impacts as well as natural impacts (such as bioturbation, erosion etc) within the investigation area are considered to be moderate in the northern portion (subject to

clearing and grazing) and very high in the southern portion (coal storing area and currently consists of coal tailings throughout).

Archaeological sites are typically identified within exposures (caused by erosion, water run-off, tracks, animal activity) and this includes the site previously indentified by AMBS that is situated within the swamp/flats along a track in the northern portion of the investigation area. Additionally, surface sites identified on mid to lower slopes may have derived from the upper slope and moved down slope due to erosion and water-run-off. Also, sites located along a creek or creek beds are likely to have derived upstream and moved due to flooding (alluvial movement). Therefore site integrity cannot be assumed.

Additionally, although without excavation it is difficult to determine post-depositional impacts, given that past studies have shown that grazing can disturb the surface of topsoils, and that the water table has been reduced by the floodgates (and hence would have been higher than today) the northern portion of the investigation area is expected to have moderate subsurface disturbances.

6.8.2 Regional & local context

Although the results from this assessment are limited, the evidence can be compared with other assessment and sites from the region. The main purpose for this is to identify any differences or similarities with other assessments throughout the region (such as site patterning, site types, land form preference etc) in order to provide a framework to interpret and establish representativeness for the identified sites within the investigation area.

Several similarities have been recognised between the evidence within the investigation area and other assessments from the surrounding area in terms of landforms. These are as follows:

- The elevated landform (swamp margins) typically have evidence of occupation in similar landforms throughout the local and regional area;
- The elevated landform with a vantage point and close proximity to water typically have evidence of occupation in similar landforms throughout the local and regional area; and
- The impacts from past and present land uses within the northern portion of the investigation area are expected to have moderate impacts to the subsurface materials that may be present.

The Hexham Swamp area is know to be of great significance to the Awabakal people and in addition to this, the Hunter River, located immediately to the east, is also a well known source of resources for past societies. The northern portion of the study area, which remains the least disturbed, contains one disturbed site (possibkly part of fill). With the exception of the access road and rail works along the far eastern portion of the investigation area, the northern portion of the investigation area will not be impacted on by the proposed development.

6.8.3 Interpretation & occupation model

The inferences that can be made about the nature of occupation within the investigation area and the specific sites identified area are limited by the small sample size. However, consistent

with the Hunter Valley occupation model (Kuskie and Kamminga 2000), it is inferred from the evidence that:

- Aboriginal people used and occupied the area but generally at a very low intensity within the last 4,000 years. Although occupation of the region extends back to at least 20,000 years ago, the environmental context would have been very different to the present over such an extended period of time
- Most of the artefact evidence is consistent with transitory movement through the landscape and occasional and short-duration visits by small parties of hunters and/or gatherers for food procurement;
- These activities appear to have occurred more frequently on swamp margins rather that the swamp itself;
- Evidence is identified as a result of disturbances and exposures; and
- Notwithstanding the points above, the lack of artefacts within the investigation area and the topography of the area (low lying swamp land) indicates that in the broader locality focused occupation was more likely to have occurred outside of the direct investigation area in association with those such contexts where more preferential circumstances existed for water, level ground and subsistence resources (such as swamp margins);

The survey results are consistent with, or do not contradict the general model of occupation.

6.8.4 Reassessment of the predictive model

In view of the survey results, the predictive model of site location can be reassessed for the investigation area.

The potential for bora/ceremonial, carved tree, scarred tree, rock engraving and stone arrangement sites to occur within the investigation remains assessed as very low or negligible.

No direct evidence of lithic procurement sites was identified, however the potential for casual, opportunistic procurement of stone, such as quartz, from colluvial gravels within the investigation area cannot be discounted.

No evidence was encountered of burial sites, and although the potential for skeletal remains to occur within the investigation area is considered to be very low, it cannot be discounted.

Sites of traditional cultural significance (such as mythological sites) were not identified by the Aboriginal stakeholders or stakeholder representatives involved in the investigation. The registered Aboriginal stakeholders also did not disclose any specific knowledge of other cultural values/places (for example, historically known places or resource use areas). However, the possibility cannot be excluded that traditional or historical Aboriginal values or associations may exist that were not divulged to MCH by the persons consulted, although this potential is assessed as low.

One artefact scatter was previously identified within the northern portion of the investigation area (though may be part of a fill deposit). There is a very low potential for additional artefact

evidence to occur in the areas currently obscured by vegetation (swamp/flats to the north), and such evidence is likely to occur in very low density. The artefact evidence may involve a broad range of artefact and stone types. Environmental contexts in which a higher artefact density and potentially deposits of research significance may occur, in association with more focused and/or repeated Aboriginal occupation, are largely absent from the investigation area.

Site location, in relation to landforms and proximity to reliable water is also supported by the evidence.

6.9 CONCLUSION

Sites provide valuable information about past occupation, use of the environment and its specific resources including diet, raw material transportation, stone tool manufacture, and movement of groups throughout the landscape.

Proximity to water was an important factor in past occupation of the area, with sites reducing in number significantly away from water with most sites located within 50 metres of the tributaries. The surrounding area contains no raw materials that are typically used in the manufacture of stone tools, and as such it can be assumed that any artefacts identified would be of materials traded and/or transported from other locations. The access to Hexham Swamp and associated resources would have provided the necessary resources for sustained occupation of the area.

The areas along the Hunter River and on the elevated landforms surrounding Hexham Swamp would have been the most favoured for past occupation, not the swamp or low lying flood plain that has been an bay/lake and constantly waterlogged. It is also known that locations with a view and vantage point were possibly utilised by past societies. One PCD and one artefact scatter (HS1) with an associated PAD have been identified in the northern portion of the study area. Additionally, cultural objects have been identified on the south. The Hexham Swamp area is of great significance to the Awabakal people. Being well resourced by both Hexham swamp and the Hunter River, the area was well suited for hunting and gathering.

7 ASSESSMENT OF SIGNIFICANCE

7.1 THE SIGNIFICANCE ASSESSMENT PROCESS

One of the key steps in the process of cultural heritage management is the assessment of significance. Not all sites are equally significant and not all are worthy of equal consideration and management (Sullivan and Bowdler 1984; Pearson and Sullivan 1995: 7). The determination of significance can be a difficult process as the social and scientific context within which these decisions are made is subject to change (Sullivan and Bowdler 1984). This does not lessen the value of the heritage approach, but enriches both the process and the long-term outcomes for future generations as the reasons for, and objectives of, site conservation also change over time.

The assessment of significance of archaeological sites and resources is defined in most cases by what these entities can contribute to our understanding or knowledge of a place or site. In most cases, it is not possible to fully articulate or comprehend the extent of the archaeological resource at the outset, let alone its value. Therefore, the evaluation of the significance of archaeological material is based on the potential this resource has to contribute to our understanding of the past. Of importance is the type of information that can be revealed. In particular, site significance can be due to knowledge not available through other sources, and the contribution that it can make to our understanding of a place or a cultural landscape.

7.2 BASIS FOR EVALUATION

The significance of indigenous archaeological sites or cultural places can be assessed on the criteria of the Burra Charter, the Australian Heritage Commission Criteria of the National Estate, and the OEH guidelines that are derived from the former two. The NSW NPWS Aboriginal Cultural Heritage Standards and Guidelines Kit (1997) emphasises two realms of significance assessment:

- Aboriginal cultural significance
- Archaeological (scientific) significance

The cultural significance of the sites or landscape will be assessed by the Aboriginal groups mentioned previously.

7.3 ARCHAEOLOGICAL (SCIENTIFIC) SIGNIFICANCE

Scientific significance is assessed according to the contents of a site, state of preservation, integrity of deposits, representativeness/rarity of the site type, and potential to answer research questions on past human behaviour (NPWS 1997).

For open campsites, evidence required to adequately assess significance includes information about the presence of sub-surface deposits, the integrity of these deposits, the nature of site's contents and extent of the site. A review of information pertaining to previously recorded sites within the local area and region enables the rarity and representativeness of a site to be assessed.

High significance is usually attributed to sites that are so rare or unique that the loss of the site would affect our ability to understand an aspect of past Aboriginal use/occupation of an area. In some cases a site may be considered highly significant because its type is now rare due to destruction of the archaeological record through development. Medium significance can be attributed to sites that provide information on an established research question. Low significance is attributed to sites that cannot contribute new information about past Aboriginal use/occupation of an area. This may be due to site disturbance or the nature of the site's contents. In order to clarify the significance assessment, the criteria used are explained below.

7.3.1 Research potential

Research potential refers to the potential for information gained from further investigations of the evidence to be used in answering current or future research questions. Research questions can relate to any number of issues concerning past human material culture and associated behaviour (including cultural, social, spiritual etc) and/or use of the environment. Several inter-related factors to take into consideration include the intactness or integrity of the site, the connectedness of the site to other sites, and the potential for a site to provide a chronology extending back in the past. Several questions are posed for each site or area containing evidence of past occupation:

- Can the evidence contribute information not available from any other resource?
- Can the evidence contribute information not available from any other location or environmental setting?
- Is this information relevant to questions of past human occupation (including cultural, social and/or spiritual behaviour) and/or environments or other subjects?

Assessing research potential therefore relies on comparisons with other evidence both within the local and regional context. The criteria used for assessing research potential include:

- potential to address specific local research questions;
- potential to address specific regional questions;
- potential to address general methodological and theoretical questions;
- potential sub-surface deposits; and
- potential to address future research questions.

The particular questions asked of the available evidence should be able to contribute information that is not available from other resources or evidence and are relevant to questions about past human societies and their material culture. Levels for defining research potential are as follows:

High	Has the potential to provide new information not obtained from any other resource to answer current and/or future research questions.
Medium	Has the potential to contribute significant additional information to answer current and/or future research questions.
Low	Has no potential to contribute significant information to answer current or future research questions.

7.3.2 Representativeness and rarity

Representativeness and rarity are assessed at a local, regional and national level (although assessing at a national level is difficult and commonly not possible due to a lack of national reports and available database). As the primary goal of cultural resource management is to afford the greatest protection to a representative sample of Aboriginal heritage throughout a region, this is an important criterion. The more unique or rare the evidence is, the greater its value as being representative within a regional context.

The main criteria used for assessing representativeness and rarity include:

- the extent to which the evidence occurs throughout the region;
- the extent to which this type of evidence is subject to existing and potential future impacts in the region;
- the integrity of the evidence compared to that at other locations within the region;
- whether the evidence represents a primary example of its type within the region; and
- whether the evidence has greater potential for educational purposes than at other similar locations within the region.

7.3.3 Nature of the Evidence

The nature of the evidence is related to representativeness and research potential. For example, the less common the type of evidence, the more likely it is to have representative value. The nature of the evidence is directly related to its potential to be used in addressing current and/or future research questions. Criteria used in assessing the nature of the evidence include:

- presence, range and frequency of artefacts;
- presence, range and frequency of artefact types; and
- presence and types of other features.

7.3.4 Integrity

The state of preservation and disturbances of the evidence (integrity) is also related to representativeness and research potential. The higher the integrity (well preserved and not disturbed) of the evidence, the greater the level of information that is likely to be obtained from further study. This translates to greater importance for the evidence within a local and regional context, as it may be a suitable example for preservation/conservation. The criteria used in assessing integrity include:

- horizontal spatial distribution of artefacts;
- vertical spatial distribution of artefacts;
- preservation of intact features such as hearths or knapping floors;
- preservation of site contents such as charcoal which may enable direct dating providing a reliable date of occupation of a given area;

- preservation of artefacts which may enable use-wear/residue analysis to determine tool use and possibly diet; and
- preservation of other cultural materials that may enable interpretation of the evidence in relation to cultural/social behaviour (e.g. burial types and associated mortuary practices may have been based on cultural, social, age, and/or gender distinctions).

Many of these criteria can only be obtained through controlled excavation. Generally high levels of ground disturbance (such as erosion, tracks, dams etc) limit the possibility that an area would unlikely contain intact spatial distributions, intact features, in situ charcoal et cetera.

Definitions for defining levels of site integrity and condition have been derived from Witter (1992) and HLA (2002) and are as follows:

Excellent	Disturbance, erosion or development is minimal.
Good	Relatively undisturbed deposits or partially disturbed with an obvious in situ deposit.
Fair	Some disturbance but the degree of disturbance is difficult to assess.
Poor	Clearly mostly destroyed or disturbed by erosion or development.
Very Poor	Sites totally disturbed or clearly not in situ.
Destroyed	A known site that is clearly no longer there.

7.4 EVALUATION

The following is an evaluation of the scientific significance of the individual archaeological sites identified. *Table 7.1* presents the significance assessment for the sites identified.

Table 7.1 Scientific significance

Site	Site Type	Representativeness	Integrity	Res. Pot	Sci. Sig
PCD	PCD	unknown	fair	unknown	unknown
HS1 (surface site)	artefact scatter	unknown (may be part of fill)	poor	low / moderate	low / moderate
HS1 (PAD)	PAD	unknown	unknown	unknown	unknown

7.5 CULTURAL SIGNIFICANCE

While Aboriginal sites and places may have scientific significance, they also have cultural/social significance to the Aboriginal people from that area. Determining cultural/social significance can only be determined by the Aboriginal people from the area in which the sites and/or places were identified. Consultation with the Aboriginal stakeholders has been undertaken in order to document cultural/social significance and as discussed in *Section 6.6*, all registered stakeholders have stated the Hexham Swamp area is of very high cultural significance (also refer to *Annex A*).

8 ASSESSMENT OF IMPACTS

The archaeological record is a non-renewable resource that is affected by many processes and activities. As outlined in *Chapter 3*, the various natural processes and human activities may impact on archaeological deposits through both site formation and taphonomic processes. *Chapter 6* describes the impacts within the study area, showing how these processes and activities have disturbed the landscape and associated cultural materials in varying degrees.

8.1 IMPACTS

Detailed descriptions of the impacts are provided in *Section 1.5* and the results of the survey in *Chapter 6*. The PCD will be impacted through the construction of an access road and a section to the east will be impacted upon by the train support facility. The PAD and HS1 may be impacted on by the access road.

The OEH Code of Practice for the Archaeological Investigation of Aboriginal Objects in New South Wales (2010:21) describes impacts to be rated as follows:

1) Type of harm: is either direct, indirect or none
2) Degree of harm is defined as either total, partial or none
3) Consequence of harm is defined as either total loss, partial loss, or no loss of value

Table 8.1 Impact summary

Site	Site type	Type of harm	Degree of harm	Consequence of harm	Representative	Integrity	Res. Pot	Sci. Sig
PCD	PCD	direct	partial	partial loss of value	unknown	unknown	unknown	unknown
HS1 (surface site)	artefact scatter	none	none	no loss of value	unknown (may be part of fill)	poor	low / moderate	low / moderate
HS1 (PAD)	PAD	direct	partial	partial loss of value	unknown	unknown	unknown	unknown

8.2 CUMULATIVE IMPACTS

The cumulative impact to Aboriginal heritage in the area is limited given that:

- The net development footprint (i.e. the area of direct impact) is small and does not affect a high proportion of any particular landform present within the region;
- A comparable suite of landforms (swamps and swamp margins) that are expected to, and do contain a similar archaeological resource occur in multiple contexts both within the local area;
- All high density deposits identified to date occur outside the development footprint;
- The site HS1 has been subject to long term past land uses (impacts) that have resulted in a disturbed landscape and as a consequence of these disturbances the representative value of the archaeological resource is lessened;

- The placement of the development within the swamplands and within the disturbed context, ensures the cumulative impacts are focused in the areas of lower potential and therefore are kept to a minimum;
- Plans have been altered to ensure that no part of the surface expression of site HS1 will be impacted upon, thereby retaining a representative archaeological and cultural resource for the study area;
- As a small portion of the potential subsurface expression of site HS1 may be impacted upon, test excavations will assist in identify the nature and extent of any subsurface materials and allow the proposed development flexibility to plan around such evidence; and
- The PCD has also been subject to long term past land uses (impacts) that have resulted in a disturbed landscape and as a consequence of these disturbances the representative value of the cultural resource is lessened. Such impacts include clearing and agricultural practices. The majority of the PCD will remain undisturbed, the only disturbance will include the access track, and the remainder will be protected.

Mitigation measures to minimise these impacts are outlined in the following chapter.

9 MITIGATION AND MANAGEMENT STRATEGIES

Specific management strategies are considered below for the management of identified sites and potential archaeological/cultural deposits within the study area.

One of the most important considerations in selecting the most suitable and appropriate strategy is the recognition that Aboriginal cultural heritage is very important to the local Aboriginal stakeholders. Decisions about the management of sites and potential archaeological deposits should be made in consultation with the appropriate local Aboriginal stakeholders.

To summarise the findings of this assessment, the area with the least disturbances is the northern portion which is an identified PCD, site HS1 and HS1PAD are also within the PCD. The project plans had been altered during this assessment to ensure the least impact on the cultural heritage. Based on the current plans and assessment the following has been determined:

- The surface expression of Site HS1will not be impacted on;
- The majority of the HS1/PAD will not be impacted on. The only portion to be impacted on will be the eastern section where the access road will be placed;
- The majority of the PCD will not be impacted on. The only portion that will be impacted on will be the where the access road will be placed; and
- The cultural site known as COHS/1 is not a registered archaeological site, however the Aboriginal stakeholders will be given the opportunity to collect the objects prior to works.

The following management strategies are discussed in relation to the project, the results of the assessment and discussions with the Aboriginal stakeholders.

9.1 CONSERVATION/PROTECTION

Conservation is the first avenue and is suitable for all sites, especially those considered high archaeological significance and/or cultural significance. Conservation includes the processes of looking after an indigenous site or place so as to retain its cultural significance and are managed in a way that is consistent with the nature of peoples' attachment to them.

As the surface expression of Site HS1 will not be impacted on, this site will be temporarily fenced to ensure its protection during construction.

As the only portion of the HS1/PAD that will be impacted on will be the eastern section where the access road will be placed, the road construction foot print will be temporarily fenced to ensure its protection during construction.

As the only portion of the PCD that will be impacted on will be the access road, the road construction foot print will be temporarily fenced to ensure its protection during construction.

Such measures will ensure the temporary fencing will delineate the development footprint and prevent any access to the remaining areas, thus ensuring the protection of areas not impacted by the proposed development.

COHS/1 is in a highly disturbed context and will be impacted on by the development and as such conservation is not justified

9.2 *FURTHER INVESTIGATION*

An Aboriginal Heritage Impact Permit (AHIP) under Section 90 of the *National Parks & Wildlife Act* 1974 is not required for Part 3A projects to undertake archaeological subsurface test excavations, provided the excavations are carried out in accordance with the Code of Practice and in consultation with the local Aboriginal stakeholders.

Subsurface testing is appropriate when a Potential Archaeological Deposit (PAD) has been identified, and it can be demonstrated that sub-surface Aboriginal objects with potential conservation value have a high probability of being present, and that the area cannot be substantially avoided by the proposed activity.

Subsurface testing can identify whether subsurface cultural deposits exist, their nature, extent, content, integrity and significance.

As a small part of the HS1/PAD site may be impacted on, further investigations are required prior to works. A PCD has also been identified in the northern portion of the study area. The majority of this PCD will be protected by fencing, and it will not be impacted by the project. However, the proposed access road has been planned within this area, and as such further investigations are required prior to works.

Archaeological test excavations will be undertaken as part of the *Code of Practice*'s suggested due diligence approach, to confirm that no harm is caused to Aboriginal Objects or Places. It is anticipated that no impacts will occur at the surface expression of HS1 and as such it is considered that no further investigations are justified in this area. The registered Aboriginal stakeholders will be provided with the opportunity to collect the cultural objects COHS/1 prior to any works being undertaken.

The registered Aboriginal stakeholders will be provided the opportunity to collect the cultural objects COHS/1 prior to any works being undertaken.

9.3 *AHIP*

Under Part 4 and 5 of the EP&A Act, if harm will occur to an Aboriginal object or Place, then an AHIP is required from the OEH. An AHIP is required when a site is identified but its extent, the nature of its contents, level of integrity and/or its significance cannot be adequately assessed through a surface survey. In this case, if a systematic excavation of the known site could provide benefits and information for the Aboriginal stakeholders and/or archaeological study of past Aboriginal occupation, a salvage program may be an appropriate strategy to further assess

the site to determine its extent, nature, content, integrity and significance. The AHIP may also include surface collection of artefacts.

However, as this project is Part 3A (transitioning to Part 5.1), an AHIP is not required for any sites that may be impacted on. No impacts will occur at the surface expression of HS1 and as such no further investigations/salvage is justified.

9.4 MONITORING

An alternative strategy for areas where archaeological deposits are predicted to occur is was to monitor development works for cultural materials, predominantly during the initial earth moving and soil removal works. This was the main strategy for managing the possible occurrence of Aboriginal skeletal remains.

However, with the legislative changes, monitoring is not an option as if there is even a slight possibility of cultural materials being present this must be addressed through the due diligence process and Code of Practice.

9.5 ABORIGINAL CULTURAL HERITAGE MANAGEMENT PLAN

QR National's is committed to implementing a sustainable Aboriginal Cultural Heritage Management Plan (ACHMP) on site, to facilitate employees and contractors to protect any potential cultural and archaeological deposits on site from harm. The ACHMP will be developed cooperatively with the RAPs, the McCardle archaeologist and QR National.

This ACHMP will cover all activities during the construction and post construction phase of the project. The ongoing sustainable management of the cultural heritage values within the project study area will be the responsibility of QR National. The ACHMP will be an evolving document that will be continuously updated as appropriate at each stage of archaeological investigative works are carried out.

To ensure that all personnel involved in the project, from the initial planning stages through to development, construction and future use of the land, are aware of and implement the appropriate management actions for the protection of Aboriginal cultural heritage values, QR National proposes to prepare an induction program as part of the ACHMP.

The ACHMP will establish the broad framework for achieving sustainable protection of cultural heritage values within the constraints of the project. This section briefly outlines the issues that would be addressed by the ACHMP for the construction phase of the project. The ACHMP will be completed prior to the start of any geotechnical or earth works for the project. The ACHMP will address (but is not necessarily limited to) the following:

- An outline of the project, including archaeological works to date;
- Objectives and targets of the ACHMP;
- Consultation/communications protocol for communications between QR National and the RAPs. This will include ongoing consultation, future archaeological works, ACHMP and the care and control of any cultural materials uncovered. Regular meetings to

ensure all parties have a clear understanding of what is feasible and to work constructively together to ensure the best outcomes for the cultural heritage values within the project study area;

- Works schedule that will enable archaeological works to be undertaken in a timely manner;
- Procedures for further investigations, including excavation, site recording, site types uncovered and mitigation options;
- Procedure in the event of unexpected archaeological and/or cultural finds during construction;
- Procedures for skeletal remains if uncovered during construction;
- Care and control agreement for any cultural materials uncovered;
- Artefacts and reporting requirements for all stakeholders including the archaeologist and registered Aboriginal stakeholder;
- Ongoing management of protected areas will include a protocol for the temporary fencing of the boundaries of areas that will be managed for cultural heritage conservation, to ensure that subcontractors do not inadvertently damage those areas and site(s) during the construction of the project. This component of the ACHMP will also examine permanent fencing if required; and
- Cultural heritage awareness training requirements for contractors involved in all earth works during all stages of the project development. Part of the site induction will include an induction on the cultural heritage of the study area. All personnel on site must be inducted and as such are made aware of the cultural heritage values across the study area. The induction package can be included in the Environmental Management Plan and/or Aboriginal Cultural Heritage Management Plan.

10 RECOMMENDATIONS

10.1 GENERAL

1) The persons responsible for the management of works on site will ensure that all staff, contractors and others involved in construction and maintenance related activities are made aware of the statutory legislation protecting sites and places of significance; and

2) The involvement of the registered Aboriginal stakeholders in the ongoing management of the Aboriginal cultural materials within the project study should be promoted and included in the Environmental Management Plan and the Aboriginal Cultural Heritage Management Plan.

10.2 PCD, PAD & SITE

3) As part of the PCD will be impacted upon by the access road, an archaeological subsurface investigation will be required in accordance with the Code of Practice for Archaeological Investigations of Aboriginal Objects in NSW within the area to be impacted only;

4) As part of the potential subsurface component of site HS1(PAD) will be impacted on, an archaeological subsurface investigation will be required in accordance with the Code of Practice for Archaeological Investigations of Aboriginal Objects in NSW within the area to be impacted only;

5) The surface expression of site HS1 will not be impacted upon by the proposed development and will be suitable fenced prior to works to ensure its protection;

6) Temporary fencing will be in place following the test excavation and before works start, to ensure no impacts will occur outside the identified development footprint, and

7) COHS/1 will be collected by the registered Aboriginal Stakeholders prior to any works.

10.3 COHS/1

8) The registered Aboriginal stakeholders will be provided the opportunity to collect the cultural objects COHS/1 prior to any works being undertaken.

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ANNEX A

Stakeholders Cultural Heritage Assessment

Contact made	Date	Who contacted Whom	Contacts	Purpose	Phone conversation/ notes	Outcomes
1st	13 December 2010	MCH contacted the required Government departments requesting a list of Aboriginal groups to contact for registration and consultation	DECCW, LALC, Registrar of Aboriginal Owners, Native Title Tribunal, NTSCORP Limited, local Council, Catchment Authority	Requirement under the DECCW ACHCR's (2010)	Letter contained; - Details of the project area (location) and proponent details - Request for assistance in identifying Aboriginal stakeholder groups or persons interested and to provide a list of these groups/people MCH stated this was an urgent project and requested a response by 20 December 2010.	See attached
2nd	15 December 2010	NNT contacted MCH		List of groups	Provided a response to the request for groups to consult. No groups were listed.	See attached
3rd	20 December 2010	DECCW contacted MCH		List of groups	Provided a response to the request for groups to consult. 40 groups were listed.	See attached
17 December 2010 Request for groups to consult with closed						
4th	20 December 2010	MCH contacted all groups listed in responses from Government departments listed above	See attached	Requirement under the DECCW ACHCR's (2010)	Letter contained; - Proponent details - Details of the project area (location) - Details of the proposed development - statement of the purpose of community consultation with Aboriginal people - statement that this is an invitation for Aboriginal people who hold cultural knowledge relevant to the proposed project area and who can determine the significance of Aboriginal object(s) and/or place(s) in the area of the proposed project to register an interest in a process of community consultation - advised that, unless otherwise specified, details will be provided to DECCW & LALC - that individuals must be nominated if a group or organization registers -Request for Aboriginal stakeholder groups or persons interested to register in writing to MCH no later than 5 January 2011 (additional week added due to Christmas and New Year holidays) - nominate your preferred option to receive the initial information. You may wish to have a non paid meeting and receive an information pack, or receive information packet through the mail, fax or e-mail.	See attached

Contact made	Date	Who contacted Whom	Contacts	Purpose	Phone conversation/ notes	Outcomes
5th	16 December 2010	Add in Newcastle Star Mercury Newspaper placed by client.	NA	Requirement under the DECCW ACHCR's (2010)	Add contained; - Proponent details - Details of the project area (location: map) - Details of the proposed development - statement of the purpose of community consultation with Aboriginal people - statement that this is an invitation for Aboriginal people who hold cultural knowledge relevant to the proposed project area and who can determine the significance of Aboriginal object(s) and/or place(s) in the area of the proposed project to register an interest in a process of community consultation - advised that, unless otherwise specified, your details will be provided to DECCW and the LALC - that individuals must be nominated if a group or organization registers -Request for Aboriginal stakeholder groups or persons interested to register in writing to MCH no later than 5 January 2011 (additional week added due to Christmas and New Year holidays) - nominate your preferred option to receive the initial information. You may wish to have a non paid meeting and receive an information pack, or receive information packet through the mail, fax or e-mail.	See attached
6th	16 December 2010	ALALC contacted MCH	David Ahoy (ALALC) rang Penny McCardle (MCH)	Registration	David rang Penny to register for the project.	See attached phone log
7th	21 December 2010	CMA Hunter Central Rivers contacted MCH		List of groups	Stated they did not have or provide a list of groups to contact DECCW.	See attached
8th	30 December 2010	Awabakal Descendants Traditional Owners (ADTO) contacted MCH	Shane Frost (ADTO) contacted Penny McCardle (MCH)	Registration	Shane rang Penny to register for the project and said he would send through a registration letter also. Shane also mentioned another group who may register.	See attached phone log

Contact made	Date	Who contacted Whom	Contacts	Purpose	Phone conversation/ notes	Outcomes
9th	4 January 2011	Awabakal Descendants Traditional Owners (ADTO) contacted MCH	Shane Frost (ADTO) contacted Penny McCardle (MCH)	Registration	Shane provided MCH with their written registration. Shane also provided MCH with their rates of pay and insurance details and requested they remain confidential.	See attached
10th	4 January 2011	MCH contacted ADTO	Penny McCardle (MCH) contacted Shane Frost (ADTO)	registration	Penny thanked Shane for his registration and stated that the rates of pay and insurance details would remain confidential and that the rates of pay would only go to the proponent.	See attached
11th	5 January 2011	Awabakal Traditional Owners Aboriginal Corporation (ATOAC) contacted MCH	Kerrie Brauer (ATOAC) contacted penny McCardle (MCH)	registration	Kerrie provided MCH with their written registration.	See attached
12th	5 January 2011	MCH contacted ATOAC	Penny McCardle (MCH) contacted Kerrie Brauer (ATOAC)	registration	Penny thanked Kerrie for her registration and stated that an information pack would be sent in a few days	See attached
5 January 2011 Registration closed						
13th	6 January 2011	MCH contacted all registered groups: sent an information pack for the project	See attached	Requirement under the DECCW ACHCR's (2010) Posted Information package	Information package contained; - Cover letter - Project overview - Details of the project area and maps - Roles and responsibilities of all parties - Methods of gathering information on cultural knowledge and the archaeological assessment - Defined consultation and employment - Critical time lines - Pro forma for response Response due date was also included (27 January 2011)	See attached
14th	18 January 2011	ATAOC contacted MCH	Kerrie Brauer (ATAOC) e-mailed Penny McCardle (MCH)	Response to info pack	Kerry provided MCH with a copy of their fees and charges and also requested the information pack to be e-mailed in a word document.	See attached
15th	18 January 2011	MCH contacted ATOAC	Penny McCardle (MCH) contacted Kerrie Brauer (ATOAC)	Response to e-mail	Penny sent Kerry the information pack in word documents via e-mail	See attached

Contact made	Date	Who contacted Whom	Contacts	Purpose	Phone conversation/ notes	Outcomes
16th	21 January 2011	ADTOAC contacted MCH	Shane Frost (ADTOAC) e-mailed Penny McCardle (MCH)	Response to info pack	Shane provided MCH with their response to the information pack	See attached
17th	24 January 2011	Newcastle City Council (NCC) contacted MCH		List of groups	Stated that MCH should contact Awabakal LALC.	See attached
18th	27 January 2011	ATAOC contacted MCH	Kerrie Brauer (ATAOC) e-mailed Penny McCardle (MCH)	Response to info pack	Kerry provided MCH with a response to the information pack	See attached
19th	1 February 2011	MCH contacted all registered groups		Survey invitation	MCH sent a letter of invitation to the survey on 9 March 2011	See attached
20th	1 February 2011	MCH contacted all registered groups		Survey invitation	MCH sent a letter of invitation to the survey on 9 February 2011	See attached
21st	1 February 2011	ADTOAC e-mailed MCH	Shane Frost (ADTOAC) e-mailed Penny McCardle (MCH)	survey	Shane confirmed he will be attending the survey	See attached
22nd	1 February 2011	ATAOC contacted MCH	Kerrie Brauer (ATAOC) e-mailed Penny McCardle (MCH)	survey	Kerry confirmed she will be attending the survey	See attached
23rd	1 February 2011	MCH contacted ATAOC	Penny McCardle (MCH) e-mailed Kerrie Brauer (ATAOC)	survey	Penny reminded Kerry to sign and return the required paperwork before the survey	See attached
24th	2 February 2011	ATAOC contacted MCH	Kerrie Brauer (ATAOC) e-mailed Penny McCardle (MCH)	survey	Kerry returned signed paperwork for the survey	See attached
25th	3 February 2011	MCH contacted ATAOC	Penny McCardle (MCH) e-mailed Kerrie Brauer (ATAOC)	Info pack questions	Penny responded to Kerrys questions and comments on the information pack	See attached
26th	9 February 2011	survey				
27th	11 March 2011	MCH contacted all groups	See attached	Draft report	Penny sent all groups a copy of the draft report for their review and asked if they had any comments or wished to provide MCH with a letter/report to do so no later than 31 March 2011.	See attached
28th	22 March 2011	MCH contacted all groups	See attached	Draft report	Penny sent all groups a reminder that their letter/report was due no later than 31 March 2011.	See attached
29th	23 March 2011	ADTOAC contacted MCH	Shane Frost (ADTOAC) e-mailed Penny McCardle (MCH)	Response to draft report	Shane provided MCH with their response to the draft report. Shane raised a number of points	See attached

Contact made	Date	Who contacted Whom	Contacts	Purpose	Phone conversation/ notes	Outcomes
30th	29 March 2011	MCH contacted ADTO	Penny McCardle (MCH) contacted Shane Frost (ADTO)	report	Penny thanked Shane for providing his report and that his comments will be include din the report. Penny also brought to his attention that test excavations were not warranted as the are of less disturbance will be designated environmental land and as such conserved. Penny also invited Shane to revise his report in light of this if he wished to.	See attached
31st	29 March 2011	MCH contacted ATAOC	Penny McCardle (MCH) e-mailed Kerrie Brauer (ATAOC)	report	Penny sent Kerry a reminder that their letter/report was due no later than 31 March 2011.	See attached
32nd	29 March 2011	MCH contacted ALALC	Penny McCardle (MCH) e-mailed David Ahoy (ALALC)	report	Penny sent David a reminder that their letter/report was due no later than 31 March 2011.	See attached
33rd	31 March 2011	ATAOC contacted MCH	Kerrie Brauer (ATAOC) e-mailed Penny McCardle (MCH)	report	Kerry provide MCH with their report	See attached
34th	31 March 2011	MCH contacted ATAOC	Penny McCardle (MCH) e-mailed Kerrie Brauer (ATAOC)	report	Penny thanked Kerrie for her report and stated that her comments and everyone else's would be reflected in the revised report	See attached
35th	31 March 2011	ALALC contacted MCH	ALALC contacted Penny McCardle (MCH)	report	Provide MCH with their report	See attached
36th	15 July 2011	MCH contacted all groups	See attached	Final report	Penny sent all groups a copy of the final report	See attached
37th	26 March 2012	MCH contacted all groups	See attached	Site visit	Penny sent all groups an invitation to a site meeting on 2 April 2012 to discuss the site identified by AMBS	See attached
38th	Site meeting: no stakeholders attended. The site was not re-located and MCH discussed the possibility of the site being transported in with fill as the site location was raised, fill included to cross a creek and road gravels were present throughout. It was discussed that the best way forward would be to hold another site meeting with the registered stakeholders and AMBS and MCH archaeologist to discuss the site.					
39th	2 April 2012	MCH contacted all groups	See attached	Site visit	Penny sent all groups an e-mail outlining the site visit and the possibility of another site visit	See attached
40th	2 April 2012	ADTOAC contacted MCH	Shane Frost (ADTOAC) e-mailed Penny McCardle (MCH)	Site visit	Rang Penny and apologized for not attending the site visit as he only received the letter that day. Penny explained the site visit and that there may be another site visit organized and she will be in touch.	
41st	2 April 2012	ATAOC contacted MCH	Kerrie Brauer (ATAOC) e-mailed Penny McCardle (MCH)	Site visit	Kerry e-mailed Penny to apologise for not attending the site visit due to other commitments	See attached

13 December 2010

SENDER TO KEEP
LIFT & PEEL
005065892096

Peter Schultz and George Tonna
NTSCORP Limited
PO Box 2105,
Strawberry Hills 2012

McCardle Cultural Heritage Pty Ltd

PO Box 166
ADAMSTOWN NSW 2289

Mobile: 0412 702 396
Fax: 4952 5501
Email: mcheritage@iprimus.com.au

MCH Reference: Indigenous Archaeological Assessment at Hexham

Dear Peter and Goerge,

RE: INDIGENOUS ARCHAEOLOGICAL ASSESSMENT AT HEXHAM

In accordance with the new DECCW Aboriginal Cultural Heritage Consultation Requirements for Proponents (2010), I am contacting you in order to obtain assistance in identifying Aboriginal stakeholder groups or persons interested in the above project.

MCH have been commissioned by ADW Johnson to undertake an Aboriginal Archaeological assessment at Hexham, Newcastle LGA. This project is urgent and I would like to request a quick response. Could you please provide the contact details for any interested parties no later than 20 December 2010. Please note that no response by the specified date will result in the proponent proceeding with the consultation process. Please feel free to e-mail your response to the address above.

Should you wish to discuss this matter, please do not hesitate to contact me on 0412 702 396.

Yours sincerely,
for McCardle Cultural Heritage Pty Ltd

Penny McCardle
Principal Archaeologist
Forensic Anthropologist

McCardle Cultural Heritage Pty Ltd
A.C.N. 104 590 141 A.B.N.89 104 590 141

13 December 2010

LIFT & PEEL SENDER TO KEEP 005065893093

McCardle Cultural Heritage Pty Ltd

PO Box 166
ADAMSTOWN NSW 2289

Mobile: 0412 702 396
Fax: 4952 5501
Email: mcheritage@iprimus.com.au

Native Title Tribunal
GPO Box 9973
Sydney NSW 2001

MCH Reference: Indigenous Archaeological Assessment at Hexham

Dear Sir/madam,

RE: INDIGENOUS ARCHAEOLOGICAL ASSESSMENT AT HEXHAM

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for McCardle Cultural Heritage Pty Ltd

Penny McCardle
Principal Archaeologist
Forensic Anthropologist

McCardle Cultural Heritage Pty Ltd
A.C.N. 104 590 141 A.B.N.89 104 590 141

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13 December 2010

McCardle Cultural Heritage Pty Ltd

PO Box 166
ADAMSTOWN NSW 2289

Mobile: 0412 702 396
Fax: 4952 5501
Email: mcheritage@iprimus.com.au

Department of Environment, Climate Change & Water
Sarah Paddington
Locked Bag 914
COFFS HARBOUR NSW 2450

MCH Reference: Archaeological assessment at Hexham

Dear Sarah,

RE: INDIGENOUS ARCHAEOLOGICAL ASSESSMENT AT HEXHAM

In accordance with the new DECCW Aboriginal Cultural Heritage Consultation Requirements for Proponents (2010), I am contacting you in order to obtain assistance in identifying Aboriginal stakeholder groups or persons interested in the above project.

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Yours sincerely,
for McCardle Cultural Heritage Pty Ltd

Penny McCardle
Principal Archaeologist
Forensic Anthropologist

McCardle Cultural Heritage Pty Ltd
A.C.N. 104 590 141 A.B.N.89 104 590 141

13 December 2010

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McCardle Cultural Heritage Pty Ltd

PO Box 166
ADAMSTOWN NSW 2289

Mobile: 0412 702 396
Fax: 4952 5501
Email: mcheritage@iprimus.com.au

General Manager,
Northern Rivers Catchment Management Authority,
PO Box 618
Grafton NSW 2460.

MCH Reference: Indigenous Archaeological Assessment at Hexham

Dear Sir/Madam,

RE: INDIGENOUS ARCHAEOLOGICAL ASSESSMENT AT HEXHAM

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Yours sincerely,
for McCardle Cultural Heritage Pty Ltd

Penny McCardle
Principal Archaeologist
Forensic Anthropologist

McCardle Cultural Heritage Pty Ltd
A.C.N. 104 590 141 A.B.N.89 104 590 141

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LIFT & PEEL
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13 December 2010

McCardle Cultural Heritage Pty Ltd

PO Box 166
ADAMSTOWN NSW 2289

Mobile: 0412 702 396
Fax: 4952 5501
Email: mcheritage@iprimus.com.au

ALALC
127 Maitland Road
Islington NSW 2296

MCH Reference: Indigenous Archaeological Assessment at the Hexham

Dear Sir/Madam,

RE: INDIGENOUS ARCHAEOLOGICAL ASSESSMENT AT HEXHAM

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Should you wish to discuss this matter, please do not hesitate to contact me on 0412 702 396.

Yours sincerely,
for McCardle Cultural Heritage Pty Ltd

Penny McCardle
Principal Archaeologist
Forensic Anthropologist

McCardle Cultural Heritage Pty Ltd
A.C.N. 104 590 141 A.B.N.89 104 590 141

SENDER TO KEEP
LIFT & PEEL
005079708093

13 December 2010

McCardle Cultural Heritage Pty Ltd

PO Box 166
ADAMSTOWN NSW 2289

Mobile: 0412 702 396
Fax: 4952 5501
Email: mcheritage@iprimus.com.au

Newcastle City Council
PO Box 489
Newcastle NSW 2300

MCH Reference: Indigenous Archaeological Assessment at Hexham

Dear Sir/Madam,

RE: INDIGENOUS ARCHAEOLOGICAL ASSESSMENT AT HEXHAM

In accordance with the new DECCW Aboriginal Cultural Heritage Consultation Requirements for Proponents (2010), I am contacting you in order to obtain assistance in identifying Aboriginal stakeholder groups or persons interested in the above project.

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Should you wish to discuss this matter, please do not hesitate to contact me on 0412 702 396.

Yours sincerely,
for McCardle Cultural Heritage Pty Ltd

Penny McCardle
Principal Archaeologist
Forensic Anthropologist

McCardle Cultural Heritage Pty Ltd
A.C.N. 104 590 141 A.B.N.89 104 590 141

National Native Title Tribunal

New South Wales and Australian Capital Territory Registry
Level 25, 25 Bligh Street
Sydney NSW 2000
GPO Box 9973
Sydney NSW 2000
Telephone (02) 9235 6300
Facsimile (02) 9233 5613

15 December 2010

Penny McCardle
Principal Archaeologist
McCardle Cultural Heritage Pty Ltd
Po Box 166
ADAMSTOWN NSW 2289

Our Reference: 4000/10KW
Your Reference: Indigenous Archaeological Assessment at Hexam

Dear Ms McCardle

Native Title Search Results of Newcastle Local Government Area

Thank you for your letter of 13 December 2010.

My search on 15 December 2010 found:

Register Type	NNTT Reference Numbers
National Native Title Register	Nil.
Register of Native Title Claims	Nil.
Unregistered Claimant applications	Nil.
Register of Indigenous Land Use Agreements	Nil.

I have included a NNTT Registers fact sheet to help you understand the search result.

Please note that there may be a delay between a native title determination application being lodged in the Federal Court and its transfer to the Tribunal. As a result, some native title determination applications recently filed in the Federal Court may not appear on the Tribunal's databases.

If you need more information please call me on 1800 640 501.

Yours sincerely

Kimberley Wilson
Search Co-ordinator

Telephone (02) 9235 6328
Facsimile (02) 9233 5613
Email Kimberley.wilson@nntt.gov.au

Encl

Searching the NNTT Registers in New South Wales

Search service
On request the National Native Title Tribunal will search its public registers for you. A search may assist you in finding out whether any native title applications (claims), determinations or agreements exist over a particular area of land or water.

In New South Wales native title cannot exist on privately owned land including family homes or farms.

What information can a search provide?
A search can confirm whether any applications, agreements or determinations are registered in a local government area. Relevant information, including register extracts and application summaries, will be provided.

In NSW because we cannot search the registers in relation to individual parcels of land we search by local government area.

Most native title applications do not identify each parcel of land claimed. They have an external boundary and then identify the areas not claimed within the boundary by reference to types of land tenure e.g., freehold, agricultural leasehold, public works.

What if the search shows no current applications?
If there is no application covering the local government area this only indicates that at the time of the search either the Federal Court had not received any claims in relation to the local government area or the Tribunal had not yet been notified of any new native title claims.

It does not mean that native title does not exist in the area.

Native title may exist over an area of land or waters whether or not a claim for native title has been made.

Where the information is found
The information you are seeking is held in three registers and on an applications database.

National Native Title Register
The National Native Title Register contains determinations of native title by the High Court, Federal Court and other courts.

Register of Native Title Claims
The Register of Native Title Claims contains applications for native title that have passed a registration test.

Registered claims attract rights, including the right to negotiate about some types of proposed developments.

Register of Indigenous Land Use Agreements
The Register of Indigenous Land Use Agreements contains agreements made with people who hold or assert native title in an area.

The register identifies development activities that have been agreed by the parties.

Application summaries
An application summary contains a description of the location, content and status of a native title claim.

This information may be different to the information on the Register of Native Title Claims, e.g., because an amendment has not yet been tested.

How do you request a search?

A search request form is available on the Tribunal's web site at:
http://www.nntt.gov.au/registers/search.html
This form says how much searches cost.
Mail, fax or email your request to the Tribunal's Sydney registry, identifying the local government area/s you want searched.

Email: SydneySearch@nntt.gov.au
Fax: (02) 9233 5613
Address: GPO Box 9973, Sydney NSW 2001
Phone: (02) 9235 6300

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INSULATION in bags 430's and 580's to match joist centres avail. All Aust. and NZ standards and Govt Cert. From $13.80 per bag
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Cultural Heritage Assessment – registration of interest for Aboriginal people who hold cultural knowledge

Proponent: Queensland Rail National

Project: This Environmental Assessment will addresses a "Concept Plan" for Stage 1 Train Support Facility, Stage 2 Industrial Subdivision and Stage 3 Intermodal Facility as well as a "Project Application" for the Stage 1 Train Support Facility at Hexham.

Location: The subject land is located on the west side of the Pacific Highway at Hexham and includes Lot 101 DP 1084709, Lot 102 DP1084709, Lot 2 DP735456, Lot 10 DP735235, Lot 104 DP1084709, Pt Lot 104 DP1084709, Lot 113 DP755323, Lot 1 DP 155530, Lot 12 DP 1075150, Lot 1 DP1062240 and Lot 311 DP583724.

The purpose of community consultation with Aboriginal people is to assist the proposed applicant in the preparation of an application for an AHIP and to assist the Director General of DECCW in his or her consideration and determination of the application should an AHIP be required.

This is an invitation for Aboriginal people who hold cultural knowledge relevant to the proposed project area and who can determine the significance of Aboriginal object(s) and/or place(s) in the area of the proposed project to register an interest in a process of community consultation.

As per the DECCW Aboriginal Cultural Heritage Consultation Requirements for Proponents (2010), interested parties are advised of the following:

- unless otherwise specified, if you register your interest your details will be provided to DECCW and the LALC.
- the LALC's who hold cultural knowledge relevant to the proposed project area that is relevant to determining the significance of Aboriginal objects and/or places within the proposed project area who wish to register, must do so as an Aboriginal orginisation not as an individual.
- Where an Aboriginal organisation representing Aboriginal people who hold cultural knowledge relevant to the proposed project area (such as a LALC) and that is relevant to determining the significance of Aboriginal objects and/or places within the proposed project area who wish to register, must nominate a contact person and provide written confirmation and contact details of this person or persons.

Should you wish to register your interest in this project, please register in writing no later than (5th January) to:

Penny McCardle
Principal Archeologist
McCardle Cultural Heritage
PO Box 166
Adamstown NSW 2289

If you register your interest in this project, please also nominate your preferred option to receive the initial information. You may wish to attend a non paid meeting and receive an information pack, or receive an information packet through the fax or e-mail.

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Your reference -
Date: 20/12/2010
Our reference: DOC10/56993
Contact: Rosalie Neve, ph: (02) 6659 8221

Ms Penny McCardle
McCardle Cultural Heritage Pty Ltd
PO Box 166
ADAMSTOWN NSW 2289

Dear Ms McCardle

RE: PROPOSED INDIGENOUS ARCHAEOLOGICAL ASSESSMENT AT HEXHAM

I refer to your correspondence, dated 13 December 2010, to the Department of Environment, Climate Change and Water (DECCW) for your project located within Newcastle LGA and described as proposed Indigenous archaeological assessment at Hexham, NSW.

Please find attached a list of known Aboriginal parties that DECCW considers is likely to have an interest in your development. I note this is not necessarily an exhaustive list of all interested Aboriginal parties. Receipt of this list does not remove the requirement for a proponent/consultant to advertise the proposal in the local print media and contact other bodies and community groups seeking interested Aboriginal parties, in accordance with DECCW's *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010 (CRs).*

We would also like to take this opportunity to remind the proponent or consultant of a number of key issues we have been encountering of late, and we'd ask your organisation to take note and ensure compliance please. These issues include:

- Please ensure the project documents the full consultation process in the Aboriginal cultural heritage assessment report or Aboriginal Heritage Impact Permit application and to include copies of all correspondence sent or received from all relevant stakeholders (including Aboriginal stakeholders and the agencies listed in section 4.1.2). *Omission of these records in the final report may cause delays in approval or require parts of the consultation process to be repeated if the evidence provided to DECCW does not demonstrate that the consultation process has been fair, equitable and transparent.*

- *Unless DECCW is provided with evidence that reasonable attempts have been made to contact the relevant parties associated with the CRs, then DECCW will deem that the consultation process has not been complied with.*

- DECCW considers *evidence of reasonable efforts* to contact relevant parties would *include, but not be limited to, multiple forms of communication*; faxes (with

Locked Bag 914, Coffs Harbour NSW 2450
Federation House, Level 7, 24 Moonee Street
Coffs Harbour NSW
Tel: (02) 6651 5946 Fax: (02) 6651 6187
ABN 30 841 387 271
www.environment.nsw.gov.au

confirmation slips demonstrating successful transmission), an e-mail log, registered post details, copies of letters and a phone call log.

- *Please note in Appendix A of the 2010 CRs contains a map illustrating which regions of DECCW that need to contacted according to which local government area your project falls within.* Full details of the consultation requirements and the relevant Fact Sheets can be located on our website at: http://www.environment.nsw.gov.au/licences/consultation.htm

- *If you encounter any changes to the contact details of interested Aboriginal parties, or become aware of additional parties, we encourage you to forward this information to the Department so we can update our records.*

- *Consultation must be fair, equitable and transparent. If the Aboriginal parties express concern or objects to parts or all of your project, DECCW expects that evidence will be provided to demonstrate the efforts made to find common ground between the two perspectives.*

If you have any further questions regarding this matter, please contact me on (02) 66598221

Yours sincerely

ROSALIE NEVE
Aboriginal Heritage Planning Officer
Planning and Aboriginal Heritage
Environment Protection & Regulation Group

Enclosure

Awabakal Traditional Owners Aboriginal Corporation,
Kerrie Brauer
PO Box 253
Jesmond NSW 2299
(02) 4915 6947
0412 866 357

1. Awabakal Descendants Traditional Owners Aboriginal Corporation,
Shane Frost
PO Box 384
Wallabadah NSW 2343

2. Awabakal Newcastle Aboriginal Co-op,
Kevin McKenney
64 Hannell Street
Wickham NSW 2203
(02) 4969 4711

3. Cacatua Culture Consultants,
Donna & George Sampson
22 Ibis Parade
Woodberry NSW 2322
(02) 4964 4685
cacatua@resetdsl.net.au

4. Arwarbukarl Cultural Resource Association,
Darren McKenny
PO Box 240
Broadmeadow NSW 2292
(02) 4961 0515
info@yarnteen.com.au

5. Koompahtoo Local Aboriginal Land Council,
C/O Awabakal Local Aboriginal Land Council,
Cheryl Kitchener
PO Box 437
Hamilton NSW 2303
(02) 4965 4532
cheryl.awabaka@bigpond.com.au awabakal@bigpond.com.au

6.

7. Hunter Traditional Owner,
Paulette Ryan
14 Barton Ave
SINGLETON NSW 2330
(02) 65744906
pauletteryan@live.com

8. Wonnaruah Elders Council,
Uncle Tommy Miller
PO Box 184
SINGLETON NSW 2330

9. Wonnarua Nation Aboriginal Corporation,
Laurie Perry
PO Box 3066

SINGLETON NSW 2330
(02) 6571 5419

10. Wonnarua Culture Heritage,
Gordon Griffiths
19 O'Donnell Crescent
METFORD NSW 2323
(02) 4934 6437
0401 028 807

11. Wonn1 Contracting,
Arthur Fletcher
619 Main Road
GLENDALE NSW 2285
(02) 4954 7751
0402 146 193
Wonn1sites@gmail.com

12. Aboriginal Native Title Elders Consultants,
Margaret Matthews
16a Mahogany St
MUSWELLBROOK NSW 2333
0417 725 956

13. Kayaway ,
Mark Hickey
3/11 Stringybark Place
METFORD NSW 2323
0413 411 936
kayaway@rocketmail.com

14. Hunter Valley Natural & Cultural Resources,
David French
10 Mill Street
MUSWELLBROOK NSW 2333

15. Ungooroo Aboriginal Corporation,
Alan Paget
PO Box 3095
SINGLETON NSW 2330
(02) 6571 5111
ungooroo@bigpond.com

16. Ungooroo Cultural & Community Services,
Rhonda Ward
8 Blaxland Avenue
SINGLETON NSW 2330
0450 754 199
ungooroo59@hotmail.com

17. Hunter Valley Cultural Surveying,
Luke Hickey
2/8 Midanga Ave
MUSWELLBROOK NSW 2333
(02) 6541 0525
0448 552 477
hvcs@bigpond.com

18. Wanaruah Custodians,

Barbara Foot
35 Acacia Circuit
SINGLETON NSW 2330
6573 1712
0421 151 650

19. Valley Culture,
Larry Van Vliet
140 Sydney Street
MUSWELLBROOK NSW 2333

20. Upper Hunter Wonnarua Council Inc,
Rhoda Perry
17/174 John Street
SINGLETON NSW 2330
(02) 6572 1889

21. Upper Hunter Heritage Consultants,
Melissa & Darrel Matthews
14 Edinglassie Ave
MUSWELLBROOK NSW 2333
(02) 6541 3532
0439 556 641

22. Hunter Valley Cultural Consultants,
Christine Matthews
40 Humphries Street
MUSWELLBROOK NSW 2333
0438 390 882

23. Mingga Consultants,
Clifford Matthews
11 Coolibah Close
MUSWELLBROOK NSW 2333
(02) 6541 0751
0413 091 527

24. Muswellbrook Cultural Consultants,
Brian Horton
10 Scott street
MUSWELLBROOK NSW 2333

25. Black Creek Aboriginal Corporation,
Tracey White
PO Box 168
KURRI KURRI NSW 2327 (02) 4990 6747
blackcreek@idl.net.au

26. Bullen Bullen,
Lloyd Mathews
16B Mahogany Avenue
MUSWELLBROOK NSW 2333

27. Carrawonga Consultants,
Cheryl Moodie & Justin Matthews
11 Coolibah Close
MUSWELLBROOK NSW 2333
0411 958 511

28. Lower Hunter Wonnarua Council Inc,
Lea-Anne Ball / Uncle Tommy Miller
51 Bowden Street
HEDDON GRETA NSW 2321
4937 2694
0447 266 590 (LM) lea-anne.ball@bigpond.com or
0402 636 521 tn.miller@bigpond.com

29. Culturally Aware,
Tracey Skene
7 Crawford Place
MILLFIELD NSW 2325
0458 983 941
anigunya@hotmail.com

30. Hunter Valley Aboriginal Corporation,
Rhonda Griffiths
PO Box 579
MUSWELLBROOK NSW 2333

31. Gidawaa Walang & Barkuma Neighbourhood Centre Inc. ,
Debbie Dacey-Sullivan
76 Lang Street
KURRI KURRI NSW 2327
(02) 4937 1094
0411 196 991
barkuma@hotmail.com

32. Yinarr Cultural Services,
Kathleen Steward
111 Westwood Road
GUNGAL NSW 2333
02 6547 6077
0432 720 623
kathleen.steward@bigpond.com
yinarrculturalservices@bigpond.com

33. Lower Wonnaruah Tribal Consultancy Pty Ltd,
Barry Anderson
156 The Inlet Road
BULGA NSW 2330
0417 403 153
barry156@bigpond.com

34. Yarrawalk (A division of TOCOMWALL PTY LTD),
Scott Franks
Po Box 76
CARINGBAH NSW 1495
(02)6579 1185
0404 171 544
yarrawalk@tpg.com.au

35. Wattaka Wonnarua C.C. Service,
Des Hickey
4 Kennedy Street
SINGLETON NSW 2330
(02) 6573 3786
0432 977 178
deshickey@bigpond.com

36. Giwiirr Consultants,
Michele Stair
8 Fitzgerald Avenue
MUSWELLBROOK NSW 2333
(02) 6541 0506
0421 434 590

37. David French
Cultural Heritage Officer
10 Mill St
MUSWELLBROOK NSW 2333

38. St Clair Singleton Aboriginal Corporation
Cultural Heritage Officer
PO Box 710
SINGLETON NSW 2330

39. Widescope Indigenous Group Pty Ltd
Amanada Hickey
73 Russell St
EMU PLAINS NSW 2750

20 December 2010

McCardle Cultural Heritage Pty Ltd

PO Box 166
ADAMSTOWN NSW 2289

Mobile: 0412 702 396
Fax: 4952 5501
Email: mcheritage@iprimus.com.au

Kerrie Brauer
Awabakal Traditional Owners Aboriginal Corporation
PO Box 253
Jesmond NSW 2299

MCH Reference: Indigenous Archaeological Assessment at Hexham

Dear Kerrie,

RE: PROPOSED PROJECT AT HEXHAM

McCardle Cultural heritage has been commissioned by ADW Johnson to undertake the archaeological assessments for the proposed Hexham - Part 3A Project - Queensland Rail Project.

The study area is located on the west side of the Pacific Highway at Hexham. The project involves an assessment that addresses a "Concept Plan" for Stage 1 Train Support Facility, Stage 2 Industrial Subdivision and Stage 3 Intermodal Facility as well as a "Project Application" for the Stage 1 Train Support Facility. The proposed Concept Plan and Project Application are matters to which Part 3A of the Environmental Planning & Assessment Act apply and so will be determined by the Minister for Planning.

The purpose of community consultation with Aboriginal people is to assist the proposed applicant in the preparation of an application for an AHIP and to assist the Director General of DECCW in his or her consideration and determination of the application should an AHIP be required.

This is an invitation for Aboriginal people who hold cultural knowledge relevant to the proposed project area and who can determine the significance of Aboriginal object(s) and/or place(s) in the area of the proposed project to register an interest in a process of community consultation.

As per the DECCW Aboriginal Cultural Heritage Consultation Requirements for Proponents (2010), you are advised of the following:

- You are also advised that, unless otherwise specified, if you register your interest your details will be provided to DECCW and the LALC.
- the LALC's who hold cultural knowledge relevant to the proposed project area that is relevant to determining the significance of Aboriginal objects and/or places within the proposed project area who wish to register, must do so as an Aboriginal orginisation not an individual.

- Where an Aboriginal organisation representing Aboriginal people who hold cultural knowledge relevant to the proposed project area and that is relevant to determining the significance of Aboriginal objects and/or places within the proposed project area who wish to register, must nominate a contact person and provide written confirmation and contact details of this person or persons.

Should you wish to register your interest in this project, please register in writing no later than **5 January 2011** (additiona week has been added due to the Christmas/New Year holidays) to:

Penny McCardle
McCardle Cultural Heritage
PO Box 166
Adamstown NSW 2289

If you register your interest in this project, please also nominate your preferred option to receive the initial information. You may wish to have a non paid meeting and receive an information pack, or receive information packet through the mail, fax or e-mail.

MCH have provided a form attached for your convienience, however if you wish to provide your own registration letter please do so.

Yours sincerely,
for McCardle Cultural Heritage Pty Ltd

Penny McCardle
Principal Archaeologist
Physical Anthropologist

20 December 2010

McCardle Cultural Heritage Pty Ltd

PO Box 166
ADAMSTOWN NSW 2289

Mobile: 0412 702 396
Fax: 4952 5501
Email: mcheritage@iprimus.com.au

Shane Frost
Awabakal Descendants Traditional Owners Aboriginal Corporation
PO Box 384
Wallabadah NSW 2342

MCH Reference: Indigenous Archaeological Assessment at Hexham

Dear Shane,

RE: PROPOSED PROJECT AT HEXHAM

McCardle Cultural heritage has been commissioned by ADW Johnson to undertake the archaeological assessments for the proposed Hexham - Part 3A Project - Queensland Rail Project.

The study area is located on the west side of the Pacific Highway at Hexham. The project involves an assessment that addresses a "Concept Plan" for Stage 1 Train Support Facility, Stage 2 Industrial Subdivision and Stage 3 Intermodal Facility as well as a "Project Application" for the Stage 1 Train Support Facility. The proposed Concept Plan and Project Application are matters to which Part 3A of the Environmental Planning & Assessment Act apply and so will be determined by the Minister for Planning.

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Yours sincerely,
for McCardle Cultural Heritage Pty Ltd

Penny McCardle
Principal Archaeologist
Physical Anthropologist

20 December 2010

McCardle Cultural Heritage Pty Ltd

PO Box 166
ADAMSTOWN NSW 2289

Mobile: 0412 702 396
Fax: 4952 5501
Email: mcheritage@iprimus.com.au

Kevin McKenney
Awabakal Newcastle Aboriginal Co-Op
64 Hannell St
Wickham NSW 2203

MCH Reference: Indigenous Archaeological Assessment at Hexham

Dear Kevin,

RE: PROPOSED PROJECT AT HEXHAM

McCardle Cultural heritage has been commissioned by ADW Johnson to undertake the archaeological assessments for the proposed Hexham - Part 3A Project - Queensland Rail Project.

The study area is located on the west side of the Pacific Highway at Hexham. The project involves an assessment that addresses a "Concept Plan" for Stage 1 Train Support Facility, Stage 2 Industrial Subdivision and Stage 3 Intermodal Facility as well as a "Project Application" for the Stage 1 Train Support Facility. The proposed Concept Plan and Project Application are matters to which Part 3A of the Environmental Planning & Assessment Act apply and so will be determined by the Minister for Planning.

The purpose of community consultation with Aboriginal people is to assist the proposed applicant in the preparation of an application for an AHIP and to assist the Director General of DECCW in his or her consideration and determination of the application should an AHIP be required.

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Yours sincerely,
for McCardle Cultural Heritage Pty Ltd

Penny McCardle
Principal Archaeologist
Physical Anthropologist

20 December 2010

McCardle Cultural Heritage Pty Ltd

PO Box 166
ADAMSTOWN NSW 2289

Mobile: 0412 702 396
Fax: 4952 5501
Email: mcheritage@iprimus.com.au

Darren McKenney
Arwarbukarl Cultural Resource Association
PO Box 140
Broadmeadow NSW 2292

MCH Reference: Indigenous Archaeological Assessment at Hexham

Dear Darren,

RE: PROPOSED PROJECT AT HEXHAM

McCardle Cultural heritage has been commissioned by ADW Johnson to undertake the archaeological assessments for the proposed Hexham - Part 3A Project - Queensland Rail Project.

The study area is located on the west side of the Pacific Highway at Hexham. The project involves an assessment that addresses a "Concept Plan" for Stage 1 Train Support Facility, Stage 2 Industrial Subdivision and Stage 3 Intermodal Facility as well as a "Project Application" for the Stage 1 Train Support Facility. The proposed Concept Plan and Project Application are matters to which Part 3A of the Environmental Planning & Assessment Act apply and so will be determined by the Minister for Planning.

The purpose of community consultation with Aboriginal people is to assist the proposed applicant in the preparation of an application for an AHIP and to assist the Director General of DECCW in his or her consideration and determination of the application should an AHIP be required.

This is an invitation for Aboriginal people who hold cultural knowledge relevant to the proposed project area and who can determine the significance of Aboriginal object(s) and/or place(s) in the area of the proposed project to register an interest in a process of community consultation. As per the DECCW Aboriginal Cultural Heritage Consultation Requirements for Proponents (2010), you are advised of the following:

- You are also advised that, unless otherwise specified, if you register your interest your details will be provided to DECCW and the LALC.

- the LALC's who hold cultural knowledge relevant to the proposed project area that is relevant to determining the significance of Aboriginal objects and/or places within the proposed project area who wish to register, must do so as an Aboriginal orginisation not an individual.

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Yours sincerely,
for McCardle Cultural Heritage Pty Ltd

Penny McCardle
Principal Archaeologist
Physical Anthropologist

20 December 2010

McCardle Cultural Heritage Pty Ltd

PO Box 166
ADAMSTOWN NSW 2289

Mobile: 0412 702 396
Fax: 4952 5501
Email: mcheritage@iprimus.com.au

Cheryl Kitchener
Koompahtoo LALC C/O Awabakal LALC
PO Box 437
Hamilton NSW 2303

MCH Reference: Indigenous Archaeological Assessment at Hexham

Dear Cheryl,

RE: PROPOSED PROJECT AT HEXHAM

McCardle Cultural heritage has been commissioned by ADW Johnson to undertake the archaeological assessments for the proposed Hexham - Part 3A Project - Queensland Rail Project.

The study area is located on the west side of the Pacific Highway at Hexham. The project involves an assessment that addresses a "Concept Plan" for Stage 1 Train Support Facility, Stage 2 Industrial Subdivision and Stage 3 Intermodal Facility as well as a "Project Application" for the Stage 1 Train Support Facility. The proposed Concept Plan and Project Application are matters to which Part 3A of the Environmental Planning & Assessment Act apply and so will be determined by the Minister for Planning.

The purpose of community consultation with Aboriginal people is to assist the proposed applicant in the preparation of an application for an AHIP and to assist the Director General of DECCW in his or her consideration and determination of the application should an AHIP be required.

This is an invitation for Aboriginal people who hold cultural knowledge relevant to the proposed project area and who can determine the significance of Aboriginal object(s) and/or place(s) in the area of the proposed project to register an interest in a process of community consultation. **Although DECCW provided a lsit of 40 groups, most of which are not Awabakal, the study area is within Awabakal country and we rerspectifully request that you register only for areas within your own traditional boundaries.**

As per the DECCW Aboriginal Cultural Heritage Consultation Requirements for Proponents (2010), you are advised of the following:

- You are also advised that, unless otherwise specified, if you register your interest your details will be provided to DECCW and the LALC.
- the LALC's who hold cultural knowledge relevant to the proposed project area that is

relevant to determining the significance of Aboriginal objects and/or places within the proposed project area who wish to register, must do so as an Aboriginal orginisation not an individual.

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Yours sincerely,
for McCardle Cultural Heritage Pty Ltd

Penny McCardle
Principal Archaeologist
Physical Anthropologist

20 December 2010

McCardle Cultural Heritage Pty Ltd

PO Box 166
ADAMSTOWN NSW 2289

Mobile: 0412 702 396
Fax: 4952 5501
Email: mcheritage@iprimus.com.au

Paulette Ryan
Hunter Traditional Owner
14 Barton Ave
Singleton NSW 2330

MCH Reference: Indigenous Archaeological Assessment at Hexham

Dear Paulette,

RE: PROPOSED PROJECT AT HEXHAM

McCardle Cultural heritage has been commissioned by ADW Johnson to undertake the archaeological assessments for the proposed Hexham - Part 3A Project - Queensland Rail Project.

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Tracey Skeen
Culturally Aware
7 Crawford Place
Millfield NSW 2325

MCH Reference: Indigenous Archaeological Assessment at Hexham

Dear Tracey,

RE: PROPOSED PROJECT AT HEXHAM

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Rhonda Ward
Ungooroo Cultural & Community Services Inc.
8 Blacland Ave
Singleton NSW 2330

MCH Reference: Indigenous Archaeological Assessment at Hexham

Dear Rhonda,

RE: PROPOSED PROJECT AT HEXHAM

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Barry Anderson
Lower Wonnarua Tribal Consultancy Pty Ltd
156 The Inlet Road
Bulga NSW 2330

MCH Reference: Indigenous Archaeological Assessment at Hexham

Dear Barry,

RE: PROPOSED PROJECT AT HEXHAM

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Penny McCardle
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Physical Anthropologist

20 December 2010

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Fax: 4952 5501
Email: mcheritage@iprimus.com.au

George Sampson
Cacutua Cultural Consultants
22 Ibis Pde
Woodberry NSW 2322

MCH Reference: Indigenous Archaeological Assessment at Hexham

Dear George,

RE: PROPOSED PROJECT AT HEXHAM

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McCardle Cultural Heritage Pty Ltd
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Rhoda Perry
Upper Hunter Wonnarua Council
PO Box 184
Singleton NSW 2329

MCH Reference: Indigenous Archaeological Assessment at Hexham

Dear Rhoda,

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Alan Paget
Ungooroo Aboriginal Corporation
PO Box 3095
Singleton NSW 2330

MCH Reference: Indigenous Archaeological Assessment at Hexham

Dear Alan,

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Barbara Foot
Wanaruah Aboriginal Custodians Corporation
35 Acacia Circut
Singleton NSW 2330

MCH Reference: Indigenous Archaeological Assessment at Hexham

Dear Barbara,

RE: PROPOSED PROJECT AT HEXHAM

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John & Margaret Matthews
Aboriginal Native Title Elders Consultants
16A Mahagony Ave
Muswellbrook NSW 2333

MCH Reference: Indigenous Archaeological Assessment at Hexham

Dear John & Margaret,

RE: PROPOSED PROJECT AT HEXHAM

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Christine Archibald
Hunter Valley Cultural Consultants
40 Humphries St
Muswellbrook NSW 2333

MCH Reference: Indigenous Archaeological Assessment at Hexham

Dear Christine,

RE: PROPOSED PROJECT AT HEXHAM

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Darrel Matthews
Upper Hunter Heritage Consultants
14 Edinglassie Drive
Muswellbrook NSW 2333

MCH Reference: Indigenous Archaeological Assessment at Hexham

Dear Darrel,

RE: PROPOSED PROJECT AT HEXHAM

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Penny McCardle
McCardle Cultural Heritage
PO Box 166
Adamstown NSW 2289

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Yours sincerely,
for McCardle Cultural Heritage Pty Ltd

Penny McCardle
Principal Archaeologist
Physical Anthropologist

20 December 2010

McCardle Cultural Heritage Pty Ltd

PO Box 166
ADAMSTOWN NSW 2289

Mobile: 0412 702 396
Fax: 4952 5501
Email: mcheritage@iprimus.com.au

Clifford Matthews
Mingga Consultants
11 Coolibah Close
Muswellbrook NSW 2333

MCH Reference: Indigenous Archaeological Assessment at Hexham

Dear Clifford,

RE: PROPOSED PROJECT AT HEXHAM

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Rodney Matthews
Giwiirr Consultants
8 Fitzgerald Ave
Muswellbrook NSW 2333

MCH Reference: Indigenous Archaeological Assessment at Hexham

Dear Rodney,

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Physical Anthropologist

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Justin Matthews
Carrawonga Consultants
16B Mahogany Ave
Muswellbrook NSW 2333

MCH Reference: Indigenous Archaeological Assessment at Hexham

Dear Justin,

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Des Hickey
Wattaka Wonnarua Traditional Owner
4 Kennedy St
Singleton NSW 2330

MCH Reference: Indigenous Archaeological Assessment at Hexham

Dear Des,

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Luke Hickey
Hunter Valley Cultural Surveying
Unit 2 /8 Midanga Ave
Muswellbrook NSW 2333

MCH Reference: Indigenous Archaeological Assessment at Hexham

Dear Luke,

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Mark Hickey
Kayaway eco-Cultural and Heritage Services
3 Unit 11, Stringybark Place
Metford NSW 2323

MCH Reference: Indigenous Archaeological Assessment at Hexham

Dear Mark,

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Larry Van Vliet
Valley Culture
140 Sydney St
Muswellbrook NSW 2333

MCH Reference: Indigenous Archaeological Assessment at Hexham

Dear Larry,

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David French
Hunter Valley Natural & Cultural Resources
10 Mill Street
Muswellbrook NSW 2334

MCH Reference: Indigenous Archaeological Assessment at Hexham

Dear David,

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Tommy Miller
Wonnaruah Elders Council
PO Box 184
Singleton NSW 2330

MCH Reference: Indigenous Archaeological Assessment at Hexham

Dear Tommy,

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Arthur Charles Fletcher
Wonn 1 Contracting
619 Main Road
Glendale NSW 2285

MCH Reference: Indigenous Archaeological Assessment at Hexham

Dear Arthur,

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Penny McCardle
McCardle Cultural Heritage
PO Box 166
Adamstown NSW 2289

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MCH have provided a form attached for your convienience, however if you wish to provide your own registration letter please do so.

Yours sincerely,
for McCardle Cultural Heritage Pty Ltd

Penny McCardle
Principal Archaeologist
Physical Anthropologist

20 December 2010

McCardle Cultural Heritage Pty Ltd

PO Box 166
ADAMSTOWN NSW 2289

Mobile: 0412 702 396
Fax: 4952 5501
Email: mcheritage@iprimus.com.au

David french
Cultural Heritage Officer
10 Mill Street
Muswellbrook NSW 2333

MCH Reference: Indigenous Archaeological Assessment at Hexham

Dear David,

RE: PROPOSED PROJECT AT HEXHAM

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Principal Archaeologist
Physical Anthropologist

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PO Box 166
ADAMSTOWN NSW 2289

Mobile: 0412 702 396
Fax: 4952 5501
Email: mcheritage@iprimus.com.au

Lea-Ann Ball
Lower Hunter Wonnarua Council Inc
51 Bowden St
Heddon Greta NSW 2321

MCH Reference: Indigenous Archaeological Assessment at Hexham

Dear Lea-Ann,

RE: PROPOSED PROJECT AT HEXHAM

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Principal Archaeologist
Physical Anthropologist

20 December 2010

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Fax: 4952 5501
Email: mcheritage@iprimus.com.au

Gordon Griffiths
Wonnarua Culture Heritage
19 O'Donnell Cres
Metford NSW 2323

MCH Reference: Indigenous Archaeological Assessment at Hexham

Dear Gordon,

RE: PROPOSED PROJECT AT HEXHAM

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Mobile: 0412 702 396
Fax: 4952 5501
Email: mcheritage@iprimus.com.au

Brian Horton
Musswellbrook Cultural Consultants Pty Ltd
10 Scott Street
Muswellbrook NSW 2333

MCH Reference: Indigenous Archaeological Assessment at Hexham

Dear Brian,

RE: PROPOSED PROJECT AT HEXHAM

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Penny McCardle
Principal Archaeologist
Physical Anthropologist

20 December 2010

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PO Box 166
ADAMSTOWN NSW 2289

Mobile: 0412 702 396
Fax: 4952 5501
Email: mcheritage@iprimus.com.au

Tracey White
Black Creek Aboriginal Corporation
PO Box 168
Kurri Kurri NSW 2328

MCH Reference: Indigenous Archaeological Assessment at Hexham

Dear Tracey,

RE: PROPOSED PROJECT AT HEXHAM

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Rhonda Griffiths
Hunter Valley Aboriginal Corporation
PO Box 579
Muswellbrook NSW 2333

MCH Reference: Indigenous Archaeological Assessment at Hexham

Dear Rhonda,

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Mobile: 0412 702 396
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Email: mcheritage@iprimus.com.au

Lloyd Matthews
Bullen Bullen
16B Mahagony Ave
Muswellbrook NSW 2333

MCH Reference: Indigenous Archaeological Assessment at Hexham

Dear Lloyd,

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Email: mcheritage@iprimus.com.au

Debbie Dacey-Sullivan
Gidawaa Walang & Barkuma Neighbourhood Centre Inc.
76 Lanf Street
Kurri Kurri NSW 2327

MCH Reference: Indigenous Archaeological Assessment at Hexham

Dear Debbie,

RE: PROPOSED PROJECT AT HEXHAM

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Email: mcheritage@iprimus.com.au

Laurie Perry
Wanaruah Nations Aboriginal Corporation
PO Box 3066 Singleton Delivery Centre
Singleton NSW 2330

MCH Reference: Indigenous Archaeological Assessment at Hexham

Dear Laurie,

RE: PROPOSED PROJECT AT HEXHAM

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A.C.N. 104 590 141 A.B.N.89 104 590 141

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Email: mcheritage@iprimus.com.au

Scott Franks
YarraWalk
PO Box 76
Caringbah NSW 1495

MCH Reference: Indigenous Archaeological Assessment at Hexham

Dear Scott,

RE: PROPOSED PROJECT AT HEXHAM

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- You are also advised that, unless otherwise specified, if you register your interest your details will be provided to DECCW and the LALC.
- the LALC's who hold cultural knowledge relevant to the proposed project area that is

relevant to determining the significance of Aboriginal objects and/or places within the proposed project area who wish to register, must do so as an Aboriginal orginisation not an individual.

- Where an Aboriginal organisation representing Aboriginal people who hold cultural knowledge relevant to the proposed project area and that is relevant to determining the significance of Aboriginal objects and/or places within the proposed project area who wish to register, must nominate a contact person and provide written confirmation and contact details of this person or persons.

Should you wish to register your interest in this project, please register in writing no later than **5 January 2011** (additiona week has been added due to the Christmas/New Year holidays) to:

Penny McCardle
McCardle Cultural Heritage
PO Box 166
Adamstown NSW 2289

If you register your interest in this project, please also nominate your preferred option to receive the initial information. You may wish to have a non paid meeting and receive an information pack, or receive information packet through the mail, fax or e-mail.

MCH have provided a form attached for your convienience, however if you wish to provide your own registration letter please do so.

Yours sincerely,
for McCardle Cultural Heritage Pty Ltd

Penny McCardle
Principal Archaeologist
Physical Anthropologist

20 December 2010

McCardle Cultural Heritage Pty Ltd

PO Box 166
ADAMSTOWN NSW 2289

Mobile: 0412 702 396
Fax: 4952 5501
Email: mcheritage@iprimus.com.au

Kathleen Steward Kinchela
Yinnar Cultural Services
111 Westwood Rd
Gungal NSW 2333

MCH Reference: Indigenous Archaeological Assessment at Hexham

Dear Kathleen,

RE: PROPOSED PROJECT AT HEXHAM

McCardle Cultural heritage has been commissioned by ADW Johnson to undertake the archaeological assessments for the proposed Hexham - Part 3A Project - Queensland Rail Project.

The study area is located on the west side of the Pacific Highway at Hexham. The project involves an assessment that addresses a "Concept Plan" for Stage 1 Train Support Facility, Stage 2 Industrial Subdivision and Stage 3 Intermodal Facility as well as a "Project Application" for the Stage 1 Train Support Facility. The proposed Concept Plan and Project Application are matters to which Part 3A of the Environmental Planning & Assessment Act apply and so will be determined by the Minister for Planning.

The purpose of community consultation with Aboriginal people is to assist the proposed applicant in the preparation of an application for an AHIP and to assist the Director General of DECCW in his or her consideration and determination of the application should an AHIP be required.

This is an invitation for Aboriginal people who hold cultural knowledge relevant to the proposed project area and who can determine the significance of Aboriginal object(s) and/or place(s) in the area of the proposed project to register an interest in a process of community consultation. **Although DECCW provided a lsit of 40 groups, most of which are not Awabakal, the study area is within Awabakal country and we rerspectifully request that you register only for areas within your own traditional boundaries.**

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Adamstown NSW 2289

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Yours sincerely,
for McCardle Cultural Heritage Pty Ltd

Penny McCardle
Principal Archaeologist
Physical Anthropologist

20 December 2010

McCardle Cultural Heritage Pty Ltd

PO Box 166
ADAMSTOWN NSW 2289

Mobile: 0412 702 396
Fax: 4952 5501
Email: mcheritage@iprimus.com.au

Sir/Madam
St Clair Singleton Aboriginal Corporation
PO Box 710
Singleton NSW 2330

MCH Reference: Indigenous Archaeological Assessment at Hexham

Dear Sir/Madam,

RE: PROPOSED PROJECT AT HEXHAM

McCardle Cultural heritage has been commissioned by ADW Johnson to undertake the archaeological assessments for the proposed Hexham - Part 3A Project - Queensland Rail Project.

The study area is located on the west side of the Pacific Highway at Hexham. The project involves an assessment that addresses a "Concept Plan" for Stage 1 Train Support Facility, Stage 2 Industrial Subdivision and Stage 3 Intermodal Facility as well as a "Project Application" for the Stage 1 Train Support Facility. The proposed Concept Plan and Project Application are matters to which Part 3A of the Environmental Planning & Assessment Act apply and so will be determined by the Minister for Planning.

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Penny McCardle
McCardle Cultural Heritage
PO Box 166
Adamstown NSW 2289

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MCH have provided a form attached for your convienience, however if you wish to provide your own registration letter please do so.

Yours sincerely,
for McCardle Cultural Heritage Pty Ltd

Penny McCardle
Principal Archaeologist
Physical Anthropologist

20 December 2010

McCardle Cultural Heritage Pty Ltd

PO Box 166
ADAMSTOWN NSW 2289

Mobile: 0412 702 396
Fax: 4952 5501
Email: mcheritage@iprimus.com.au

Amanda Hickey
Widescope Indigenous Group Pty Ltd
73 Russell St
Ume Plains NSW 2750

MCH Reference: Indigenous Archaeological Assessment at Hexham

Dear Amanda,

RE: PROPOSED PROJECT AT HEXHAM

McCardle Cultural heritage has been commissioned by ADW Johnson to undertake the archaeological assessments for the proposed Hexham - Part 3A Project - Queensland Rail Project.

The study area is located on the west side of the Pacific Highway at Hexham. The project involves an assessment that addresses a "Concept Plan" for Stage 1 Train Support Facility, Stage 2 Industrial Subdivision and Stage 3 Intermodal Facility as well as a "Project Application" for the Stage 1 Train Support Facility. The proposed Concept Plan and Project Application are matters to which Part 3A of the Environmental Planning & Assessment Act apply and so will be determined by the Minister for Planning.

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MCH have provided a form attached for your convienience, however if you wish to provide your own registration letter please do so.

Yours sincerely,
for McCardle Cultural Heritage Pty Ltd

Penny McCardle
Principal Archaeologist
Physical Anthropologist

"From the Mountains to the Sea"
AWABAKAL
Descendants Traditional Owners
Aboriginal Corporation
ICN:4500 ABN:20402046601

PO BOX 86
CLARENCE TOWN
NSW 2321

Date: 2 January 2011

Attention: Penny McCardle
McCardle Cultural Heritage
PO Box 166
Adamstown NSW 2289

Re: Registration of Interest Regarding Consultation for Aboriginal Cultural Heritage Assessment for the proposed Queensland Rail Project at Hexham.

ALLA (Hello in Awabakal) Penny,

We are writing to you regarding the **Consultation and Aboriginal Cultural Heritage Assessment for the proposed Queensland Rail Project at Hexham.** We would like to notify you of the ***Awabakal Descendants Traditional Owners Aboriginal Corporations*** registration of interest for the proposed project and that it is our desire to be consulted in regard to any Aboriginal archaeological management or consultation that is to take place for any area located within the Traditional Awabakal Tribal area.

We are a registered Aboriginal Corporation under the Federal Governments ***Aboriginal Corporations Act*** to carry out business within Australia in regard to the representation of our people through this corporation known as the ***Awabakal Descendants Traditional Owners Aboriginal Corporation***.

Being the direct descendants of the Traditional Awabakal People of the Lake Macquarie/Newcastle area we take this opportunity in a few sentences to quickly formalise our position with you.

Our great great great Grandmother was one of the first Aboriginal People to be recorded in the Lake Macquarie and Newcastle area in 1828 when the Reverend L.E.Threlkeld made the first list of the Aboriginal People of the Lake Macquarie and Newcastle districts (which included the Hexham Swamp area) from his mission station at Belmont. At Warner's Bay our great great great Grandmother and her daughter, our great great Grandmother, were recorded by Jonathon Warner in 1833 and then again at Toronto in 1836 by L.E.Threlkeld at his mission there. We also have many well documented instances, as well as oral history of our People, which were also recorded by the Rev. L.E. Threlkeld living in and around the area between Maitland and Hexham. Therefore our people still live and maintain our Cultural ties with our Traditional Country and are concerned with the overall welfare of our Cultural Heritage and desire to be involved in all the affairs that may affect that Cultural Heritage which is vital to our People in maintaining connectedness in respect of our Traditional Country.

Regarding the area at Hexham referred to in the documentation received from you by our organisation proposing for consultation and assessment regarding a Concept Plan for Stage 1 Train Support Facility, Stage 2 Industrial Subdivision and Stage 3 Intermodal Facility as well as a Project Application for the Stage 1 Train Support Facility for Queensland Rail, most assuredly indicates that this project is located within the Traditional Tribal Country of our People, the Awabakal. This is why it is crucial for the correct People to be involved in this process and any information relevant to this area to be accurate and forthcoming at the outset of this project. This can only be accomplished by involving those who are the direct Descendants of the original People and that were born and raised in the Traditional Country of their Ancestors and as a result also hold that Traditional Cultural Knowledge of the proposed project area. Our Traditional Tribal area is significant to us because our people have lived around Newcastle and Lake Macquarie for many thousands of years, these resource rich areas were utilised on many occasions to hunt, fish and carry on traditions that have now been passed down for centuries from one generation to another. Subsequently, there are many sites located within our Traditional Country which provide tangible evidence of the Cultural Heritage of our people and of which identification and information regarding the locations and significance of many of these is only held by the Awabakal People who hold this knowledge.

It must also be emphasised that this area is highly significant to our people, being on the edge of what is known as the Hexham Swamps and the source of many rich recourses of which our people have depended on for thousands of years. As a result, due to the occupation of this area by our People, many deposits now make up the Awabakal Cultural Heritage that is located within the perimeter of Hexham Swamp but also connects to the many other sites located within our Traditional Tribal Country.

As already explained, this area and every part of our Traditional Country are special to us, not just for the Physical aspect but also the Spiritual and Oral aspect which, when all combined, give us our complete Culture. Our Cultural Heritage and Traditional Tribal Country are two of the reasons why we take every opportunity to make ourselves available for consultation concerning the very important issues and decisions that need to be made in regard to protecting what is Culturally ours, handed onto us as a legacy from our Ancestors and what also gives us the right through birth to be called Awabakal People.

Given the opportunity to take part in this consultation and any subsequent assessment process, I (being the selected representative for this corporation) would make representation on behalf of our People and provide the necessary qualifications which are vital in delivering all aspects of the ***Cultural Knowledge*** of the proposed project area (as required by the NSW DECCW Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010)[1]. I am also physically capable to undertake any potential assessments/surveys due to spending many hours walking our Awabakal Country and carrying out assessments/surveys for Cultural Heritage and educational purposes.

As far as field identification or assessment/survey techniques are concerned and as previously outlined, I was brought up in the bush around Newcastle, Lake Macquarie and the mountains and have many years of experience spending most of my life being instructed and shown much by my Father and Grandmother in regard to our places, stories, tools/weapons and foods and how to acquire/make and use them. I have also been actively involved with Aboriginal archaeological heritage, consultation and assessments/surveys conducted within our Awabakal Country over many years. Our corporation has successfully worked with and accompanied many archaeological consultants from well known companies, (located from within and outside our area) into the field and have taken part in many projects which required a detailed consultation process and where monitoring was necessary or excavation was required and carried out to locate artefacts or to gather information which aimed to provide a greater understanding of our People both now and in the future and also add to the research potential by identifying primarily the use of certain artefacts, the type used and the utilisation and significance of place along with the underlying connection that exists between each site.

Some of those companies we have worked with on many occasions include, AECOM, ENSR, AHMS, ERM, Insite Heritage, RPS, Umwelt and many others on major and minor projects located within our Traditional area. We have provided assistance and advice for a diverse range of proponents/developers from large mining companies and government departments through to small private developers. We are presently involved with many ongoing long term projects, working with organisations to see favourable outcomes for all those involved and through these processes endeavouring to secure long term preservation and protection in relation to all issues pertaining to Awabakal Cultural Heritage.

It is imperative that we be involved with this consultation and any subsequent assessment process because of our People's connection to this area for thousands of years and as a consequence the ***Cultural Knowledge*** held by us regarding our Traditional Country.

Also as far as communicating the results of any consultation or assessment process back to stakeholder community and returning advice on the response, as Managing Director of our corporation, I have the capacity and occasion to contact our members for any comments and information that may be pertinent to this project and also have the necessary experience in production and reporting of any information required in written format in relation to any draft report that is produced.

We also hold all relevant insurances needed to participate in the event of possible fieldwork/assessments taking place and any representative selected by our corporation is covered by public liability and workers compensation insurance. These certificates of currency are supplied separately to this letter (when requested) due to confidentiality.

Our schedule fees for engagement of our representative to take part in any fieldwork/assessments which may result from the consultation process would be inclusive of all relevant and associated costs for us to participate in this process and like our insurance documents are supplied separately to this letter for confidentiality reasons (when requested).

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[1] ***Page 8, section 3.3.1, NSW DECCW Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010***

We hope this addresses any queries you may have Penny, if not and further information is required please don't hesitate to contact us ASAP. Our contact details are as follows.

NGI NOA (Farewell in Awabakal)
Shane Frost-Managing Director: Awabakal Descendants Traditional Owners Aboriginal Corporation
Email:shanefrost@bigpond.com Phone: 49964325 Fax: 49964325 Mobile: 0428320671

Penny McCardle

From: Penny McCardle [mcheritage@iprimus.com.au]
Sent: Tuesday, 4 January 2011 4:04 PM
To: 'Shane Frost'
Subject: RE: Associated Documents for the Proposed Hexham Project

Hi Shane,

Thank you for your registration. I will send an information pack in the next few days.

I will only include your letter of registration in the report and keep the rates of pay and insurances confidential (rates of pay do go to the proponent)

Also, thank you for the Awabakal words and their meaning, this is the first time someone has done that!

Kind regards
Penny

Penny McCardle
Principal Archaeologist & Forensic Anthropologist
McCardle Cultural Heritage
PO Box 166
ADAMSTOWN NSW 2289
M: 0412 702 396
F: 02 4952 5501

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From: Shane Frost [mailto:awabakal_to@bigpond.com]
Sent: Tuesday, 4 January 2011 3:12 PM
To: mcheritage@iprimus.com.au
Subject: Associated Documents for the Proposed Hexham Project
Importance: High

"From the Mountains to the Sea"
AWABAKAL
Descendants Traditional Owners
Aboriginal Corporation
ICN:4500 ABN:20402046601

ALLA Penny,

Please find attached to this email our Certificates of Currency and a document outlining our schedule fees regarding any possible field work/assessments.

Looking forward to your reply.

NGI NOA
Shane Frost
Managing Director: Awabakal Descendants Traditional Owners Aboriginal Corporation
Email:awabakal_to@bigpond.com Phone:49964325/49964362 Fax:49964325 Mobile:0428320671

4 January 2011

Penny McCardle
McCardle Cultural Heritage
PO Box 166
Adamstown NSW 2289

Dear Penny

Re: Registration of Interest Regarding Consultation for Aboriginal Cultural Heritage Assessment for the Proposed Queensland Rail Project at Hexham

The Awabakal Traditional Owners would like to register our interest regarding the Proposed Aboriginal Cultural Heritage Assessment for the Proposed Queensland Rail Project at Hexham. We wish to be consulted with regard to the Aboriginal Cultural Heritage being undertaken as participants in the assessment and consultation process archaeological investigation for the proposed project.

The Awabakal People have a Primary Cultural Association with this area as the Hexham region is well within our Awabakal Traditional Cultural Boundary. The Awabakal Traditional Owners Aboriginal Corporation are descendants of the Awabakal people, our connection to our ancestral country is both physical and spiritual.

We would like to take this opportunity to clarify our position being the direct descendants of the Traditional Awabakal People of the Lake Macquarie and Newcastle Region.
As Awabakal Descendants our cultural association with our area (Awabakal region) is derived through the history of our ancestors Margaret and Ned of the Awabakal People, the original inhabitants of the land.

Margaret and Ned are a well documented Aboriginal couple of whom numerous newspaper articles and several books have recorded their lives within the Awabakal Nation. Margaret and Ned are remembered and celebrated in Lake Macquarie and have two Bays at Swansea respectfully named in their honour, Black Neds Bay and Margarets Bay. Margarets Bay was officially named by her descendants, and is adjacent to Parbury Park which in 1880 was part of a reserve set aside for the use of Margaret and her children.

The principle vision and aims of the Awabakal People is to protect the cultural heritage of our ancestors. Therefore, any artifacts and/or residual evidence of our people are held in high regard and are considered a cultural reminder that unites us with our country, our past and spirituality.

The Hexham region is regarded as highly significant to the Awabakal People, and was utilised by our people repeatedly for many purposes including ceremony, fishing, hunting and food gathering. This is evident by the vast amount of documentation recorded from the region. This evidence indicates a lifestyle of educational value of traditional occupation, and therefore demands the respect of the historical value that this particular and surrounding area provides.

We are a registered Aboriginal Corporation under the Federal Governments Aboriginal Corporations Act and we are registered with the Department of Environment, Climate Change and Water (DECCW).

Representatives of the Awabakal Traditional Owners Aboriginal Corporation involvement is crucial during any consultation process and subsequent assessment, given that our People have a primary connection with this area for thousands of years, and the Cultural Knowledge held by us relating to our Cultural Heritage and Traditional Country.

We would appreciate confirmation regarding our involvement in the proposed project at your earliest convenience, and If you require any further information please do not hesitate in contacting me.

Yours sincerely,

Kerrie Brauer
Director | Administration

Awabakal Traditional Owners Aboriginal Corporation
ABN: 90 203 408 390 | ICN: 4411
PO Box 253 Jesmond NSW 2299 Australia
T: 61 2 49 58 81 70 | E: info@awabakal.com.au | www.awabakal.com.au

Penny McCardle

From: Penny McCardle [mcheritage@iprimus.com.au]
Sent: Wednesday, 5 January 2011 9:40 AM
To: 'kerrie@awabakal.com.au'
Subject: RE: Registration of Interest for the Hexham Project

Hi Kerrie,

Thank you for your registration. MCH will forward you an information pack in a few days.

King Regards
Penny

Penny McCardle
Principal Archaeologist & Forensic Anthropologist
McCardle Cultural Heritage
PO Box 166
ADAMSTOWN NSW 2289
M: 0412 702 396
F: 02 4952 5501

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From: Kerrie Brauer [mailto:klbrauer@bigpond.com] **On Behalf Of** kerrie@awabakal.com.au
Sent: Tuesday, 4 January 2011 10:05 PM
To: mcheritage@iprimus.com.au
Cc: 'Shane Frost'
Subject: Re: Registration of Interest for the Hexham Project

Hi Penny,

Please find attached our Registration of Interest regarding the Queensland Rail Project at Hexham.

Kind regards,
Kerrie Brauer.

ATOAC
Kerrie Brauer | Director | Administration | Awabakal Traditional Owners Aboriginal Corporation
M: 04 12 86 63 57 | E: kerrie@awabakal.com.au | www.awabakal.com.au
PO Box 253 Jesmond NSW 2299 Australia

Penny McCardle

From: Patricia McCarthy [pmccarthy@ncc.nsw.gov.au]

Sent: Monday, 24 January 2011 5:59 PM

To: 'mcheritage@iprimus.com.au'

Subject: indigenous archaeological assessment at hexham

Dear Penny – I refer to your letter dated 13 December 2010, requesting Council's assistance in identifying Aboriginal stakeholder groups or persons interested in the Hexham project. I advise that the relevant contact is the Awabakal Local Aboriginal Land Council 4965 4532.

Regards

Patricia McCarthy

Acting Manager
Development & Building Services
City of Newcastle
282 King Street (PO Box 489)
NEWCASTLE NSW 2300
P: 4974 2793

Penny McCardle

From: Penny McCardle [mcheritage@iprimus.com.au]
Sent: Thursday, 6 January 2011 11:17 AM
To: 'david'
Subject: information pack for Hexham
Attachments: Main info pack survey.pdf; Info pack letter to ALALC.pdf

Hi David,

Please see the attached letter and information pack for the Hexham Project.

Kind regards
Penny

Penny McCardle
Principal Archaeologist & Forensic Anthropologist
McCardle Cultural Heritage
PO Box 166
ADAMSTOWN NSW 2289
M: 0412 702 396
F: 02 4952 5501

Penny McCardle

From: Penny McCardle [mcheritage@iprimus.com.au]
Sent: Thursday, 6 January 2011 11:19 AM
To: 'Shane Frost'
Subject: information pack for Hexham
Attachments: Main info pack survey.pdf; Info pack letter to ADTOAC.pdf

Hi Shane,

Please see the attached letter and information pack for the Hexham Project.

Kind regards
Penny

Penny McCardle
Principal Archaeologist & Forensic Anthropologist
McCardle Cultural Heritage
PO Box 166
ADAMSTOWN NSW 2289
M: 0412 702 396
F: 02 4952 5501

Penny McCardle

From: Penny McCardle [mcheritage@iprimus.com.au]
Sent: Thursday, 6 January 2011 11:18 AM
To: 'kerrie@awabakal.com.au'
Subject: information pack for Hexham
Attachments: Main info pack survey.pdf; Info pack letter to ATOAC.pdf

Hi Kerrie,

Please see the attached letter and information pack for the Hexham Project.

Kind regards
Penny

Penny McCardle
Principal Archaeologist & Forensic Anthropologist
McCardle Cultural Heritage
PO Box 166
ADAMSTOWN NSW 2289
M: 0412 702 396
F: 02 4952 5501