



**NORTH WEST RAIL LINK EARLY WORKS PROJECT
INDIGENOUS HERITAGE AND ARCHAEOLOGICAL CONSULTANCY
WEST ZONE**

**Aboriginal Cultural Heritage Assessment Report and
Methodology for Phase 1 and Phase 2 Salvage**

Prepared for Boulderstone Pty Ltd

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**North West Rail Link Early Works Project – West Zone
Aboriginal Cultural Heritage Assessment Report**

Portions of this document have been censored for reason of confidentiality to protect sensitive cultural information.

Contents

CONTENTS	II
FIGURES	III
TABLES	III
1 INTRODUCTION	1
1.1 CULTURAL HERITAGE ASSESSMENT REPORT	2
2 PROJECT DESCRIPTION	3
2.1 NWRL OBJECTIVES AND DESIGN ELEMENTS	3
2.2 EARLY WORKS ACTIVITIES	4
2.3 EARLY WORKS - WEST ZONE	5
2.4 REQUIRED ABORIGINAL HERITAGE EARLY WORKS - WEST ZONE	6
3 CONDITIONS OF APPROVAL FOR ABORIGINAL HERITAGE	8
4 CONSULTATION WITH REGISTERED ABORIGINAL STAKEHOLDERS	10
5 ARCHAEOLOGICAL BACKGROUND	11
6 IMPACT ASSESSMENT AND MITIGATION STRATEGIES	12
6.1 REQUIREMENTS FOR SALVAGE	12
6.2 MITIGATION STRATEGIES	12
7 SALVAGE METHODOLOGY	26
7.1 INVESTIGATION QUESTION – PAST LINKAGES	26
7.2 RESEARCH DESIGN	26
7.3 FIELD METHODS	27
7.4 SALVAGE COLLECTION	27
7.5 ANALYSIS	27
8 FIELD TEAM	28
9 MANAGEMENT MEASURES	29
9.1 PROCEDURES FOR HANDLING HUMAN REMAINS	30
9.2 PROCEDURES FOR PROPOSED CHANGES TO APPROVED PROJECT	30
9.3 PROCESS FOR CONTINUED CONSULTATION WITH ABORIGINAL STAKEHOLDERS	31
REFERENCES	32
APPENDIX A ABORIGINAL STAKEHOLDER CONSULTATION	33

Figures

Figure 1. NWRL Route Map (source http://northwestrail.com.au).....	1
Figure 2. NWRL Early Works Project – Indicative East-West Split (source: Boulderstone Pty Ltd).....	5
Figure 3. NWRL Early Works – West Zone, Aboriginal heritage study area	7
Figure 4. Aboriginal heritage - Bella Vista to Kellyville	13
Figure 5. Aboriginal heritage – Kellyville	14
Figure 6. Aboriginal heritage – Kellyville to Rouse Hill	15
Figure 7. Aboriginal heritage –Rouse Hill	16
Figure 8. Aboriginal heritage – Rouse Hill to Cudgegong Road	17
Figure 9. Aboriginal heritage – Cudgegong Road	18
Figure 10. Aboriginal heritage – Tallawong.....	19

Tables

Table 1. Early Works activities summary.....	4
Table 2. Minister’s Conditions of Approval related to Aboriginal heritage	8
Table 3. Aboriginal heritage in the Early Works – West Zone	11
Table 4. Salvage Program	20
Table 5. Lithic recording characteristics	28
Table 6. Project personnel	28

1 Introduction

Transport for NSW (TfNSW) is responsible for the design, construction and operation of the North West Rail Link (NWRL), a major transport infrastructure project for New South Wales.

State Government planning approval has been given to start building the NWRL, a 23km rail link to Sydney's growing North West region (see Figure 1).

The NWRL project involves:

- eight new railway stations at Cherrybrook, Castle Hill, Showground, Norwest, Bella Vista, Kellyville, Rouse Hill and Cudgegong Road;
- 15.5km of tunnels between Bella Vista and Epping;
- above ground construction, including a 4km viaduct structure ('Skytrain') between Bella Vista and Rouse Hill; and
- 4,000 commuter car parking spaces.

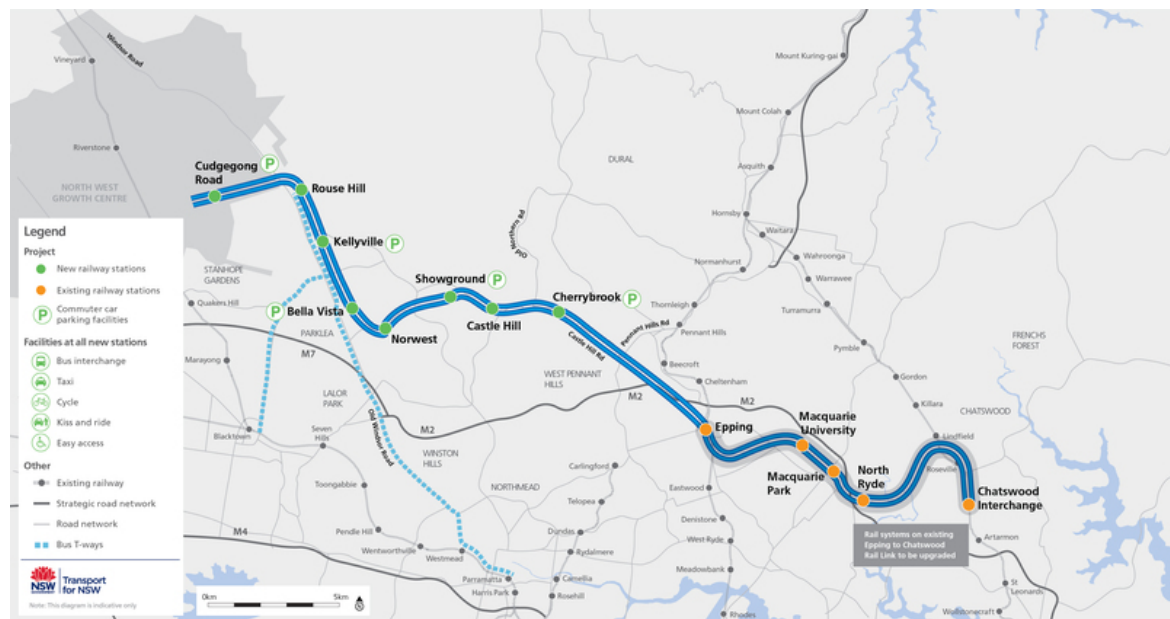


Figure 1. NWRL Route Map (source <http://northwestrail.com.au>)

As part of the planning approval, a number of conditions have been imposed by the Minister for Planning and Infrastructure. These included conditions relating to heritage and specifically to Aboriginal archaeological sites identified within the NWRL project area.

The project is progressing in stages. TfNSW engaged Boulderstone Pty Ltd (BPL) to manage the Early Works activities for the project. Early Works activities relate to tunnelling construction power supply, demolition, road adjustments, utilities and services relocation and miscellaneous works. The Early Works activities will have an impact on identified Aboriginal archaeological sites and an archaeological salvage program is required in accordance with conditions of project approval.

BPL has divided the Early Works activities into two work zones (East Zone and West Zone) to meet the scope of works required within the committed project construction timeframes. BPL engaged Kelleher Nightingale Consulting Pty Ltd (KNC) to undertake the required archaeological salvage program for the NWRL Early Works project - West Zone. The West Zone includes the section from Norwest Station to the stabling area at Tallawong Road at the western extent of the rail link project.

1.1 Cultural Heritage Assessment Report

This Cultural Heritage Assessment Report (CHAR) outlines:

1. a methodology for the archaeological salvage program for the West Zone, prepared in consultation with the registered Aboriginal stakeholders for the project, meeting Ministers Condition of Approval for the NWRL project; and
2. a management strategy for Aboriginal archaeological sites to guide future project construction activities, following the Early Works program. The principles and strategies for ongoing management of Aboriginal heritage established in the CHAR can be applied to the entirety of the NWRL project, including the construction and operation phases.

The CHAR sets out how required Early Works activities will be met for Aboriginal heritage, including:

- meeting conditions of project approval;
- being undertaken in consultation with registered Aboriginal stakeholders;
- establishing a methodology for the phase 1 Indigenous Heritage investigations of nominated construction sites; and
- providing a management strategy for the ongoing protection and management of Aboriginal heritage during the construction phase and operation of the NWRL.

2 Project Description

2.1 NWRL objectives and design elements

The NSW Government is committed to delivering an integrated and affordable transport system for the people of North West Sydney. The project objectives are to:

- provide a safe, high quality, integrated and affordable transport service;
- link existing communities and new growth areas in North West Sydney with jobs and services in the Global Economic Corridor (Macquarie Park –Chatswood – North Sydney – CBD);
- deliver a transport service that has been informed by engagement with communities and stakeholders and represents value for money;
- improve transport network reliability by facilitating a shift from road to rail for trips to and from the North West, to reduce bus and road congestion and improve amenity in the Sydney CBD;
- contribute to environmental and social sustainability by improving liveability and minimising impacts on the environment, stakeholders and the community; and
- support the Government’s objectives for population growth in the North West by increasing the potential for a range of housing and employment opportunities.

The North West Rail Link will provide eight new stations and services over a 23 kilometre addition to the CityRail network from Epping to Rouse Hill in North West Sydney (refer to figure 1). Stations are planned at Cherrybrook, Castle Hill, Showgrounds, Norwest, Bella Vista, Kellyville, Rouse Hill and Cudgegong Road. Bus, pedestrian, cycling and easy access facilities will be provided at all stations, with approximately 4000 park and ride spaces spread across five sites.

The rail link is designed to provide:

- approximately 300,000 residents in the north west with rail access to Epping, Macquarie Park, Chatswood, St Leonards, North Sydney and the Sydney CBD;
- new rail services to existing suburbs in the Hills District as well as future growth areas of the North West;
- improved travel time reliability compared with bus and private car;
- travel time savings from many areas of the north west area to the Sydney CBD and around the region, including Macquarie Park, Norwest Business Park and Rouse Hill Town Centre;
- increased services to Macquarie University and Macquarie Park area; and
- reduced bus congestion in the Sydney CBD in the long term.

Key elements of project delivery include:

- single deck, rapid transit service between Cudgegong Road and Chatswood;
- rolling stock – modern, single deck rapid transit carriages;
- eight new stations (Cherrybrook, Castle Hill, Showgrounds, Norwest, Bella Vista, Kellyville, Rouse Hill and Cudgegong Road);
- station precinct development with integration into the road and bus network;
- two elevated stations (at Rouse Hill and Kellyville) and an at grade station at Cudgegong Road;
- train stabling and maintenance facilities at Tallawong Road;
- 23 km of new track and rail infrastructure between Epping and Cudgegong Road;
- rail track and systems (power, ventilation, communication, signalling, etc);
- approximately 4 km of elevated rail track (‘Skytrain’) and 4 km of at grade track between Bella Vista and Cudgegong Road;
- excavations for the Cherrybrook, Castle Hill, Showgrounds, Norwest and Bella Vista Stations;
- approximately 15.5 km of twin running tunnels (approximately 6 metres in internal diameter) between Epping Station and Bella Vista Station. The running tunnels will be constructed primarily by tunnel boring machine;
- cross passages between the running tunnels;
- mined caverns, niches and openings for rail crossovers and equipment;
- permanent concrete lining of all tunnels, caverns, cross passages and underground openings which must allow for all future track bed and rail services fixings; and
- systems and stations on the existing 13 km Epping to Chatswood Rail Link upgraded to create an integrated service from Cudgegong Road to Chatswood.

2.2 Early Works activities

A number of activities are required to be carried out ahead of construction of the NWRL. These activities, referred to as the Early Works project, are required at 15 major worksites to allow site establishment and commencement of major works for construction of the NWRL.

The Early Works fall into four main categories:

- Tunnelling Construction Power – high voltage construction power supplies;
- Demolition – demolition of residential and commercial properties and/or facilities;
- Roads and Traffic – road adjustments, traffic signalling and transport relocations; and
- Precinct Preparation – utilities and services relocations and miscellaneous works.

Tunnelling power

Tunnelling power activities involve provision of high voltage power connections at the main tunnelling worksites to power the Tunnel Boring Machines and Road Headers during tunnel excavation.

Demolition

Demolition works involve the removal of existing commercial and residential buildings on the majority of properties in the project area in order to establish the project worksites. As well as the physical removal of structures, these works may include management of any hazardous materials identified and service disconnections (in strict compliance with safety and environmental requirements). Demolition activities are required to ensure that all above ground structures and associated services have been removed and any remaining hazards are made safe upon completion, prior to site access for construction.

Roads and Traffic

Modifications to existing roads and traffic arrangements are required at a number of worksites to allow for main worksite establishment or enable heavy vehicle access for construction. This may include road modifications, intersection and access changes, bus facilities relocations, transit way adjustments and relocation of utilities and services associated with the road and traffic modifications.

Precinct preparation

At a number of sites there are existing facilities which require adjustment or relocation prior to construction being able to commence. Precinct preparation works for each worksite are required prior to site establishment to provide unobstructed access for bulk excavation works. Tunnelling and Station civils are required at Epping, Cheltenham, Cherrybrook, Castle Hill, Showgrounds, Norwest, Bella Vista. Surface civils are required from Bella Vista to Tallawong inclusive.

Precinct preparation activities fall into three groups:

- Heritage and ecological investigations – further physical investigations at nominated specific areas to mitigate project impacts associated with heritage or ecological impacts;
- Utility service relocations – relocation or adjustment required for a number of utility services which could impact upon bulk excavation; and
- Other works – relocation or adjustment of other facilities (e.g. sporting facilities) required to facilitate construction.

Early Works activities required at worksites are summarised in the table below.

Table 1. Early Works activities summary

Activity		Worksites
Construction Power (Tunnelling)	Road header worksites	Epping, Castle Hill
	Tunnel Boring Machine worksites	Cherrybrook, Showgrounds, Bella Vista
Demolition	Tunnel worksites	Epping, Cheltenham, Cherrybrook, Castle Hill, Showgrounds, Norwest, Bella Vista station
	Surface worksites	Bella Vista to Tallawong inclusive
Roads and Traffic	Tunnel worksites	Epping, Cheltenham, Cherrybrook, Castle Hill, Showgrounds, Norwest, Bella Vista station
	Surface worksites	Bella Vista to Tallawong inclusive
Precinct Preparation	Tunnel worksites	Epping, Cheltenham, Cherrybrook, Castle Hill, Showgrounds, Norwest, Bella Vista station
	Surface worksites	Bella Vista to Tallawong inclusive

2.3 Early Works - West Zone

The provision of a number of Early Works activities has been split into two zones:

East Zone between Epping and Showgrounds Station; and

West Zone between Norwest and Tallawong Road

The study area for this CHAR/methodology is the **West Zone**.

The split was designed to reduce risks to project delivery, meet committed construction timeframes and work on multiple sites concurrently, allowing for scope flexibility. The indicative split of work zones is shown in Figure 2.

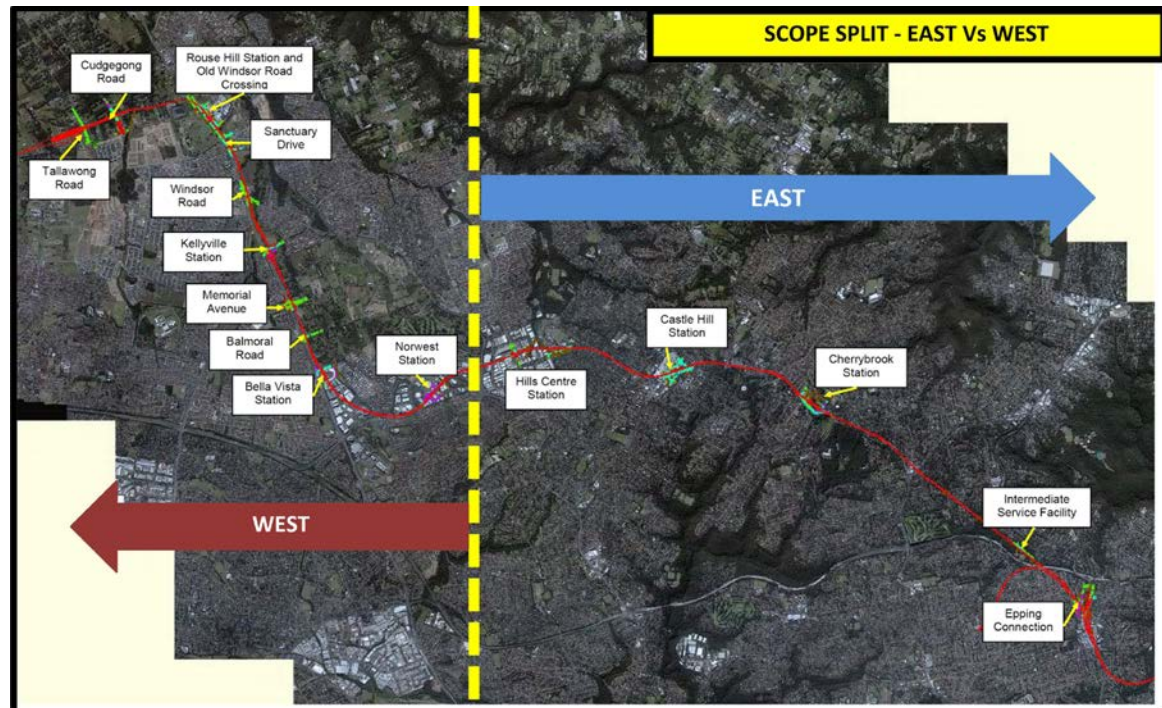


Figure 2. NWRL Early Works Project – Indicative East-West Split (source: Baulderstone Pty Ltd)

Early Works in the West Zone comprise activities at nine worksites:

1. Norwest station
2. Bella Vista station
3. Bella Vista to Kellyville
4. Kellyville station
5. Kellyville to Rouse Hill
6. Rouse Hill station
7. Rouse Hill to Cudgegong
8. Cudgegong station
9. Tallawong (stabling and maintenance facilities).

Two of these worksites, Norwest and Bella Vista stations, are tunnel worksites requiring provision of high voltage power connections to power the Tunnel Boring Machines during tunnel excavation. These worksites also require various demolition, roads and traffic, and precinct preparation works.

The remainder of the worksites in the West Zone (Bella Vista to Tallawong inclusive) are surface worksites. Early Works activities at surface worksites involve demolition, roads and traffic, and precinct preparation.

2.4 Required Aboriginal heritage Early Works - West Zone

Early Works activities for the West Zone include undertaking further Aboriginal heritage investigations at nominated sites. The required activities were identified through an assessment of known and potential heritage impacts undertaken as part of the EIS 1 process (GML 2012). In summary:

1. No further Aboriginal heritage investigations were required for the two tunnel worksites (Norwest or Bella Vista stations).
2. Further Aboriginal heritage investigations were required for the remainder of the West Zone including:
 - o Bella Vista to Kellyville
 - o Kellyville
 - o Kellyville to Rouse Hill
 - o Rouse Hill
 - o Rouse Hill to Cudgegong Road
 - o Cudgegong Road
 - o Tallawong

The locations of worksites which comprise the study area for Aboriginal heritage investigations in the West Zone are shown in Figure 3.

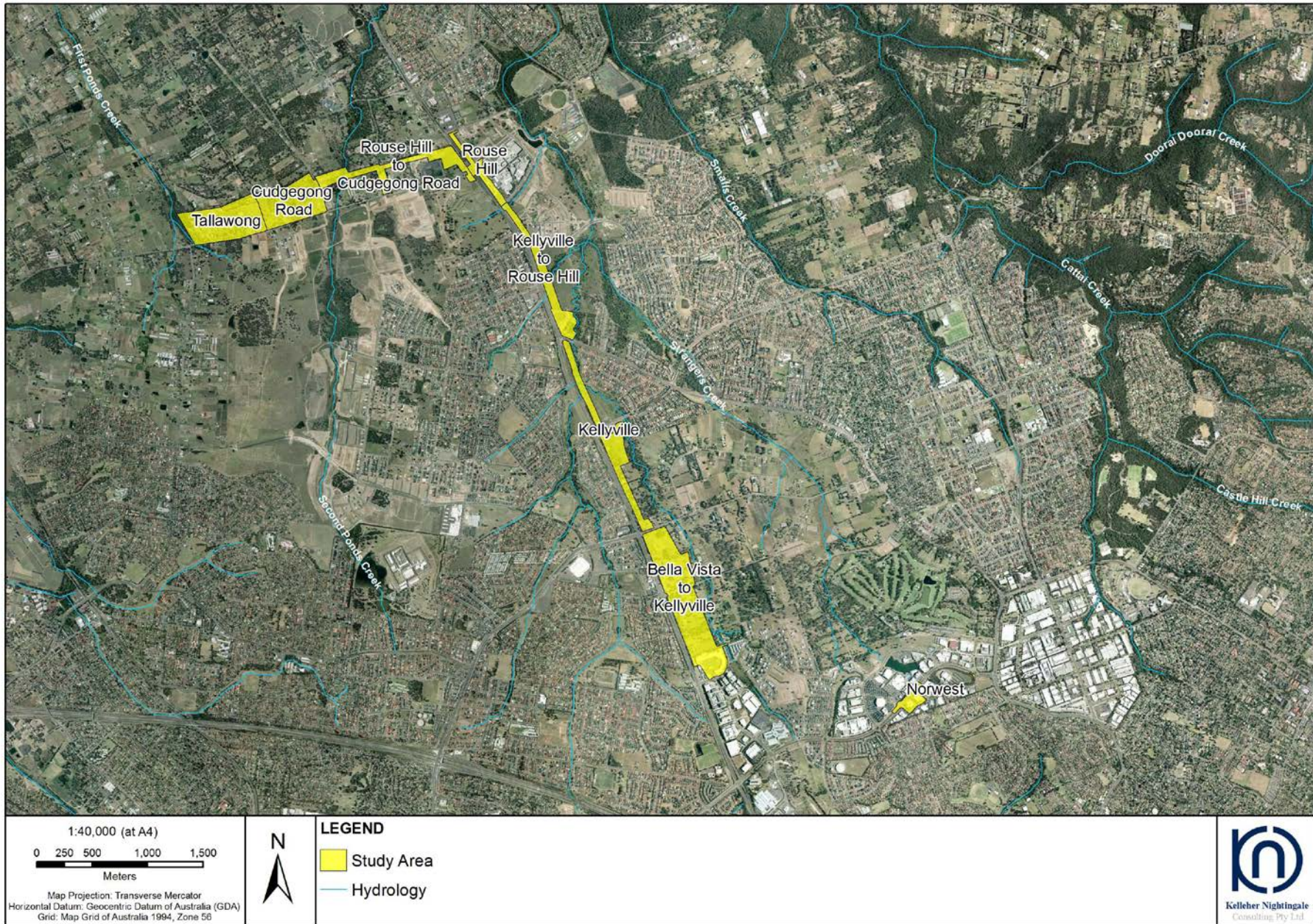


Figure 3. NWRL Early Works – West Zone, Aboriginal heritage study area

3 Conditions of Approval for Aboriginal Heritage

The Minister for Planning and Infrastructure granted Infrastructure Approval for the State significant infrastructure (SSI) project, under section 115ZB of the *Environmental Planning and Assessment Act 1979*, on 25 September 2012.

The approval was for major civil construction works for the North West Rail Link, including:

- a) Two 15.5 kilometre rail tunnels between Epping and Bella Vista, linking directly to the Epping to Chatswood Rail Line tunnel;
- b) Excavation works for underground railway station construction; and
- c) Above ground construction, including 4.2 kilometre Skytrain viaduct structure between Bella Vista and Rouse Hill and a stabling facility.

The approval was subject to a number of conditions, including conditions relating to heritage, which for the terms of the approval related to both Aboriginal and historic heritage. Specifically, conditions E7 and E9 of the Minister’s Conditions of Approval apply to the requirement for further investigation of Aboriginal heritage and form the basis for the scope of this CHAR.

In addition, the approval requires a Construction Heritage Management Plan be prepared as part of the Construction Environmental Management Plan, including details on how construction impacts on Aboriginal and historic heritage will be minimised and managed (condition E46e). Condition E42 relating to ancillary facilities also contained requirements relating to heritage. Information to assist the preparation of a Construction Heritage Management Plan for the NWRL is incorporated into section 9 of the CHAR.

Minister’s Conditions of Approval specifically related to Aboriginal heritage and how they have been addressed in this CHAR for the Early Works project are listed in the table below.

Table 2. Minister’s Conditions of Approval related to Aboriginal heritage

Condition	Requirement	Addressed in
E7	During detailed design and construction of the SSI, impacts to heritage items shall, where feasible and reasonable, be avoided and minimised, under the guidance of an appropriately qualified heritage specialist. Where impacts are unavoidable, works shall be undertaken in accordance with the strategy outlined in the Construction Heritage Management Plan (condition E46(e)).	Section 6
E9	Prior to the commencement of pre-construction and/ or construction activities that will impact the Aboriginal archaeological sites identified in table 7.3 of the North West Rail Link EIS: Technical Paper 4 – Indigenous Heritage, dated March 2012, the Proponent shall undertake an archaeological salvage program using a methodology prepared in consultation with the registered Aboriginal stakeholders, and to the satisfaction of the Director-General. This work shall be undertaken by an appropriately qualified archaeological heritage consultant. Within 2 years of completing the salvage, unless otherwise agreed by the Director General, the Proponent shall submit a report containing the findings of the salvage, including artefact analysis, and the identification of a final repository for any Aboriginal objects, prepared in consultation with the Aboriginal stakeholders and to the satisfaction of the Director-General.	Section 7 Section 9
E42(h)	Unless otherwise approved by the Director General, the location of Ancillary Facilities shall: (h) not impact on heritage items (including areas of archaeological sensitivity) beyond those already impacted by the SSI; The location of the ancillary facilities shall be identified in the Construction Environmental Management Plan (condition E46) and include consideration of the above criteria.	Section 9
E46(e)	As part of the Construction Environmental Management Plan for the SSI required under condition E45 the Proponent shall prepare and implement: (e) a Construction Heritage Management Plan to detail how construction impacts on Aboriginal and Historic heritage will be minimised and managed. The plan shall include, but not necessarily be limited to: (i) In relation to Aboriginal Heritage: I. developed in consultation with registered Aboriginal stakeholders; II. details of further investigation and identification of Aboriginal cultural heritage sites impacted by and within the construction areas except where the requirements of condition E9 have been met; III. details of management measures to be carried out in relation to Aboriginal heritage, including a detailed methodology and strategies for protection, monitoring, salvage, and conservation, of sites and items associated with the SSI and the long term storage and curation of any Aboriginal objects recovered in accordance the section 85A of the <i>National Parks and Wildlife Act</i> ;	Section 9.3 Sections 7 and 9 Sections 6, 7 and 9

	<p>IV. procedures for dealing with previously unidentified Aboriginal objects (excluding human remains) including cessation of works in the vicinity, assessment of the significance of the item(s) and determination of appropriate mitigation measures including when works can re-commence by a suitably qualified archaeologist in consultation with the Department, OEH and registered Aboriginal stakeholders and assessment of the consistency of any new Aboriginal heritage impacts against the approved impacts of the SSI, and registering of the new site in the OEH's Aboriginal Heritage Information Management System (AHIMS) register; and</p> <p>V. procedures for ongoing Aboriginal consultation and involvement for the duration of the SSI; and</p> <p>(iii) heritage training and induction processes for construction personnel (including procedures for keeping records of inductions) and obligations under the conditions of this approval including site identification, protection and conservation of Aboriginal and historic heritage;</p> <p>(iv) procedures for dealing with human remains, including cessation of works in the vicinity and notification of the Department, NSW Police Force, OEH and registered Aboriginal stakeholders and not recommencing any works in the area unless authorised by the NSW Police Force and/ or the Department; and</p> <p>(v) mechanisms for the monitoring, review and amendment of this plan.</p>	<p>Section 9</p> <p>Section 9.3</p> <p>Section 9</p> <p>Section 9.1</p> <p>Section 9</p>
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4 Consultation with Registered Aboriginal Stakeholders

The NWRL project is being undertaken in consultation with various stakeholders including government agencies, local councils and local communities.

There are 11 Aboriginal groups or individuals registered as stakeholders for consultation on the NWRL project. These stakeholders were identified, consulted and participated in the environmental assessment for the project. Stakeholder registration and consultation process followed the *Aboriginal cultural heritage consultation requirements for proponents 2010* (DECCW 2010). Aboriginal stakeholder input into EIS 1 supported the project and recommendations relating to Aboriginal heritage, including the need for further investigations including salvage.

Registered Aboriginal stakeholders on the NWRL project are:

- Metropolitan Local Aboriginal Land Council;
- Deerubbin Local Aboriginal Land Council;
- Parramatta City Council Aboriginal and Torres Strait Islander Advisory Committee;
- Mr Tony Williams;
- Darug Custodian Aboriginal Corporation;
- Darug Aboriginal Cultural Heritage Assessments;
- Darug Aboriginal Land Care Inc;
- Darug Land Observations;
- Yarrawalk/Tocomwall;
- Darug Tribal Aboriginal Corporation; and
- Gunjeewong Cultural Heritage Aboriginal Corporation.

Project approval required ongoing consultation with registered Aboriginal stakeholders. Ongoing consultation for the Early Works project has included:

- consideration and integration of stakeholder views for detailed design and impacts to items of Aboriginal heritage;
- stakeholder review and comment on the archaeological salvage methodology;
- stakeholder review and comment on a draft Aboriginal cultural heritage assessment report;
- stakeholder participation in the archaeological salvage program; and
- seeking stakeholder views and agreement for the identification of a final repository for any recovered Aboriginal objects.

A draft archaeological salvage methodology and cultural heritage assessment report was provided to registered Aboriginal stakeholders for review and comment, with a 28 day period for review and provision of written or oral comment. Comments provided are attached as Appendix A.

5 Archaeological Background

An Aboriginal heritage assessment was undertaken as part of EIS 1 for the NWRL (GML 2012). The assessment report described the ethnohistory, previous archaeological work, Aboriginal Heritage Information Management System (AHIMS) search data, landscape context, regional character and predictive model for the length of the NWRL route.

The assessment identified 27 Aboriginal archaeological sites and potential archaeological deposits would be impacted by the NWRL. 24 of these were located in the West Zone study area, between Bella Vista and Tallawong, and three in the East Zone between Epping and Showgrounds station. The lower number of sites in the eastern portion was primarily considered the result of past disturbance from existing development and land use, being the more urbanised portion of the NWRL.

The findings of the assessment formed the basis of requirements for Aboriginal heritage in the Minister’s Conditions of Approval.

For the Early Works project – West Zone, there were 24 locations of Aboriginal heritage which required further investigation and salvage. These included 17 Aboriginal archaeological sites and seven areas of potential archaeological deposit (PAD), summarised in the table below.

Table 3. Aboriginal heritage in the Early Works – West Zone

Worksite	Archaeological Sites and Potential Archaeological Deposits (PADs)		
	Name	AHIMS number	Description
Norwest	No sites or PAD identified		
Bella Vista station	No sites or PAD identified		
Bella Vista to Kellyville	WR-IF-1	45-5-3158	Isolated find
	BR01	45-5-3354	Artefact scatter and PAD
	Corner of Taggart Way and Balmoral Road	45-5-4195	Isolated find
	14 Cumbelege Lane (1) and NWRL PAD 6		Artefact scatter and PAD
	NWRL PAD 4		PAD
	NWRL PAD 5		PAD
	NWRL PAD 7		PAD
Kellyville	RH/CD9	45-5-0933	Artefact scatter and PAD
	KV/CD1 and NWRL PAD 8	45-5-2365	Artefact scatter and PAD
	NWRL PAD 9		PAD
Kellyville to Rouse Hill	Mungerie Park Open Artefact Scatter and associated PAD	45-5-3188	Artefact scatter and PAD
	NWRL PAD 10		PAD
Rouse Hill	NWRL PAD 11		PAD
Rouse Hill to Cudgegong Road	RH/SP15	45-5-2805	Artefact scatter and PAD
	SCR/UPG1	45-5-3355	Artefact scatter
	Pole 45 and Compound	45-5-3392	Artefact scatter and PAD
	RH/A20P 15	45-5-3930	Isolated find
	RH/A20P 16	45-5-3931	Isolated find
Cudgegong Road	RH/A20P 18	45-5-3933	Artefact scatter and PAD
	69 Schofields Road (SCR/UPG3 + PAD)	45-5-4112	Artefact scatter and PAD
	28 Tallawong Road	45-5-4187	Isolated find
	RH/A20P PAD 5		PAD
Tallawong	59 Schofields Road	45-5-4188	Artefact scatter
	65 Schofields Road		Isolated find

6 Impact Assessment and Mitigation Strategies

The Minister's Conditions of Approval required further consideration of impacts to heritage items during detailed design and construction of the SSI and where feasible and reasonable, avoid or minimise these impacts.

All of the identified Aboriginal archaeological sites recorded within the NWRL have been considered by TfNSW in relation to the Approved Project early works, construction and associated activities. Where significant sites or places were identified, where possible the design has been modified to avoid or limit the impact to identified archaeological sites. However, some impact to Aboriginal archaeological sites will occur as a result of the project. An archaeological salvage program has been prepared to mitigate the impact of the project on Aboriginal heritage and meet conditions of approval.

6.1 Requirements for salvage

Project approval required an archaeological salvage program prior to the commencement of pre-construction and/ or construction activities that impact identified Aboriginal archaeological sites (as per GML 2012:Table 7.3). The methodology for the archaeological salvage program was to be prepared in consultation with registered Aboriginal stakeholders and to the satisfaction of the Director-General and the work to be undertaken by an appropriately qualified archaeological heritage consultant.

The proposed archaeological salvage methodology addresses the salvage requirements at each of the identified sites, taking into account design modifications which have limited impacts to sites. Aboriginal heritage sites and items in the West Zone which require salvage in accordance with the Minister's Conditions of Approval are listed in Table 4.

The archaeological salvage methodology has been prepared in consultation with registered Aboriginal stakeholders and submitted to the Department of Planning and Infrastructure for confirmation that it is to the satisfaction of the Director-General.

6.2 Mitigation strategies

The NWRL West Zone contains 24 archaeological features consisting of: 17 archaeological sites and seven PADs (Figures 4-10).

Impact will occur to the 24 identified archaeological features within the project boundary. Specific mitigation strategies for each feature are outlined in Table 4. Table 4 provides the site reference, site type, a brief description, significance, impact and mitigation strategy. Mitigation methodology is presented in section 7.

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Figure 4. Aboriginal heritage - Bella Vista to Kellyville

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Figure 5. Aboriginal heritage – Kellyville

Map removed from public document.

Figure 6. Aboriginal heritage – Kellyville to Rouse Hill

Map removed from public document.

Figure 7. Aboriginal heritage –Rouse Hill

Map removed from public document.

Figure 8. Aboriginal heritage – Rouse Hill to Cudgegong Road

Map removed from public document.

Figure 9. Aboriginal heritage – Cudgegong Road

Map removed from public document.

Figure 10. Aboriginal heritage – Tallawong

Table 4. Salvage Program

SITE NAME AND AHIMS #	SITE TYPE	DESCRIPTION	SIGNIFICANCE / POTENTIAL	IMPACT ASSESSMENT	SALVAGE PROGRAM
Bella Vista to Kellyville					
45-5-3158 WR-IF-1	Isolated find	Site located on an upper hill slope approximately [redacted] of Elizabeth Macarthur Creek. The site was [redacted] to Taggart Way and approximately [redacted] of Balmoral Road. The site consisted of one red silcrete artefact. The area of the site was assessed as heavily disturbed and without PAD.	Low	Will be impacted	Artefact salvaged through surface collection with Aboriginal stakeholders.
45-5-3354 BR01	Artefact scatter and potential archaeological deposit (PAD)	Site located on the floodplain and lower hill slopes adjacent to the [redacted] bank of Elizabeth Macarthur Creek. The site was approximately [redacted] of Balmoral Road and [redacted] of Taggart Way. The site consisted of a moderate density artefact scatter (19 artefacts) spread over a [redacted] metre area and an associated PAD. The site is part of a large complex including NWRL PADs 4 and 7. Although containing some areas of disturbance from farming activities, the possibility of having intact subsurface deposit was assessed as being high and patches of Cumberland Plain Woodland supported this conclusion.	Moderate to High	Will be impacted	Phase 1 archaeological excavation. If significant archaeological deposit is identified undertake Phase 2 salvage excavation.
45-5-4195 Corner of Taggart Way and Balmoral Road	Isolated find	Site located on an upper hill slope approximately [redacted] of Elizabeth Macarthur Creek. The site was approximately [redacted] of Balmoral Road and [redacted] of Taggart Way. The site consisted of one silcrete core with three negative flake scars. The area of the site was assessed as disturbed with no further archaeological potential.	Low	Will be impacted	Artefact salvaged through surface collection with Aboriginal stakeholders.
14 Cumbelege Lane (1) and NWRL PAD 6	Artefact scatter and potential archaeological deposit (PAD)	Site located on hill slope and crest adjacent to the [redacted] of Elizabeth Macarthur Creek. The site was adjacent to [redacted] and approximately [redacted] of Balmoral Road. The site consisted of a moderate density artefact scatter (18 artefacts) and an associated PAD. The PAD was defined by an area of Cumberland Plain Woodland approximately [redacted] metres in size. The presence of Cumberland Plain Woodland suggested the subsurface deposit has not been extensively impacted by modern disturbance. The proximity to a creek and topographic location on a hill slope also supported the potential for archaeological deposit at this location.	Moderate to High	Will be partially impacted (portion of site exists outside of project boundary)	Phase 1 archaeological excavation in areas of impact. If significant archaeological deposit is identified undertake Phase 2 salvage excavation.
NWRL PAD 4	Potential archaeological deposit (PAD)	Site located mid-slope, approximately [redacted] of Elizabeth Macarthur Creek. The site was approximately [redacted] of Taggart Way and [redacted] ([redacted]) to Balmoral Road. The PAD was contained within a copse of Cumberland Plain Woodland and measured approximately [redacted] metres. The presence of Cumberland Plain Woodland suggested the subsurface deposit had not been extensively impacted by modern disturbance. The proximity to a creek and topographic location on a hill slope also supported the potential for archaeological deposit at this location. This PAD is part of a larger complex of sites including 45-5-3354 (BR01).	Moderate	Will be impacted	Phase 1 archaeological excavation. If significant archaeological deposit is identified undertake Phase 2 salvage excavation.

SITE NAME AND AHIMS #	SITE TYPE	DESCRIPTION	SIGNIFICANCE / POTENTIAL	IMPACT ASSESSMENT	SALVAGE PROGRAM
NWRL PAD 5	Potential archaeological deposit (PAD)	Site located on an upper hill slope, approximately [redacted] of Elizabeth Macarthur Creek. The site was bound by Balmoral Road [redacted] and Cumbelege Lane [redacted]. The PAD was contained within a copse of Cumberland Plain Woodland and measured approximately [redacted] metres. The presence of Cumberland Plain Woodland suggested the subsurface deposit had not been extensively impacted by modern disturbance. The proximity to a creek and topographic location on a hill slope also supported the potential for archaeological deposit at this location.	Moderate	Will be impacted	Phase 1 archaeological excavation. If significant archaeological deposit is identified undertake Phase 2 salvage excavation.
NWRL PAD 7	Potential archaeological deposit (PAD)	Site located on a lower to mid hill-slope and [redacted] to Elizabeth Macarthur Creek. The site was approximately [redacted] of Taggart Way and [redacted] of Burns Road. The PAD was contained within a copse of Cumberland Plain Woodland and measured approximately [redacted] metres. The presence of Cumberland Plain Woodland suggested the subsurface deposit had not been extensively impacted by modern disturbance. The proximity to a creek and topographic location on a hill slope also supported the potential for archaeological deposit at this location.	Moderate	Will be partially impacted (portion of site exists outside of project boundary)	Phase 1 archaeological excavation in areas of impact. If significant archaeological deposit is identified undertake Phase 2 salvage excavation.
Kellyville					
45-5-0933 RH/CD9	Artefact scatter and potential archaeological deposit (PAD)	Site located across a large area that included the floodplain and hill slopes adjacent to the [redacted] of Caddies Creek and the floodplain and hillslope adjacent to the [redacted] of Caddies Creek after its division from Elizabeth Macarthur Creek. The site was bound by [redacted] to the [redacted], [redacted] to the [redacted] and [redacted] to the [redacted]. Test excavation was conducted at the site in 1993 with a total of 115 artefacts recovered (Brayshaw and McDonald 1993:Table 6.1). The area tested extended from approximately [redacted] junction of Caddies and Elizabeth Macarthur Creeks to the corner of Old Windsor and Windsor Roads (Brayshaw and McDonald 1993:Map 3). The associated PAD appeared to consist of the [redacted] portion of the site, from Samantha Riley Drive to the edge of the test excavation area encompassing an area of approximately [redacted] metres. The PAD was assessed as having low level disturbance and moderate to high archaeological potential (GML 2012:Table 5.2).	Moderate to High	Will be impacted	Phase 1 archaeological excavation. If significant archaeological deposit is identified undertake Phase 2 salvage excavation.
45-5-2365 KV/CD1 and NWRL PAD 8	Artefact scatter and potential archaeological deposit (PAD)	Site located across a large area that included portions of the western slope, floodplain, creek bank, eastern hill slope and a part of Elizabeth Macarthur Creek. The site was approximately [redacted] of Windsor Road and [redacted] of Memorial Avenue. Four artefacts were found by Brayshaw and McDonald (1994) on a [redacted] exposure located [redacted] of Elizabeth Macarthur Creek and located close to the [redacted] border of the site. The area was designated KV/CD1 and assessed as having limited potential due to the shallow deposit and modern disturbance (Brayshaw and McDonald 1994:13). The associated PAD contained clusters of Cumberland Plain Woodland with intermittent areas of clearance. The site encompassed an area of approximately [redacted] metres. The presence of Cumberland Plain Woodland suggested the subsurface deposit had not been extensively impacted by modern disturbance. The	Low to Moderate	Will be partially impacted (portion of site exists outside of project boundary)	Phase 1 archaeological excavation in areas of impact. If significant archaeological deposit is identified undertake Phase 2 salvage excavation.

SITE NAME AND AHIMS #	SITE TYPE	DESCRIPTION	SIGNIFICANCE / POTENTIAL	IMPACT ASSESSMENT	SALVAGE PROGRAM
		cleared areas were considered to suggest some modern disturbance had occurred at the site and it was therefore was assessed as having low to moderate potential (GML 2012:Table 5.2).			
NWRL PAD 9	Potential archaeological deposit (PAD)	Site located on a hill top, adjacent to the [redacted] of Elizabeth Macarthur Creek. The site was approximately [redacted] of Old Windsor Road and [redacted] of Samantha Riley Drive. The PAD area consisted of a mixture of Cumberland Plain Woodland [redacted] and exotic trees [redacted]. The area measured approximately [redacted] metres. The presence of Cumberland Plain Woodland suggested the subsurface deposit had not been extensively impacted by modern disturbance. The proximity to a creek and topographic location on a hill slope also supported the potential for archaeological deposit at this location.	Moderate	Will be impacted	Phase 1 archaeological excavation. If significant archaeological deposit is identified undertake Phase 2 salvage excavation.
Kellyville to Rouse Hill					
45-5-3188 Mungerie Park Open Artefact Scatter and associated PAD	Artefact scatter and potential archaeological deposit (PAD)	Site located on the floodplain and low to middle hill slopes, [redacted] of a tributary of Caddies Creek. The site was [redacted] to White Hart Drive and approximately [redacted] metres [redacted] of Windsor Road. Four artefacts were found within [redacted] metres of each area approximately [redacted] metres northwest of Picket Place. The PAD consisted of an area of Cumberland Plain Woodland on the mid slope [redacted] and exotic vegetation on the lower slopes and flood plain [redacted]. The site area had approximate dimensions of [redacted] metres. The presence of Cumberland Plain Woodland and proximity to a creek suggested that Aboriginal artefacts may have been deposited in this area and there was potential for intact subsurface deposit. Portions of the site have been impacted by agricultural activity.	Moderate	Will be impacted	Phase 1 archaeological excavation. If significant archaeological deposit is identified undertake Phase 2 salvage excavation.
NWRL PAD 10	Potential archaeological deposit (PAD)	Site located on the floodplain and adjacent lower slopes to the [redacted] of a tributary of Caddies Creek. The site was approximately [redacted] of Windsor Road and [redacted] of Sanctuary Drive. The PAD consisted of an area of river flat eucalypt forest on the [redacted] of the tributary creek and exotic vegetation [redacted]. The site area had approximate dimensions of [redacted] metres. The site was assessed as having low-moderate potential (GML 2012:Table 5.4).	Low to Moderate	Will be partially impacted (portion of site exists outside of project boundary)	Phase 1 archaeological excavation in areas of impact. If significant archaeological deposit is identified undertake Phase 2 salvage excavation.
Rouse Hill					
NWRL PAD 11	Potential archaeological deposit (PAD)	Site located on hill slopes overlooking Second Ponds Creek and associated flood plain. The site was bound by [redacted] and split in two ([redacted] [redacted]) by Schofields Road. The site was approximately [redacted] metres [redacted] of Caddies Creek and [redacted] metres [redacted] of Second Ponds Creek. A portion of NWRL PAD 11 was excavated and one artefact was recovered demonstrating a low archaeological potential (GML 2011:13). NWRL PAD 11 contained patches of Cumberland Plain Woodland in close proximity to Schofields Road and in the northwestern portion of the site. The remainder of the area had exotic vegetation.	Low to Moderate	Will be partially impacted (portion of site exists outside of project boundary)	Limited Phase 1 archaeological excavation in areas of impact to confirm general absence of dense archaeological deposit. If significant archaeological deposit is identified undertake Phase 2 salvage excavation.

SITE NAME AND AHIMS #	SITE TYPE	DESCRIPTION	SIGNIFICANCE / POTENTIAL	IMPACT ASSESSMENT	SALVAGE PROGRAM
Rouse Hill to Cudgegong					
45-5-2805 RH/SP15	Artefact scatter and potential archaeological deposit (PAD)	Site located on the lower slopes and floodplain adjacent to the [redacted] of Second Ponds Creek. The site was approximately [redacted] of Schofields Road and [redacted] of Cudgegong Road. The site consisted of two areas of visible artefacts and an associated PAD (JMCD CHM 2002: 42). Five artefacts were observed at the site (JMCD CHM 2002: 42). The site [redacted] an area of Cumberland Plain Woodland along the [redacted] and River Flat Eucalyptus Forest around Second Ponds Creek. Elsewhere, areas of modern disturbance were present including a domestic garden, animal enclosures and a ploughed paddock (JMCD CHM 2002: 42). The presence of Cumberland Plain Woodland and River Flat Eucalyptus Forest suggested the subsurface deposit in these areas had not been extensively impacted by modern disturbance. The proximity to a creek and surface artefacts also supported the potential for archaeological deposit at this location.	Moderate	Will be partially impacted (portion of site exists outside of project boundary)	Phase 1 archaeological excavation in areas of impact. If significant archaeological deposit is identified undertake Phase 2 salvage excavation.
45-5-3355 SCR/UPG1	Artefact scatter	Site located on a lower hill slope overlooking Second Ponds Creek. The site was [redacted] to the [redacted] of Cudgegong Road and approximately [redacted] metres [redacted] of Schofields Road. One silcrete flaked piece was recorded at the site. However, an additional survey in the area found 2 silcrete flakes at the same location (GML 2012:Table 5.1). The artefacts were located in the [redacted] and the area was identified as disturbed (GML 2012:Table 5.1).	Low	Will be impacted	Artefact salvaged through surface collection with Aboriginal stakeholders.
45-5-3392 Pole 45 and Compound	Artefact scatter and potential archaeological deposit (PAD)	Site located in [redacted]. The site was [redacted] Schofields Road to the [redacted] and Cudgegong Road to [redacted]. The site was positioned on a lower hill slope overlooking Second Ponds Creek, approximately [redacted] from the [redacted] corner of the [redacted] and approximately [redacted] from the [redacted]. Test excavation was conducted at the site prior to the construction of the existing [redacted]. Twenty eight artefacts were recovered from eight trenches (Hardy 2007:27). A further eight artefacts were identified during monitoring activities at the site and 83 recovered from additional testing in the [redacted] (Hardy 2008: 26, 45). The site was assessed as having a moderate to high archaeological potential (GML 2012: Table 6.2).	Moderate to High	Will be impacted	Phase 1 archaeological excavation in areas of impact. If significant archaeological deposit is identified undertake Phase 2 salvage excavation.
45-5-3930 RH/A20P 15	Isolated find	Site located on a lower hill slope, approximately [redacted] of Second Ponds Creek. The site was approximately [redacted] of Schofields Road and [redacted] of Terry Road. The site consisted of one pink silcrete core with 5 negative flake scars (KNC 2009: Table 6). The site was within Cumberland Plain Woodland and disturbance within the area was minimal (KNC 2009:Table 3). The site was assessed as having a low scientific value resulting from modern disturbance caused by the construction of a dam (GML 2012:Table 5.2).	Low	Will be impacted	Artefact salvaged through surface collection with Aboriginal stakeholders.
45-5-3931 RH/A20P 16	Isolated find	Site located mid slope, approximately [redacted] of Second Ponds Creek. The site was on a [redacted], approximately [redacted] of Schofields Road and [redacted] of Terry Road. The site consisted of a red silcrete flake (KNC 2009:Table 6). The site was assessed as highly disturbed (KNC 2009: Table 5).	Low	Will be impacted	Artefact salvaged through surface collection with Aboriginal stakeholders.

SITE NAME AND AHIMS #	SITE TYPE	DESCRIPTION	SIGNIFICANCE / POTENTIAL	IMPACT ASSESSMENT	SALVAGE PROGRAM
Cudgegong					
45-5-3933 RH/A20P 18	Artefact scatter and potential archaeological deposit (PAD)	Site located within [redacted], [redacted], and [redacted] of [redacted]. The site was less than [redacted] metres from the [redacted] of Cudgegong Road and approximately [redacted] metres from Schofields Road. The site was positioned on a hill slope with a [redacted] overlooking Second Ponds Creek, approximately [redacted] metres away. The site consisted of seven silcrete artefacts located across several exposures in the [redacted] part of the site (KNC 2009:43). The site was revisited by GML and only three silcrete artefacts were observed (GML 2012: Table 5.1). The associated PAD had approximate dimensions of [redacted] metres. The [redacted] portion of the site contained Cumberland Plain Woodland, while the remainder had been cleared for agriculture. The PAD was within [redacted] of Second Ponds Creek. The presence of Cumberland Plain Woodland suggested there was potential for intact subsurface deposit in this area. The site was assessed as exhibiting moderate significance and salvage excavation was recommended (KNC 2009:Table 5).	Moderate	Will be impacted	Phase 1 archaeological excavation. If significant archaeological deposit is identified undertake Phase 2 salvage excavation.
45-5-4112 69 Schofields Road (SCR/UPG3 + PAD)	Artefact scatter and potential archaeological deposit (PAD)	Site located within [redacted] and [redacted] of [redacted]. The site was [redacted] to the [redacted] of Tallawong Road and approximately [redacted] metres from Schofields Road. The site was positioned on a minor ridge overlooking First Ponds Creek, approximately [redacted] metres to the [redacted] and Second Ponds Creek, approximately [redacted] metres to the [redacted]. The site consisted of two silcrete artefacts identified during survey (GML 2011a: 16). A portion of the site was subsequently test excavated and three artefacts were found (KNC 2012:11). The associated PAD had approximate dimensions of [redacted] metres and located within an area of Cumberland Plain Woodland. The presence of Cumberland Plain Woodland suggested there was potential for intact subsurface deposits in this area.	Moderate	Will be impacted	Phase 1 archaeological excavation. If significant archaeological deposit is identified undertake Phase 2 salvage excavation.
45-5-4187 28 Tallawong Road	Isolated find	Site located on an upper hill slope, approximately [redacted] metres [redacted] of Second Ponds Creek. The site was approximately [redacted] metres [redacted] of Schofields Road and [redacted] metres [redacted] of Tallawong Road. The site consisted of one red silcrete flaked piece (GML 2012:67). The site was assessed as moderately disturbed due to past ploughing and it was concluded that the site had low archaeological potential(GML 2012:67.)	Low	Will be impacted	Artefact salvaged through surface collection with Aboriginal stakeholders.
RH/A20P PAD 5	Potential archaeological deposit (PAD)	PAD located in [redacted]. The area was approximately [redacted] metres from Cudgegong Road and [redacted] metres [redacted] of Schofields Road. The site was positioned on the upper and mid slope of a [redacted] hill slope overlooking Second Ponds Creek, approximately [redacted] metres away. The site contained areas of Cumberland Plain Woodland and cleared areas that had been used for agriculture. Subsurface disturbance was identified in a small strip running parallel to the [redacted] boundary of [redacted] (KNC 2009:52). The site was assessed as having moderate archaeological potential (GML 2012: Table 6.2).	Moderate	Will be partially impacted (portion of site exists outside of project boundary)	Phase 1 archaeological excavation in areas of impact. If significant archaeological deposit is identified undertake Phase 2 salvage excavation.

SITE NAME AND AHIMS #	SITE TYPE	DESCRIPTION	SIGNIFICANCE / POTENTIAL	IMPACT ASSESSMENT	SALVAGE PROGRAM
Tallowong					
45-5-4188 59 Schofields Road	Artefact scatter	<p>Site located in [redacted]. The site was less than [redacted] metres from the [redacted] edge of Schofields Road along the [redacted] boundary and approximately [redacted] metres [redacted] of Tallowong Road. The site encompassed a mid to lower hill slope with a [redacted] overlooking First Ponds Creek, approximately [redacted] metres away.</p> <p>Six artefacts were identified in areas of modern disturbance caused by agriculture (GML 2012:67). The site contained an area of River Flat Eucalypt Forest adjacent to First Ponds Creek. The remainder of the site had been cleared for agricultural use. The presence of River Flat Eucalypt Forest suggested there was potential for intact subsurface deposits in this area. Moderate to high levels of disturbance were reported within the cleared area because of ploughing (GML 2012: 67). The site was assessed as having a moderate archaeological potential and scientific value (GML 2012:Table 6.2).</p>	Moderate	Will be impacted	Phase 1 archaeological excavation. If significant archaeological deposit is identified undertake Phase 2 salvage excavation.
65 Schofields Road	Isolated find	<p>Site located on an upper hill slope, approximately [redacted] metres [redacted] of First Ponds Creek. The site was approximately [redacted] metres [redacted] of Schofields Road and [redacted] metres [redacted] of Tallowong Road.</p> <p>The site consisted of one silcrete core and one silcrete flaked piece (GML 2012:67). The site was located on a [redacted] and it was concluded that it had low archaeological potential (GML 2012:67).</p>	Low	Will be impacted	Artefact salvaged through surface collection with Aboriginal stakeholders.

7 Salvage Methodology

The aim of the proposed salvage methodology is to identify and salvage Aboriginal archaeological objects within the project boundary for the NWRL in accordance with the project approval.

Two phases of salvage are undertaken during the archaeology program: Phase 1 excavation and Phase 2 detailed salvage excavation. Phase 1 excavation will identify where significant subsurface Aboriginal archaeological deposits are located within the project boundaries. Phase 2 salvage excavations will be undertaken where significant Aboriginal archaeological deposits were located during Phase 1.

Significant Aboriginal archaeological deposits are determined by a series of triggers (described below in section 7.3) identifying significant quantities of objects and/or other archaeological features worthy of further investigation.

Where Phase 1 results determine the archaeological deposit is not significant, no triggers exist for salvage, no further archaeological assessment will be necessary or warranted and construction activities may proceed in accordance with the project approval.

24 Aboriginal archaeological features exist within the West Zone of the NWRL. 17 archaeological sites and seven PADs require salvage mitigation in accordance with the project approval.

7.1 Investigation question – Past linkages

The Aboriginal archaeology of the northwest Cumberland Plain has been assessed by numerous small and large scale studies, notably centering on Caddies Creek, Second Ponds Creek and Eastern Creek. Some of these studies and the models they develop are insightful and offer a glimpse into Sydney's Aboriginal past, but none are truly all-encompassing assessments of the cultural fabric of the Cumberland Plain. Mitigative research is necessarily limited to specific boundaries which hampers an archaeological assessment of landscape. Cultural landscape is defined by connections between places, the current library of studies documents numerous places but few connections. Archaeological research of the Cumberland Plain is now at a tipping point, in order to further the Aboriginal past we must look at how the places fit together, in other words how identified archaeological sites link (or not link) together in space and time. The NWRL project offers an opportunity to investigate linkages because the design of the project itself and the land it encompasses is a physical link across the Cumberland Plain.

The research question is to examine:

differences in the archaeological record along the NWRL as reflecting potential links (or divisions) between places on the Cumberland Plain.

Archaeological connections between places (archaeological sites or landforms) will be visible in the range of activities expressed by changes in the lithic assemblage.

7.2 Research design

To answer the research question KNC propose a salvage excavation design as follows:

- To salvage a representative sample of the identified archaeological site prior to development impact.
- From this sample, assess changes in lithic assemblages distributed across the study area.
- Analysis of the salvaged archaeological material to gain and conserve knowledge and understanding of the scientific and cultural information exhibited by the activities associated with the study area.
- Use the excavation results to gain insight into the subsurface archaeology of the adjacent areas not being impacted by construction. This will allow an increase in future educational opportunities and a more informed management of the wider area.

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

- Determining the integrity of the deposit involves assessing the degree of disturbance which is present.
- Determining the statistical extent of the sites and/or activity areas involves identifying the boundaries associated with the identified archaeological deposit.

- Assessing the spatial distribution involves identifying the presence/absence of archaeological material across the identified archaeological sites.
- The nature of the sites refers to the type of activities indicated by the artefactual material (e.g. primary production, domestic knapping, hunting camps). The goal would be to retrieve entire assemblages from specific activities if such activities were present.
- Retrieved assemblages would be compared with the results from other relevant archaeological projects (e.g. Second Ponds Creek, Catties Creek, Eastern Creek and Rouse Hill) in order to assess significance.

7.3 Field methods

Phase 1 Excavation

Phase 1 excavation will be undertaken for sites/PADs as detailed in Table 4. Phase 1 excavation is designed to establish the subsurface archaeological significance of the project area. Phase 1 consists of one square metre excavation squares strategically distributed along transects within identified archaeological sites and potential archaeological deposits. Excavation squares on each transect will be placed at 20m and 40m intervals. The number of squares required at each location will depend on the degree of disturbance, geomorphology, archaeological potential of the soil matrix and identified archaeological deposit.

Excavation squares will be hand excavated in stratigraphic units. Squares will be excavated until the basal layer or culturally sterile deposit is reached. The initial squares at each location will be excavated well into the sterile unit to confirm the absence of artefacts. Previous excavation of the podzolic soils associated with the area indicates no archaeological stratigraphy within units. As such the A1 and A2 soil layers are culturally one layer (suffering from cyclical soil transfer resulting in a mixed cultural profile within the soil) and can be salvaged as one unit where possible.

All excavated deposit will be wet sieved on 2.5mm and 5.0mm nested sieves. All artefacts would be collected and bagged. The location of each square will be identified on a surveyed plan of the site. Stratigraphic section detailing the stratigraphy and features within the excavated deposit will be drawn and all squares will be photographed. Soil and carbon samples will also be collected for analysis. Detailed geomorphological analysis will be undertaken where appropriate.

If significant Aboriginal archaeology is not identified during Phase 1, no further salvage excavation is required. If significant Aboriginal archaeology is identified Phase 2 salvage excavation will be required.

Triggers (following GML 2012) for the identification of significant Aboriginal archaeology include:

- soil horizons with good condition and integrity;
- any archaeological feature and/or the presence of more than 10 objects per square meter;
- objects exhibiting a range of diagnostic characteristics;
- chronological material and/or taphonomic indicators; and
- located within a landform suitable for open area salvage.

Phase 2 Salvage Excavation

Phase 2 open area salvage will be undertaken where Phase 1 results identify triggers related to presence of significant Aboriginal archaeology. Phase 1 results will delineate the spatial extent of Phase 2 salvage. The excavation method for Phase 2 salvage excavation is the same as Phase 1, however the scope is larger. Phase 2 excavation involves open area salvage encompassing approximately 50-100m² contiguous squares with the aim of recovering entire activity areas or until a diminished return is evident in the archaeological information.

7.4 Salvage collection

The surface artefacts will be collected with the assistance of Aboriginal stakeholders from the sites specified in Table 4. The salvaged artefacts will be labelled and bagged with location information. The artefacts will be documented in the excavation report.

7.5 Analysis

Collected information will be assessed in accordance with archaeological best practice. Geomorphological information will be assessed by Dr Matthew Kelleher and specialist geomorphologist where required.

A range of stone artefacts may be present within the study area and the analysis would expand accordingly to account for artefact variability. All information would be recorded in database form (MS Excel). A short description of the proposed analysis is outlined below.

- Field analysis would record basic data, such as material type, number, and any significant technological characteristics, such as backing or bipolar techniques; added to this would be any provenance data such as square ID and spit number. The purpose of the field recording is twofold: 1) establish a basic recording of artefacts retrieved and 2) to allow on-going assessment of the excavation regime (e.g. whether higher stratigraphic resolution is required while excavating).
- Detailed (laboratory) analysis would entail recording a larger number of characteristics for each individual artefact. These details would be recorded in matrices suitable for comparative analysis (e.g. multivariate and univariate) of the assemblage on a local and regional basis.
- Lithic characteristics to be recorded cover a range of basic information but are not limited to these categories (see Table 5).

Table 5. Lithic recording characteristics

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

- Minimum Number of Flake (MNF) calculations formulated by Hiscock (2000, 2002) will be undertaken where applicable.

The analysis of artefacts recovered during the excavation program would be undertaken in a transparent and replicable fashion so as to permit the comparison of the NWRL material with previous and subsequent investigations. An archaeological report detailing the findings of the salvage program will be completed to the satisfaction of DP&I, in accordance with the Minister's Conditions of Approval.

8 Field Team

KNC directors, Dr Matthew Kelleher and Alison Nightingale, would be responsible for the excavation program. Dr Matthew Kelleher would direct the excavation component of the Aboriginal archaeological assessment. Matthew has extensive experience in managing large scale archaeological excavations and research projects.

The proposed field team personnel, roles and tasks are listed in the table below.

Table 6. Project personnel

Personnel	Role	Tasks
Dr Matthew Kelleher	Director / Archaeologist	Project and Excavation director, coordinate team, lithic analysis, assessment and reporting
Alison Nightingale	Director / Archaeologist	Project manager, coordinate team, liaison with Aboriginal community, assessment and reporting
Mark Rawson	Senior Archaeologist	Excavation supervisor, lithic analysis and reporting
Ben Anderson	Archaeologist/GIS	Mapping
Archaeologists (4)	Field Archaeologists	Excavation program

9 Management Measures

Management measures for Aboriginal heritage in relation to salvage activities and construction activities (or fencing, investigative drilling, minor clearing, establishing site compounds, adjustment to services/utilities etc.) include the following:

Responsibility for compliance with Management Measures

1. The Proponent must ensure all of its employees, contractors and subcontractors and agents are made aware of and comply with this management policy.
2. The Proponent must appoint a suitably qualified and experienced environmental manager who is responsible for overseeing the activities related to this management policy.
3. The Proponent must appoint a suitably qualified and experienced Archaeologist who is responsible for overseeing, for and on behalf of the Proponent, the salvage activities relating to the project.

Operational constraints

4. Where archaeological excavation has been nominated for impacted sites, no construction activities (or fencing, investigative drilling, minor clearing, establishing site compounds, adjustment to services/utilities etc.) can occur on the lands to be investigated until the relevant archaeological excavation at the nominated site has been completed.
5. Prior to the commencement of early works activity (e.g. fencing, minor clearing, establishing site compounds etc.) a construction heritage site map identifying Aboriginal sites to be excavated must be prepared.
6. All employees, contractors, subcontractors and agents carrying out early works activities (e.g. fencing, minor clearing, establishing site compounds etc.) must undertake a Project induction (including the distribution of a construction heritage site map) to ensure that they have an understanding and are aware of the Aboriginal heritage issues affecting the activity.

Aboriginal archaeological sites and objects to be impacted

7. The archaeological sites identified as being impacted by construction activities are listed in Table 4.

Unexpected Finds Procedures

8. Procedures for handling unexpected Aboriginal heritage objects will follow the Heritage Management Plan.

Human Remains

9. This management policy does not authorise any damage of human remains.
10. If potential human remains are disturbed the Proponent must follow the procedures outlined in section 9.3 below.

Salvage Activities

11. The archaeological salvage excavation must be carried out in accordance with the methodology specified in section 7 of this report.

Involvement of Aboriginal groups and/or individuals

12. Opportunity must be provided to registered Aboriginal stakeholders to be involved in the following activities:
 - a. assist with the salvage excavation.

The long term management of collected Aboriginal objects is as follows:

13. DP&I, as the approval authority, will be consulted;
14. Aboriginal objects will be transferred to the Australian Museum in accordance with legislative requirements, Australian Museum Archaeological Collection Deposition Policy v1.0 January 2012. The Australian Museum should accept Aboriginal objects from the NWRL program because archaeological impacts of major infrastructure are important to document.
15. In the event the Australian Museum is unable to accept the objects, the objects will be transferred in accordance with a Care Agreement or similar agreement to an Aboriginal community;
16. In the event that neither the Australian Museum nor the Aboriginal community are able to accept the archaeological objects, KNC will seek alternative arrangements in consultation with DP&I and the Aboriginal community.

Reporting requirements

17. A written archaeological excavation report must be provided to Baulderstone within a reasonable time following the completion of the archaeological program. The report will be prepared in accordance with the Minister's Conditions of Approval.

Notification and reporting about incidents that breach this management policy

18. Incident reporting requirements is to include Aboriginal heritage.

9.1 Procedures for Handling Human Remains

- **Note that Project Approvals do not include the destruction of Aboriginal remains**

This section outlines the procedure for handling human remains in accordance with the Skeletal Remains – Guidelines for the Management of Human Skeletal Remains under the *Heritage Act 1977* (NSW Heritage Office 1998) and the Aboriginal Cultural Heritage Standards and Guidelines Kit (NPWS 1997). In the event that Early Works or construction activity reveals possible human skeletal material (remains), the following procedure is to be followed:

1. as soon as remains are exposed, all work is to halt at that location immediately and the Project environmental manager on site is to be immediately notified to allow assessment and management;
 - i. stop all activities; and
 - ii. secure the site.
2. contact police, the discovery of human remains triggers a process which assumes that they are associated with a crime. The NSW Police retain carriage of the process until such time as the remains are confirmed to be Aboriginal or historic;
3. DP&I, as the approval authority, will be notified when human remains are found;
4. once the police process is complete and if remains are not associated with a contemporary crime contact DP&I. The DP&I will determine the process, in consultation with OEH as appropriate;
 - i. if the remains are identified as Aboriginal, the site is to be secured and the DP&I and all Aboriginal stakeholders are to be notified in writing. The DP&I will act in consultation with OEH as appropriate. OEH will be notified in writing according to DP&I instructions; or
 - ii. if the remains are identified as non-Aboriginal (historical) remains, the site is to be secured and the DP&I is to be contacted. The DP&I will act in consultation with the Heritage Branch of OEH as appropriate. The Heritage Branch will be notified in writing according to DP&I instructions;
5. once the police process is complete and if the remains are identified as not being human, work can recommence once the appropriate clearances have been given.

9.2 Procedures for proposed changes to Approved Project

In the course of constructing the NWRL, design alterations or other changes to the Approved Project may be required.

A proposed change to the Approved Project (such as an alteration of the current design, the location of ancillary facilities) within the project boundary may result in a:

- Reduced impact to Aboriginal cultural heritage; or an
- Increased impact to Aboriginal cultural heritage.

Note: the use of the word impact in this section is defined as an impact on the significance of Aboriginal cultural heritage rather than simply an increased physical impact.

To ensure consistency with the Approved Project and this document any change in the overall impact on Aboriginal cultural heritage will need to be considered. The process to determine consistency is outlined in section 9.2.1 below.

Where a proposed change to the Approved Project occurs outside of the project boundary considered for the EIS further heritage assessment will be required to determine if there would be an impact on Aboriginal cultural heritage and whether this represents a modification to the Approved Project (outlined below).

9.2.1 Changes in heritage impact

Where the Proponent seeks to make a change to the design and construction of the Approved Project which changes the assessed impact on Aboriginal cultural heritage the Proponent will need to prepare an assessment of the new impacts of this work in consultation with the appointed Archaeologist. The continued involvement of the Aboriginal stakeholders in this process is outlined in section 9.3.

- New impacts consistent with previously identified impacts

If a proposed change to the Approved Project is considered to have a neutral or lesser significant impact on Aboriginal cultural heritage than that identified in this document it would be considered a consistent impact.

If the proposed change is considered to be consistent with the Approved Project TfNSW may approve the change with no requirements to seek further approval. However, in certain circumstances, further consultation with Aboriginal stakeholders may still be required (see section 9.3 below).

- New impacts inconsistent with previously identified impacts

If a proposed change to the Approved Project is considered to have a more significant impact on Aboriginal cultural heritage than that identified in the EIS it would be considered an inconsistent impact.

If the proposed change is considered inconsistent with the assessed impact on Aboriginal cultural heritage, as detailed in Table 4 of this document, TfNSW would require an amendment to the mitigation measures agreed in this report. If this proposed change is considered inconsistent with the Approved Project TfNSW may require a modification of the project approval or other approvals as identified in any condition of approval. Further consultation with Aboriginal stakeholders will be undertaken (see 9.3 below).

9.3 Process for continued consultation with Aboriginal stakeholders

The extent to which TfNSW will continue to consult with Aboriginal stakeholders is dependent upon the level of impact and whether the area was assessed as part of the EIS. The types of potential impacts are identified as reduced impacts, increased impacts or unknown impacts. The following outlines a recommended protocol for consultation.

a) Reduced or neutral impact

If as a result of alterations to the project design a previously identified impact to an Aboriginal heritage item is reduced or neutral then no further consultation is required.

If as a result of alterations to the project design an impact to an Aboriginal heritage item is proposed that results in a reduced impact on the overall heritage significance of the study area (i.e. the cumulative impact is reduced), then further consultation with Aboriginal stakeholders is suggested. This consultation may entail a phone call and phone log of comments received or the provision of a report for comment (10 working days).

b) Increased impact

Where as a result of alterations to the project design an impact on Aboriginal heritage is considered to be greater than identified by the Approved Project further consultation will be undertaken. This consultation will either entail a phone call and phone log of comments received or the provision of a report for comment (10 working days).

c) Unknown impacts: Assessment process

Where a proposed change is an area located outside of the project boundary assessed as part of the Approved Project the impact on Aboriginal cultural heritage is considered to be unknown. This area would require preliminary assessment to determine any impacts upon Aboriginal heritage. Should no impacts be identified then no consultation with Aboriginal stakeholders is required. Should potential impacts be identified consultation with Aboriginal stakeholders will be undertaken. This consultation will entail the provision of a report for stakeholder comment (10 working days) detailing the impacts and mitigation strategies proposed.

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Appendix A Aboriginal Stakeholder Consultation

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DARUG CUSTODIAN ABORIGINAL CORPORATION

PHONE: [REDACTED] FAX: [REDACTED]
MOBILE: [REDACTED]
EMAIL: [REDACTED]

Date: 1st March 2013

ATTENTION: Matthew Kelleher.

Subject: North West Rail Link- Aboriginal Heritage and Archaeological Early Works – West Zone. Salvage Methodology and Cultural Heritage Assessment Report.

Dear Matthew,

The Darug Custodian Aboriginal Corporation have received and reviewed the Aboriginal Cultural Heritage early works methodology for the West zone.

This area is significant to the Darug people due to the evidence of continued occupation, within close proximity to this project site there is a complex of significant sites. Sites are significant to us for the information that they hold and the connection to Darug people. Aboriginal people (Darug) had a complex lifestyle that was based on respect and belonging to the land, all aspects of life and survival did not impact on the land but helped to care for and conserve land and the sustenance that the land provided. As Darug people moved through the land there were no impacts left, although there was evidence of movement and lifestyle, the people moved through areas with knowledge of their areas and followed signs that were left in the landscape. Darug people knew which areas were not to be entered and respected the areas that were sacred.

Darug custodian Aboriginal Corporation's site officers have knowledge of Darug land, Darug Culture, Oral histories, landforms, sites, Darug history, wildlife, flora and legislative requirements. We have worked with consultants and developers for many years in Western Sydney (Darug Land) for conservation, site works, developments and interpretation/education strategies. We are concerned with the amount of stakeholders listed on this project and many other projects that we are involved in cultural heritage is not for personal profit, but to provide knowledge to Darug people on the scientific evidence of

Darug Country is From the Blue Moutains in the West to the ocean in the East from the Hawkesbury River in the North to Appen in the south. Respect is given to the Elders past and present. |

DCAC

culture and also for communities to protect sites of significance. Community groups representing Darug people should be the determinates of cultural heritage and the carers of these sites.

We support the methodology for this project and the areas that are included in the program. The research questions are also research supported by our group.

We look forward to working with you on this project please contact us with all enquiries on [REDACTED] or [REDACTED]

Regards


Leanne Watson

Darug Country is From the Blue Moutains in the West to the ocean in the East from the Hawkesbury River in the North to Appen in the south. Respect is given to the Elders past and present. |

Darug Aboriginal Cultural Heritage Assessments

ABN 51734106483

Gordon Morton & Associates

Mob: [REDACTED]
Fax: [REDACTED]

Celestine Everingham

Ph/Fax: [REDACTED]
Mob: [REDACTED]

8. 3. 13

Attention:

Matthew Kelleher
H/N Consulting

re N.W. Rail Link - West Zone

DACAHA have reviewed your proposed methodology for an archaeological program for the Darug sites and we support your aims and objectives. We look forward to working with you on this project.

Yours Sincerely,
C. Everingham

Cultural Heritage – Building respect for the past and Conservation for the future