# Nowra Bridge Project

## Addendum Review of Environmental Factors

Transport for NSW | January 2021

# Nowra Bridge Project

## Addendum Review of Environmental Factors

Transport for NSW | January 2021

Prepared by Fulton Hogan and Transport for NSW

# Document controls

## Approval and authorisation

| | |
|---|---|
| **Title** | Nowra Bridge Addendum Review of Environmental Factors |
| **Accepted on behalf of Transport for NSW by:** | Ryan Whiddon<br>Project/Contract Manager |
| **Signed:** |  |
| **Dated:** | 21/01/2021 |

## Document status

| Document status | Date | Prepared by | Reviewed by |
|---|---|---|---|
| Revision 1 | 21/09/2020 | Mitchell Bryson | Sam Leigh |
| Revision 2 | 7/10/2020 | Mitchell Bryson | Sam Leigh |
| Revision 3 | 17/11/2020 | Mitchell Bryson | Sam Leigh |
| **Revision 4** | 27/11/2020 | Mitchell Bryson | Sam Leigh |
| **Revision 5** | 15/01/2021 | Tash Pace | Charlie Payne |

# Executive summary

## The proposal

This addendum REF will allow the construction of a revised property access to 125 Brinawarr Street, Bomaderry. A new property access is required due to the approved project boundary encroaching on existing access and the realigned driveway needs to be built to the east of the current driveway.

This REF addendum includes provision for a revised boundary, minor clearing, minor impacts to property curtilage and the demolition of a small building. This additional approval will ensure that permanent access to 125 Brinawarr Street, Bomaderry is maintained.

This document should be read in conjunction with the existing Nowra Bridge Project approvals including:

- Project REF approved February 2019
- REF submissions report May 2019
- Addendum REF approved in May 2020

The scope of this proposal is minor and includes the following changes:

- Minor clearing
- Demolition of a property outbuilding, a shed near the tennis court
- Realignment and construction of the property access to 125 Brinawarr Street, Bomaderry
- Construction access through 125 Brinawarr Street both for the construction of the new property access and for the projects works on the boundary of this property, these works include a new retaining wall and boundary fence

Construction is programmed to start in January 2021 and would take up to 12 months to complete, weather dependent.

## Need for the proposal

This REF addendum assesses a new property access to 125 Brinawarr Street, Bomaderry and its potential environmental impacts.

The project REF assessed and approved the concept design which did not initially include a revised property access at this location. The concept design is subject to refinements and improvements during the detailed design phase of the project.

The property access changes are driven by the design of the at grade intersection which connects Bolong Road to the Princes Highway, refer section 2.5 of the approved REF. The project boundary was required to be moved further east from ch 76550 to ch 76750 to accommodate the design of the road and features. This boundary change encroached on the existing property access resulting for the need a new property access and this approval document.

The revised property access assessed in this document results in minor impacts. Properties accesses must be maintained and not impacted as a result of the approved project.

## Proposal objectives

Section 2.3 of the project REF identified the project objectives that apply to the proposal.

The proposal would facilitate the overall project objectives while minimising adverse environmental and socio-economic impacts.

## Options considered

**Option 1**: Do nothing

This option would not facilitate the strategic need and project objectives identified in the project REF.

The unfavourable implications of this option would include the following:

- Closure of the service driveway into 125 Brinawarr Street due to the project.
- Construction of the retaining wall would require access from the Princes Highway and impact pedestrian access and southbound traffic flow on the Princes Highway.

**Option 2**: New property access off the Princes Highway

This option would facilitate the strategic need but not meet the project objectives identified in the project REF.

The unfavourable implications of this option would include the following:

- Would increase delay, queuing and inefficiency of traffic flow along the Princes Highway.
- Increase impact to native vegetation
- Increased construction impacts including traffic, vibration, noise and construction duration
- Increased property impacts

**Option 3**: This proposal, construction of a new property access within the lot boundary of 125 Brinawarr Street

This option would facilitate the delivery of the project and ultimately improve the efficiency of traffic movements along a key section of the Princes Highway.

The benefits of this option would include the following:

- Provide access to construct the new retaining wall and provision of a 1.8m high property boundary fence.
- Allow the service driveway into 125 Brinawarr Street to be realigned and reinstated.

Option 3 is the preferred option because it results in the lowest overall impacts but meets the objectives of the project.

## Statutory and planning framework

TfNSW is the proponent and determining authority for the proposal. Clause 94 of the State Environmental Planning Policy (Infrastructure) 2007 (ISEPP) permits development on any land for the purpose of a road or road infrastructure facilities to be carried out by, or on behalf of, a public authority without consent. As the proposal is for a road and is to be undertaken on behalf of TfNSW, the proposal can be assessed under Division 5.1 of the EP&A Act.

Development consent from Shoalhaven City Council is not required.

## Community and stakeholder consultation

The proposal is expected to have a minor to moderate impact on the locally heritage listed *'Illowra'* property. As a result, consultation with the Shoalhaven Council is required under

clause 14 of the ISEPP, in accordance with the statutory consultation checklist in Appendix B. TfNSW has undertaken consultation with the landowner as the proposal is on land owned by TfNSW. Other regulatory agencies were not consulted due to the minor nature and impact of the works.

# Environment impacts

The proposal is likely to only have minor impact on the local environmental features of the site. The main potential impacts are related to the heritage listing of the property and biodiversity.

Potential environment impacts would managed by safeguards and management measures described in the currently approved CEMP and additional mitigation measures as listed in section 7 of this document. Extra mitigation measures should be included in a future revision of the project CEMP

Potential environmental impacts are assessed below:

### Aboriginal Heritage

The proposal area has already been heavily modified as a result of landscaping, ground levelling activities and the construction of the existing driveway. There is a very low likelihood of any intact archaeological deposit within the study area that may be impacted by the proposal.

### Non-Aboriginal heritage

Impacts to the non-Aboriginal heritage features of 125 Brinawarr Street were assessed by Artefact under a Statement of Heritage Impacts, dated 14 January 2021. This report outlined that the changes described in this addendum would have a minor to moderate impact on the locally listed *'Illowra'* property. Further details on impact and mitigation are provided in section 6.2.

### Biodiversity

The proposal would result in the removal of 0.08 hectares of planted exotic and native flora species. It may also impact the nearby roost of the Grey-headed flying fox (GHFF). Mitigation measures to protect the GHFF roost are listed in section 6.3.5.

### Noise and vibration

Construction activities such as demolition works and driveway pavement work would generate localised noise and vibration impacts to the nearby sensitive receiver. However, these noise and vibration impacts would be consistent with the existing project approved works and increase in impacts negligible.

There will be no operation noise impacts from the realignment of the driveway within the property.

# Justification and conclusion

The proposal is subject to assessment under Division 5.1 of the EP&A Act. This addendum REF has assessed and considered to the fullest extent possible all matters impacting or likely to impact the environment by reason of the proposal.

The safeguards and management measures described in this addendum REF would mitigate or minimise identified potential impacts to the extent that the proposal would outweigh potential impacts. In accordance with the project REF, the proposal would facilitate the delivery of the project and is consistent with the project objectives. Therefore, the proposal is considered to be justified.

The environmental impacts of the proposal are not likely to be significant and therefore the preparation of an environmental impact statement (EIS) and approval from the Minister for Planning under Division 5.2 of the EP&A Act are not required. The proposal is not likely to significantly impact threatened species, populations or ecological communities or their habitats, within the meaning of the *Biodiversity Conservation Act 2016* or *Fisheries Management Act 1994* and therefore a Species Impact Statement is not required. The proposal is also unlikely to affect Commonwealth land or have a significant impact on any matters of national environmental significance. A referral to the Australian Government Department of the Environment and Energy is not required.

# Contents

# 1 Introduction

Transport for NSW proposes to modify the Nowra Bridge project by changing the location of the approved project boundary to complete property adjustment works. A review of environmental factors (REF) was prepared for the Nowra Bridge Project on 22 August 2018 (referred to in this addendum REF as the project REF). The project REF was placed on public display between 27 August and 28 September 2018 for community and stakeholder comment. A submissions report, dated May 2019, was prepared by Transport for New South Wales (TfNSW) to respond to issues raised.

TfNSW prepared an addendum REF (AREF May 2020) to change construction activities that were integral to meeting the strategic need of the project. The activities in this proposal are also needed to meet the objectives and needs of the project, specifically to facilitate the improvement of the intersection of the Princes Highway and Bolong Road.

This proposal is for a new property access at 125 Brinawarr and temporary construction access through the property. The key features of the proposals include:

- Minor clearing
- Demolition of a property outbuilding, a shed near the tennis court
- Realignment and construction of the property access to the 125 Brinawarr Street, Bomaderry
- Construction access through 125 Brinawarr Street both for the construction of the new property access and for the projects works on the boundary of this property, these works include a new retaining wall and boundary fence

The location of the proposal is shown in Figure 1-1 and an overview of the proposal is provided in Figure 1.2. Chapter 3 describes the proposal in more detail.


Figure 1-1: The location of the proposal area on 125 Brinawarr Street, Bomaderry.

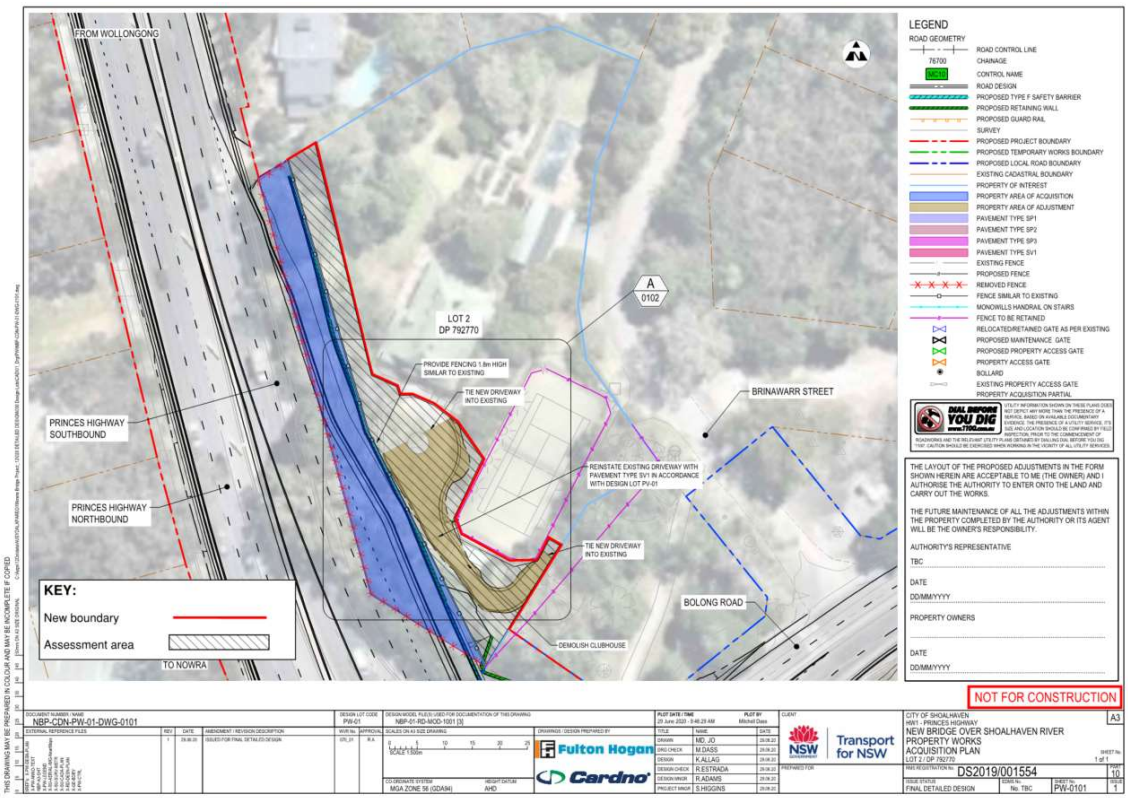


Figure 1-2: The proposal location showing the extent of the assessment area and the location of the new project boundary. The blue polygon shows land already approved for impact, the new assessment area is shown in cross hatching

## 1.1 Purpose of the report

This addendum review of environmental factors (AREF) has been prepared by Fulton Hogan on behalf of TfNSW. For the purposes of these works, TfNSW is the proponent and the determining authority under Division 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

This AREF is to be read in conjunction with the project REF, submissions report and AREF (May 2020). The purpose of this AREF is to describe the proposal, to document and assess the likely impacts of the proposal on the environment, and to detail mitigation and management measures to be implemented.

The description of the proposal and assessment of associated environmental impacts has been undertaken in context of clause 228 of the Environmental Planning and Assessment Regulation 2000,

- Is an EIS Required? Best Practice Guidelines for Part 5 of the Environmental Planning and Assessment Act 1979
- (Is an EIS Required? Guidelines) (DUAP, 1995/1996), Roads and Road Related Facilities EIS Guideline (DUAP, 1996),
- Biodiversity Conservation Act 2016 (BC Act),
- Fisheries Management Act 1994 (FM Act),
- Australian Government's Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).

In doing so, the AREF fulfils the requirements of:

- Section 5.5 of the EP&A Act including that TfNSW examine and take into account to the fullest extent possible, all matters affecting or likely to affect the environment by reason of the activity.
- The strategic assessment approval granted by the Federal Government under the EPBC Act in September 2015, with respect to the impacts of TfNSW's road activities on nationally listed threatened species, ecological communities and migratory species.

The findings of the addendum REF would be considered when assessing:

- Whether the proposal is likely to result in a significant impact on the environment and therefore the necessity for an environmental impact statement to be prepared and approval to be sought from the Minister for Planning under Division 5.2 of the EP&A Act.
- The significance of any impact on threatened species as defined by the BC Act and/or FM Act, in Section 1.7 of the EP&A Act and therefore the requirement for a Species Impact Statement or a Biodiversity Development Assessment Report.
- The significance of any impact on nationally listed biodiversity matters under the EPBC Act, including whether there is a real possibility that the activity may threaten long-term survival of these matters, and whether offsets are required and able to be secured.
- The potential for the proposal to significantly impact any other matters of national environmental significance or Commonwealth land and therefore the need to make a referral to the Australian Government Department of the Environment and Energy for a decision by the Australian Government Minister for the Environment on whether assessment and approval is required under the EPBC Act.

# 2 Need and options considered

## 2.1 Strategic need for the proposal

Section 2 of the project REF addressed the strategic need for the project, the project objectives and the options that were considered. The proposal described and assessed in this addendum REF is consistent with the strategic need for the project.

The proposal is required to complete the property works at 125 Brinawarr Street and maintain access similar to existing for this residence. The proposal would:

- Confirm that the area of 125 Brinawarr Street within the approved project boundary will not result in a long term access or functionality impact to the property
- Provide access to construct the new retaining wall and provision of a 1.8m high property boundary fence that is within the approved project REF boundary
- Allow the driveway to 125 Brinawarr Street to be realigned and reinstated to maintain access similar to existing for the residence.

## 2.2 Proposal objectives and development criteria

Section 2.3 of the project REF identified the project objectives and development criteria that apply to the proposal. The primary project objectives are to:

- Support future traffic growth accessing the Princes Highway associated with planned land use in the Nowra Bomaderry area
- Prioritise the safety of our workers and customers
- Minimise environmental impact
- Deliver a proposal that fits sensitively with the built, natural and community environment.

## 2.3 Alternatives and options considered

Section 2.4 of the project REF discussed the options considered for the project. The options considered for the proposal are considered below.

**Option 1**: Do nothing

This option would not facilitate the strategic need and project objectives identified in the project REF.

The unfavourable implications of this option would include the following:

- Closure of the service driveway into 125 Brinawarr Street due to the project.
- Construction of the retaining wall would require access from the Princes Highway and impact pedestrian access and southbound traffic flow on the Princes Highway.

**Option 2**: New property access off the Princes Highway

This option would facilitate the strategic need but not meet the project objectives identified in the project REF.

The unfavourable implications of this option would include the following:

- Entering and exiting vehicles would increase delay, queuing and inefficiency of traffic flow along the Princes Highway.
- Increase impact to native vegetation
- Increase construction impacts including traffic, vibration, noise and construction duration
- Increase property impacts

**Option 3**: This proposal, construction of a new property access within the lot boundary of 125 Brinawarr Street

This option would facilitate the delivery of the project and ultimately improve the efficiency of traffic movements along a key section of the Princes Highway. It would also realign the service driveway as close to the existing as possible which reduces impacts to the heritage feature.

The unfavourable implications of this option would include the following:

- Minor clearing of vegetation
- Demolition of an existing structure
- Minor short-term noise and vibration impacts to 125 Brinawarr Street.

The benefits of this option would include the following:

- Provide access to construct the new retaining wall and provision of a 1.8m high property boundary fence.
- Allow the service driveway into 125 Brinawarr Street to be realigned and reinstated.
- Retain the heritage feature of the turnaround area and gardens, as the service driveway will be built as close as possible to the existing driveway.

Option 3 is the preferred option because it results in the lowest overall impacts but meets the objectives of the project.

## 2.4 Preferred option

The preferred option is considered to provide the best balance between environmental, social and technical considerations, while also being the best option to satisfy the proposal objectives.

# 3 Description of the proposal

## 3.1 The proposal

TfNSW proposes to modify the Nowra Bridge Project through changes to the location of the approved project boundary to complete property adjustment works at 125 Brinawarr Street, Bomaderry. The key features of the proposal would include:

- Minor vegetation clearing
- Demolition of a property outbuilding, a shed near the tennis court
- Realignment and construction of the property access to the 125 Brinawarr Street, Bomaderry
- Construction access through 125 Brinawarr Street both for the construction of the new property access and for the projects works on the boundary of this property, these works include a new retaining wall and boundary fence

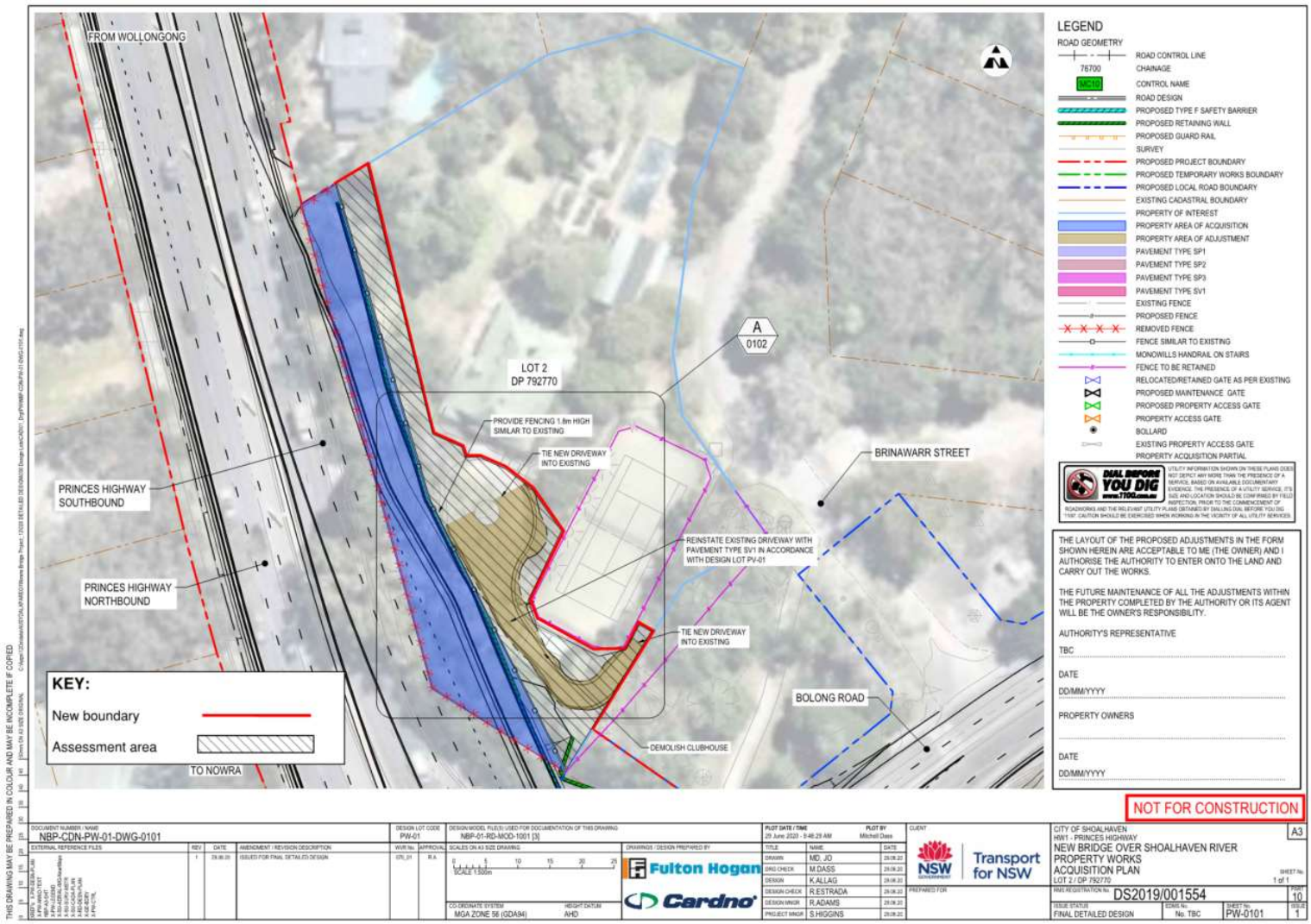


Figure 3-1: Key features of the proposal showing the extent of the assessment area and the location of the new proposed project boundary. The blue polygon is the land already acquired. Area in blue is already approved.

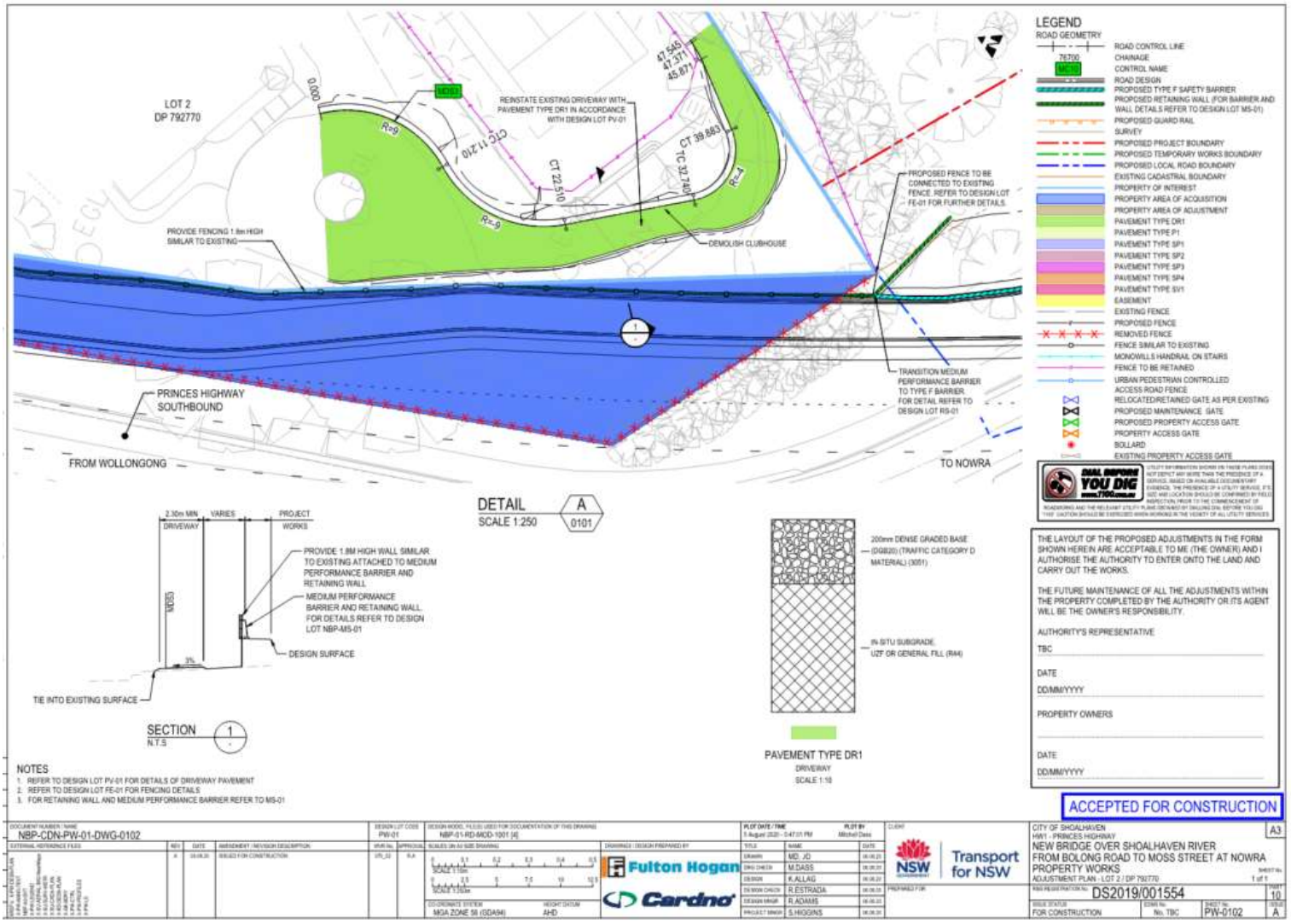


Figure 3-2: Key features of the proposal – identifies the location of the tennis clubhouse that is to be demolished, the retaining wall and boundary fence and the driveway. Area in blue is already approved, areas in green are new areas included in this REF addendum

## 3.2 Design

### 3.2.1 Design criteria

The proposal would be designed in accordance with TfNSW design criteria and other specifications. The proposal design is shown in figure 3-2.

### 3.2.2 Engineering constrains

Engineering constraints are identified in Section 3.2.2 of the project REF. No further engineering constraints have been identified for consideration in this addendum REF.

## 3.3 Construction activities

### 3.3.1 Work methodology

**Site establishment**

The following activities would be undertaken to establish the work site:

- Installation of erosion, sediment and water quality controls, sensitive area exclusion fencing and other construction environmental controls outlined in the project REF
- Establish access tracks to construct the retaining wall and property boundary fence.
- Clearing of vegetation. Clearing would be limited further where possible. Implementation of the project clearing procedure which requires hold points, clearing permits and support from the nominated project ecologist

**Property adjustment works**

The following activities would be undertaken to complete the property adjustment works:

- Demolition of the tennis clubhouse
- Removal of demolition waste and site tidy up completed progressively
- Construction of the new driveway involving: survey set out, minor vegetation clearing, removal of unsuitable material, subgrade box out, placement of crushed rock
- Installation of the retaining wall on the boundary
- Installation of the new boundary fence

**Rehabilitation works**

The following activities would be undertaken to complete rehabilitation works:

- Removal of any temporary access tracks
- Reinstate disturbed areas to pre-construction condition using spray grass or similar
- Install plantings along the Princes Highway in accordance with the Urban Design and Landscape Plan

### 3.3.2 Construction hours and duration

Construction hours would be consistent with the project approval. Accordingly, it is anticipated that construction would commence in mid-2020 with the new bridge targeted to be open to traffic in 2024.

It is anticipated that the majority of construction would be undertaken during standard construction working hours in accordance with the Interim Construction Noise Guideline (DECC, 2009):

- Monday to Friday: 7am to 6pm

- Saturday: 8am to 1pm
- Sundays and public holidays: no work. Works may be undertaken outside of standard hours where required provided the works are in accordance with the projects' Environment Protection Licence.

### 3.3.3 Plant and equipment

Plant and equipment needed for this proposal is consistent with those listed in section 3.3.3 of the approved REF.

### 3.3.4 Earthworks

The following activities would be undertaken to construct the proposal:

- Preparation of subgrade for the service driveway
- Importation and placement of dense graded base
- Installation of temporary access tracks

The estimated quantities of earthwork materials are consistent with those described in Section 3.3.4 of the project REF.

### 3.3.5 Source and quantity of materials

The source and quantity of materials needed for the modified proposal are consistent with those listed in Section 3.3.5 of the project REF.

### 3.3.6 Traffic management and access

The works will occur within a private property and there will be no traffic impacts beyond those already approved and described in in Section 3.3.6 of the project REF.

Property access would be maintained throughout the works with approval and ongoing consultation with the property residents.

This proposal maintains the long-term access off Brinawarr Street. Keeping the access in this location is consistent with the requirements of the project approvals.

## 3.4 Ancillary facilities

This proposal would not result in any required changes to the already approved ancillary facilities. The REF in section 3.4 and the AREF section 3.2.3 provides more information on the approved ancillary facilities.

## 3.5 Public utility adjustment

Public utility adjustment is consistent with Section 3.5 of the project REF.

## 3.6 Property acquisition

TfNSW are the owners of the whole lot at 125 Brinawarr Street. Property works and the extent of works is broadly described in the figure below.

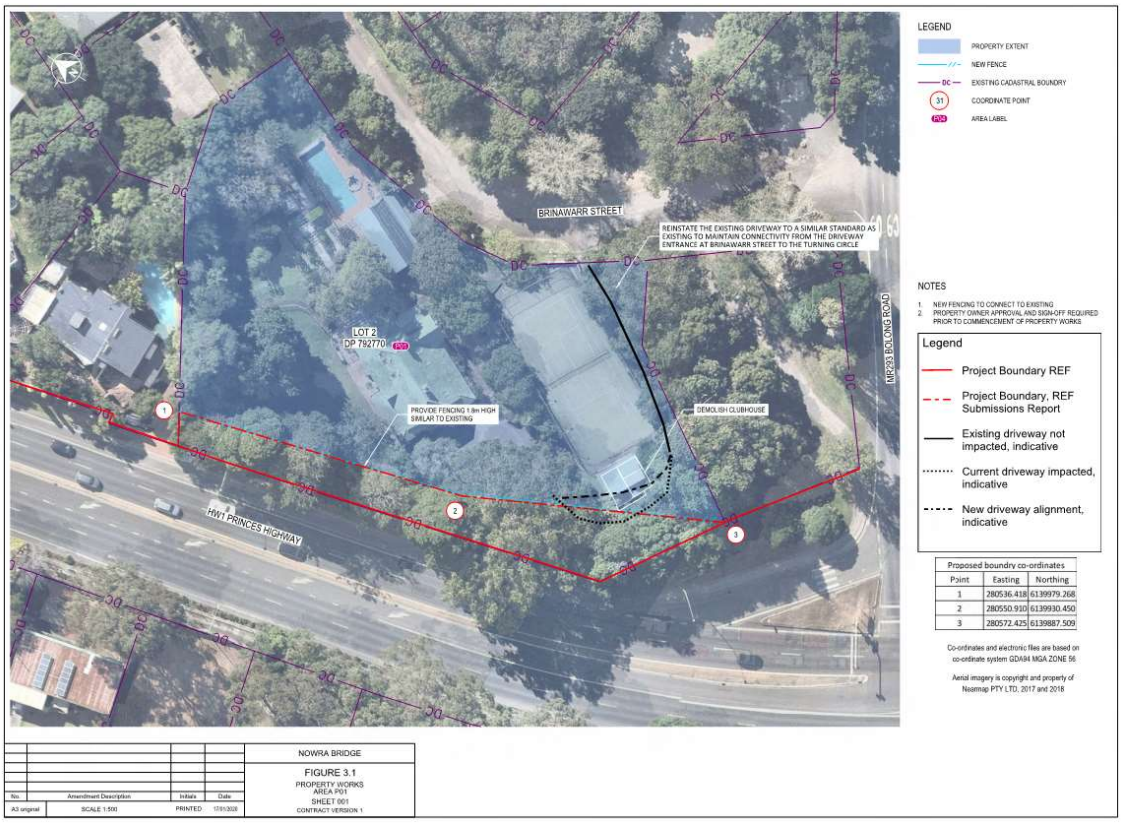


Figure 3-3: Property works drawing, the whole lot area shown in blue is owned by TfNSW

Access to facilitate the construction of the retaining wall will be in consultation with the tenants regarding use of the existing driveway.

# 4 Statutory planning framework

## 4.1 Environmental Planning and Assessment Act 1979

### 4.1.1 State Environmental Planning Policies

#### State Environmental Planning Policy (Infrastructure) 2007

State Environmental Planning Policy (Infrastructure) 2007 (ISEPP) aims to facilitate the effective delivery of infrastructure across the State. Clause 94 of ISEPP permits development on any land for the purpose of a road or road infrastructure facilities to be carried out by or on behalf of a public authority without consent.

As the proposal is for a road and/or road infrastructure facilities and is to be carried out on behalf of TfNSW, it can be assessed under Division 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Development consent from Shoalhaven City Council is not required.

Part 2 of ISEPP contains provisions for public authorities to consult with local councils and other public authorities prior to the commencement of certain types of development. Consultation, including consultation as required by the ISEPP (where applicable), is discussed in Section 5 of this addendum REF.

#### State Environmental Planning Policy (Coastal Management) 2018

State Environmental Planning Policy (Coastal Management) 2018 (CM SEPP) commenced on 3 April 2018. It consolidates and consequently repeals SEPP 14 (Coastal Wetlands), SEPP 26 (Littoral Rainforests) and SEPP 71 (Coastal Protection). The CM SEPP aims to promote an integrated and coordinated approach to land use planning in the coastal zone consistent with the objects of the *Coastal Management Act 2016.*

The proposalis located on land mapped as ‘coastal environment area’ and ‘coastal use area’. Development consent on land within these coastal areas must be in accordance with clauses 13 and 14 of the CM SEPP.

As the proposal is not designated development under the CM SEPP and is development without consent pursuant to clause 94 of the ISEPP, consent is not required from Shoalhaven City Council; therefore, the requirements of clauses 13 and 14 do not apply to the proposal. However, the proposal would be generally consistent with the requirements of these coastal management areas in the coastal zone. Refer to Table 4-1 and 4-2 of the project REF.

#### Other SEPPs

The proposal does not trigger the need for consent to be sought for state significant development or state significant infrastructure from the Minister for Planning under State Environmental Planning Policy (State and Regional Development) 2011 or State Environmental Planning Policy (State Significant Precincts) 2005.

### 4.1.2 Local Environmental Plans

#### Shoalhaven Local Environmental Plan 2014

The proposal is located within the Shoalhaven Local Government Area (LGA). The Shoalhaven Local Environmental Plan 2014 (the LEP) is the relevant local environmental planning instrument under the EP&A Act. The proposal is compatible with the objectives of the land use zones in the LEP. Consent is not required from Shoalhaven City Council.

#### Shoalhaven Local Environmental Plan 1985

The Shoalhaven Local Environmental Plan 1985 is still in effect and applies to land identified as 'Deferred Matter' in the abovementioned LEP. There are no areas of 'Deferred Matter' within the study area.

## 4.2 Other relevant NSW legislation

### 4.2.1 Biodiversity Conservation Act 2016

The *Biodiversity Conservation Act 2016* (BC Act) commenced on 25 August 2017. The purpose of the BC Act is to maintain a healthy, productive and resilient environment for the greatest well-being of the community, now and into the future, consistent with the principles of ecologically sustainable development.

The BC Act repeals the *Threatened Species Conservation Act 1995* (TSC Act). However, the transitional provisions of the Biodiversity Conservation (Savings and Transitional) Regulation 2017 apply to the project as the project REF began under Division 5.1 of the EP&A Act prior to the commencement of the BC Act; therefore, the project was assessed in accordance with the TSC Act. Accordingly, the proposal has also been assessed in accordance with the TSC Act.

### 4.2.2 Threatened Species Conservation Act 1995

The TSC Act was repealed by the BC Act which commenced on 25 August 2017. As described in Section 4.2.1, the project REF and the proposal are assessed in accordance with the TSC Act.

The objects of the TSC Act include the conservation and protection of biological diversity such as threatened species, populations, ecological communities and their habitat in NSW, and the promotion of ecologically sustainable development.

The potential impacts of the proposal on threatened species are discussed in Section 6.

The proposal is not expected to significantly impact on threatened species and consequently a Species Impact Statement (SIS) is not required.

### 4.2.3 National Parks and Wildlife Act 1974

The objects of the *National Parks and Wildlife Act 1974* (NPW Act) include the conservation of nature and objects, places or features of cultural value. The latter includes places, objects and features of significance to Aboriginal people. The NPW Act is the primary legislation protecting Aboriginal cultural heritage in NSW. Section 86

of the NPW Act provides for the protection of Aboriginal objects and places. Section 90 provides for an Aboriginal heritage impact permit (AHIP). An AHIP will be required as part of the project REF.

The proposal would not likely impact Aboriginal sites.

### 4.2.4 Protection of the Environment Operations Act 1997

The objects of the *Protection of the Environment Operations Act 1997* (POEO Act) include the protection, restoration and enhancement of the quality of the environment in NSW. Part 3.2 requires an Environment Protection Licence (EPL) for scheduled development work and scheduled activities identified in Schedule 1.

Section 4.2.6 of the project REF listed scheduled activities that potentially apply to the project. A licence is required for the project pursuant to Schedule 1, Part 1, clause 19 of the POEO Act. Refer to section 7.3 for licencing requirements.

### 4.2.5 Roads Act 1993

The objects of the *Roads Act 1993* include the regulation of activities undertaken on public roads, to establish procedures for the opening and closing of a public road as well as providing for the classification of roads and identifying the functions of road authorities.

Refer to Section 4.2.7 of the project REF.

### 4.2.6 Heritage Act 1977

The objects of the *Heritage Act 1977* (Heritage Act) include the conservation of the State's heritage, the identification and registration of items of State heritage significance and to promote an understanding of the State's heritage such as a place, building, relic or precinct.

Under Section 139, an excavation permit is required prior to the disturbance or excavation of land if a relic will or is likely to be discovered, exposed, moved, damaged or destroyed.

As outlined in the Statement of Heritage Impact (Artefact 2021), the proposal would not have any impact on any known archaeological relics, an excavation permit will not be required. If any suspected relics are found during works, the RMS Unexpected Heritage Items Procedure (2015) would be followed.

## 4.3 Commonwealth legislation

### 4.3.1 Environment Protection and Biodiversity Conservation Act 1999

Under the EPBC Act a referral is required to the Australian Government for proposed 'actions that have the potential to significantly impact on matters of national environmental significance or the environment of Commonwealth land'. These are considered in Appendix A and Section 6 of the addendum REF.

A referral is not required for the proposal as no nationally listed threatened species, endangered ecological communities or migratory species are impacted.

Potential impacts to these biodiversity matters are also considered as part of Section 6 of this addendum REF.

### Findings – matters of national environmental significance (other than biodiversity matters)

The assessment of the proposal's impact on matters of national environmental significance and the environment of Commonwealth land found that there would be no change to the findings of the determined activity and would be unlikely to cause a significant impact on matters of national environmental significance or the environment of Commonwealth land. A referral to the Australian Government Department of the Environment and Energy is not required.

## 4.4 Confirmation of statutory position

The proposal is categorised as development for the purpose of a road and/or road infrastructure facilities and is being carried out by or on behalf of a public authority. Under clause 94 of ISEPP the proposal is permissible without consent. The proposal is not State significant infrastructure or State significant development. The proposal can be assessed under Division 5.1 of the EP&A Act. Consent from Shoalhaven City Council is not required.

As stated above, no further approvals are required by the Commonwealth under the EPBC Act.

# 5 Consultation

## 5.1 Consultation strategy

A Community and Stakeholder Communication Plan was prepared for the project in accordance with the *Community Involvement Practice Notes and Resources Manual: A resource manual for staff* (RTA, 2010). The plan has guided consultation involving TfNSW, other relevant government agencies, organisations, community representatives and residents. As such, four major rounds of consultation with the community and stakeholders were undertaken for the project and are documented in Section 5.2 of the project REF.

The proposal is broadly consistent with the features and aspects of the project that the community has already being consulted on. As the proposed works impact a privately owned property, further consultation was undertaken for the residents of 125 Brinawarr Street.

The proposal is expected to have a minor to moderate impact on the locally heritage listed *'Illowra'* property. As a result, consultation with the Shoalhaven Council is required under clause 14 of the ISEPP.

## 5.2 Consultation outcomes

The residents of 125 Brinawarr Street have been consulted on the new access arrangements and property adjustments as shown in figure 3-1. The detailed design and alignment of the new driveway was completed in consultation with the landowner.

The results of the consultation were

Date: 14 October 2020

Summary: *Meeting with tenants at community display centre. Items discussed included sequence of events including fence removal, tree clearing, installation of temporary fencing, retaining wall construction and demolition of tennis club. Property adjustment drawings were also shown and explained.*

Concerns or issues raised: *Tenant requested that property be secure at all times during construction with temporary fencing. No other issues raised.*

Shoalhaven City Council was consulted about the proposed modification as per the requirements of clause 14 of ISEPP. This consultation is documented in Appendix F.

The results of the consultation were

Date: 19 January 2021

Summary: *An email response was received from Shoalhaven City Council.*

Concerns or issues raised: *Shoalhaven City Council stated that there were generally no objection to the proposed works provided that mitigation measures listed in the SOHI are complied with.*

## 5.3 Government agency and stakeholder involvement

The proposal is minor in nature, low impact and on private land. Government agencies have been extensively consulted throughout the development of the project and would not need to be consulted about the proposal.

## 5.4 Ongoing or future consultation

Ongoing consultation for the project and the proposal would be undertaken in accordance with the Community and Stakeholder Communication Plan.

The project REF on page 130 goes into more detail about how property access and temporary parking would be managed by community consultation during construction.

# 6 Environmental assessment

This section of the addendum REF provides a detailed description of the potential environmental impacts associated with the construction and operation of the proposal of the Nowra Bridge Project. All aspects of the environment potentially impacted upon by the proposal are considered. This includes consideration of:

- Potential impacts on matters of national environmental significance under the EPBC Act
- The factors specified in the guidelines Is an EIS required? (DUAP 1995/1996) as required under clause 228(1) *of the* Environmental Planning and Assessment Regulation 2000 and the *Roads and Related Facilities EIS Guideline (DUAP 1996)*. The factors specified in clause 228(2) of the Environmental Planning and Assessment Regulation 2000 are also considered in Appendix A.

Site-specific safeguards and management measures are provided to mitigate the identified potential impacts.

## 6.1 Aboriginal Heritage

### 6.1.1 Methodology

Kelleher Nightingale completed an Aboriginal Heritage Due Diligence report (appendix c) for the proposal. The report included a due diligence desktop assessment and visual inspection for Aboriginal objects or areas of potential surface deposits for the study area. It concluded that no Aboriginal heritage was identified within the '*proposal and according to the Heritage NSW Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales; the proposal can proceed with caution'.*

### 6.1.2 Existing environment

The existing environment is described in table 6-31 of the project REF, which identifies Aboriginal heritage items within the study area, notes the heritage significance of the property and refers to the LEP listing no. 136.

The study area has been heavily modified as a result of landscaping, ground levelling activities and the construction of the existing driveway. Visual inspection confirmed that no Aboriginal objects or areas of Aboriginal archaeological potential are located within the study area.

The visual inspection also confirmed there are no culturally modified trees in the study area.

### 6.1.3 Potential impacts

#### Construction

Activities associated with the proposal would impact the ground surface to some degree and therefore have the potential to harm Aboriginal objects which may be present.

The project unexpected finds procedure is to be followed for any unexpected Aboriginal finds. All personnel involved with the works will be toolboxed on the unexpected finds procedure.

The study area has already been heavily modified as a result of landscaping, ground levelling activities and the construction of the existing driveway. There is a very low likelihood of any intact archaeological deposit within the study area that may be impacted by the proposal.

## 6.2 Non-Aboriginal Heritage

### 6.2.1 Methodology

A Statement of Heritage Impact (SOHI) was prepared as part of the project REF to assess potential impacts on areas of non-Aboriginal heritage value. The assessment concluded that the project would cause a moderate impact to ‘*‘Illowra”* due to vibration of nearby construction activities.

Further consideration of impacts on the ‘*‘Illowra”* were included in the REF submissions report. Specifically the removal of screening vegetation as a result of the proposal was assessed. As a part of the submission report mitigation measure NAH 5 was updated to include:

> *‘where practicable, investigate opportunities to minimise impacts the curtilage’ ‘ of ‘Illowra’, (LEP no. 136)’*
>
> *‘Wherever possible natural screening adjacent to heritage items along the Princes Highway will be retained. Where impact to vegetation cannot be avoided new plantings will be considered’*

Impacts that may result from the proposal have been further assessed under an additional Statement of Heritage Impacts, completed by Artefact on 14 January 2021. This SOHI concluded that there would be minor to moderate impacts upon the *‘Illowra’* property as a result of the works, and that consultation under Clause 14 of the ISEPP is required to be undertaken.

### 6.2.2 Existing environment

The existing environment is described in table 6-31 of the project REF, which identifies non-Aboriginal heritage items within the study area, notes the heritage significance of the property and refers to the LEP listing no. 136. Section 5.2.5 of the REF Statement of Heritage Impact refers to the features of heritage significance at the property known as ‘*‘Illowra”*.

### 6.2.3 Potential impacts

#### Construction

As detailed in the addendum SOHI, construction of the proposal will result in minor to moderate impacts to the heritage property. These impacts would include:

- Minor to moderate direct physical impact to the listed heritage property, due to the removal of vegetation and the construction of temporary scaffolding

- Moderate indirect visual impact, due to the removal of planted vegetation on the property
- Negligible to neutral vibration impacts to the property, if provided recommendations are followed to monitor and reduce vibration
- Minor potential impact on any archaeological remains found during construction
- Moderate cumulative impact when considered in conjunction with the project as proposed in the REF, as additional vegetation is to be removed as part of the proposal, further modifying the landscape.

These impacts would be managed using the existing mitigation measures outlined in the project Heritage Management Plan, in conjunction with additional mitigation methods recommended in the addendum SOHI. These additional safeguards are listed in section 6.2.4.

### 6.2.4 Safeguards and management methods

| Impact | Environmental safeguards | Responsibility | Timing | Reference |
|---|---|---|---|---|
| *'Illowra'* property | All landscape features including the circular driveway, garden stones, brick edging, trees, decorative plantings and shrubs, to be modified for the proposal would be reinstated with like-for-like materials following the completion of works to ensure the existing character of the study area is retained. | Construction Contractor | Construction | Project specific control |
| *'Illowra'* property | Decorative elements including the decorative garden bed stones would be retained and reused in the proposed landscape design following the completion of works. | Construction Contractor | Construction | Project specific control |
| *'Illowra'* property | Vegetation to be removed for the proposal would be retained for replanting in an appropriate location within the study area. Where vegetation cannot be replaced, trees and plantings of similar species would be replanted following completion of the construction program in addition to those proposed in the landscape design plan. | Construction Contractor | Construction | Project specific control |
| *'Illowra'* property | During construction works, monitoring of vibration impacts to *'Illowra'* would be undertaken by structural engineers. Assessment and monitoring of vibration impacts would adhere to the: British Standard BS 7385: Part 2: Evaluation and Measurement for Vibrations in Buildings, and Part 2 Guide to Damage Levels from | Construction Contractor | Construction | Project specific control |

| Impact | Environmental safeguards | Responsibility | Timing | Reference |
|---|---|---|---|---|
| | Ground-Borne Vibration–German Standard DIN 4150 Part 3: Structural Vibration in Buildings: Effects on Structures. | | | |
| *'Illowra'* property | If levels of vibration are found to be damaging significant heritage fabric associated with the item, works must cease and the construction methodology be reviewed by project engineers in consultation with a heritage consultant to mitigate further impacts. | Construction Contractor | Construction | Project specific control |
| *'Illowra'* property | If changes to the current design occur an addendum SoHI would be completed to assess any additional impacts. | Construction Contractor | Construction | Project specific control |

## 6.3 Biodiversity

### 6.3.1 Methodology

A biodiversity assessment report (Ecological, 2020) was prepared for this AREF to determine the potential impacts on terrestrial biodiversity and describe management measures to minimise impacts on threatened species, communities and their habitats (appendix D).

The assessment included data and literature reviews of the study area's ecology and surrounding environments and, a site inspection. Using this information, a Test of Significance (TOS) and Significant Impact Criteria (SIC) test was completed for potential impact to species listed in the BC Act and EPBC Act.

### 6.3.2 Existing environment

The proposal is located on part of the *'Illowra'* homestead, which has a European style garden of planted native and exotic flora species. The area was historically cleared of the native vegetation prior to 1901 for the construction of the homestead.

The site inspection completed by Ecological identified no fauna habitats in the form of habitat bearing trees (HBT), cave like structures, large fallen logs or continued patches of native remnant vegetation that supports threatened fauna species.

#### Threatened flora and fauna species and populations

A desktop review identified one endangered population, 34 threatened flora species and 61 threatened fauna and migratory species that have either been recorded or are predicted to occur within a 5km radius of the proposal. Individuals of the one endangered population, *Eucalyptus langleyi* population are in fragment stands in the Bomaderry Creek Regional Park with is approximately 200m away from the study area.

No TEC's were identified on or near to the proposal.

One threatened flora species, the *Syzygium paniculatum* (Magenta Lilly Pilly) was identified within the proposal. There are five *S. paniculatum* identified in the proposal area that were planted to provide a barrier between the Princes Highway and 'Illowra' homestead. Impact assessments for these individuals were deemed unnecessary, as planted individuals are not considered to meet the threatened species listing under the BC Act or EPBC Act.

There were 19 other *S. paniculatum* identified, assessed and approved for removal in the project REF (2018b) and the projects Biodiversity study (RMS, 2018a).

One threatened fauna species, Grey-headed Flying Fox (GHFF) which is listed as Vulnerable under the BC and EPBC Act roosts near the subject site. The core roost is located approximately 50m from the proposal.

#### Vegetation community types

There are two distinct vegetation types within the proposal, including:

- Cleared, mown, planted exotic gardens
- Planted native and exotic vegetation

The planted native and exotic vegetation type recorded fifty-one (51) flora species during the site inspection. Twenty-one (21) were exotic species and thirty (30) were native.

### 6.3.3 Potential impacts

#### Construction

The proposal would result in the removal of 0.08 hectares of planted exotic and native flora species.

The vegetation being removed will be clearly marked out prior to works commencing to avoid unintentional impacts beyond the clearing limits of this AREF. The clearing limit fence will be a single strand hi-visibility flagging and sign posted 'no-go'. Any larger native trees should be mulched and reused onsite.

If required, the fauna handling procedure in Appendix C of the Flora and Fauna Management Plan (Fulton Hogan, 2019). All personnel competing the works will be toolboxed on what to do if an injured fauna is encountered.

The proposal may impact the nearby roost of the GHFF. Mitigation measures to protect the roost are listed in section 6.3.5.

#### Operation

Replanting of vegetation along the Princes Highway would reinstate the curtilage and offset the removal of vegetation during construction. Planting activities are to be undertaken in consultation with the land owner.

#### Conclusion on significance of impacts

The modification is not likely to significantly impact threatened species, populations or ecological communities or their habitats, within the meaning of the BC Act or EPBC Act and therefore a Species Impact Statement is not required.

### 6.3.4 Biodiversity offsets

Biodiversity offsets are described in Section 6.9.4 of the project REF.

The vegetation proposed for removal is not listed as a threatened flora species or a TEC under the BC or EPBC Acts, therefore requirements for biodiversity offsets are anticipated as a result of the proposal.

### 6.3.5 Safeguards and management measures

| Impact | Environmental safeguards | Responsibility | Timing | Reference |
|---|---|---|---|---|
| Potential roosting GHFF | To reduce impacts to the GHFF nearby roost habitats:<br>• Toolbox all personnel completing the works what to do if an injured GHFF is encountered<br>• Reduce and limit where practical loud machinery and equipment that produces sudden impacts/noise.<br>• During the day, any activity likely to cause loud noises that could disturb flying foxes, so that they take flight continuously and/or for periods of time in excess of 20 minutes, should be avoided and / or monitored.<br>• No tree in which a flying-fox is currently roosting in is to be trimmed or removed until the flying fox vacates the tree in the evening.<br>• A person experienced in flying-fox behaviour is to remain onsite to monitor works when canopy trimming/removal is required within 30m of roosting flying-foxes.<br>• Works will not take place in periods of adverse or extreme weather. | Construction contractor | Construction | Project specific control |

## 6.4 Noise and vibration

### 6.4.1 Methodology

A noise and vibration assessment (Renzo Tonin & Associates, 2018) was undertaken for the project REF to determine potential noise and vibration impacts and to describe reasonable and feasible management measures.

The methodology of the noise and vibration assessment is described in Section 6.2.1 of the project REF. This information was reviewed and is still considered to be relevant to the proposal.

### 6.4.2 Potential impacts

#### Construction

The project REF predicted exceedances of the noise management levels for each noise catchment area for most construction activities, particularly bulk earthworks and new pavements. The proposal would involve similar activities that would likely generate some minor construction noise at 125 Brinawarr Street.

Vibration impacts to 125 Brinawarr Street were predicted in the project REF (section 6.2). The project REF assessed vibration impacts using the most vibration intensive piece of equipment that could potentially be used, working within 20m of ‘‘Illowra’’. The proposal involves the demolition of a structure that is about 25m from ‘‘Illowra’’. The vibration impacts as a result of the proposal are considered consistent with the project REF.

Works will be effectively managed through implementation of the NVMP during construction of the proposal.

#### Operation

Operational noise and vibration is assessed in Section 6.2 of the project REF. No additional operational noise impacts are anticipated as a result of the proposal.

## 6.5 Other impacts

### 6.5.1 Existing environment and potential impacts

| Environmental factor | Existing environment | Potential impacts |
|---|---|---|
| Aboriginal heritage | The existing environment as it relates to Aboriginal heritage is described in Section 6.3.2 of the project REF and is still considered to be consistent with the proposal. | The proposal would have minor impact on potential Aboriginal heritage. Excavation works would generally not involve significant subsurface excavation that may impact Aboriginal sites. The proposal is outside the Aboriginal Heritage Impact Permit (AHIP) area described in the project REF. The AHIP will not be amended for these works based on the results and recommendations of the due diligence assessment undertaken by Kelleher Nightingale (Appendix C). |
| Landscape character and visual amenity | The existing environment as it relates to landscape character and visual amenity is described in Section 6.5.2 of the project REF and is still considered to be relevant to the proposal. | The proposal would have minor short term impact on landscape character and significant views. Potential impacts would be effectively managed through appropriate safeguards and management measures in Section 7. |
| Traffic and transport | The existing traffic and transport environment of the project is described in Section 6.1.2 of the project REF. | The proposal would not impact traffic and transport. All construction vehicles will use a private access off Brinawarr Street to access the work area. This is to be agreed with the landowner. |
| Flooding and hydrology | The existing environment as it relates to flooding and hydrology is described in Section 6.6.2 of the project REF and is still considered to be relevant to the proposal | The proposal would not impact flooding and hydrology. |
| Coastal processes | The existing environment as it relates to coastal processes is described in Section 6.6.2 of the project | The proposal would not impact coastal processes. |

| Environmental factor | Existing environment | Potential impacts |
|---|---|---|
| | REF and is still considered to be relevant to the proposal. | |
| Property and land use | The existing environment as it relates to property and land use is described in Section 6.7.1 of the project REF and is still considered to be relevant to the proposal. | The proposal would not require additional property acquisition. |
| Socio-economic | The existing environment as it relates to socio-economics is described in Section 6.8.2 of the project REF and is still considered to be relevant to the proposal. | The proposal is on private property and will not impact on business or public amenity. |
| Water quality | The existing water quality environment is described in Section 6.10.2 of the project REF. | The proposal would have minor water quality impacts. Potential impacts would be effectively managed through appropriate safeguards and management measures in Section 7. |
| Soils | The existing environment as it relates to soils is described in Section 6.11.2 of the project REF and is still considered to be relevant to the proposal. | The proposal would have very minor impacts on the soil landscape. It would have minor disturbance or soils that will be effectively managed through appropriate safeguards and management measures in Section 7. |
| Waste management | The waste resource management hierarchy principles and waste streams associated with construction are described in Section 6.12 of the project REF and are still considered to be relevant to the proposal. | The proposal would generally result in small increases volumes of green and demolition waste. The project REF identified a Waste Management Plan (WMP) would be prepared and implemented as part of the CEMP. |
| Air quality | The existing environment as it relates to air quality is described in Section 6.13.2 of the project REF and is still considered to be relevant to the proposal. | The proposal would have short-term localised impacts on air quality associated with construction including demolition activities, construction vehicle movements, earthworks and vegetation clearing. Potential impacts would be effectively managed through appropriate safeguards and management measures in Section 7. |
| Climate change and sustainability | The existing environment as it relates to climate change and sustainability is described in Section | The proposal would not generate significant greenhouse gas emissions in addition to those described in the project REF. |

| Environmental factor | Existing environment | Potential impacts |
|---|---|---|
| | 6.14.1 of the project REF and is still considered to be relevant to the proposal. | |

# 7 Environmental management

## 7.1 Environmental management plans (or system)

The proposal is minor in nature and does not result in additional safeguards and management measures. Should the proposal proceed, these management measures would already be addressed into the Environmental Work Method Statements (EWMS) and Construction Environmental Management Plan (CEMP) and applied during the construction and operation of the proposal.

## 7.2 Summary of safeguards and management measures

Environmental safeguards and management measures (SMM) for the Nowra Bridge Project are summarised in table 7-1. Any new SMM as a result of the proposal are in bold and underlined. The safeguards and management measures will be implemented during construction and operation of the proposal. These safeguards and management measures will minimise any potential adverse impacts arising from the proposal on the surrounding environment.

**Table 7-1: Summary of safeguards and management measures**

| No. | Impact | Environmental safeguards | Responsibility | Timing | Reference |
|---|---|---|---|---|---|
| GEN1 | General – minimise environmental impacts during construction | A CEMP will be prepared and submitted for review and endorsement of the TfNSW Environment Manager prior to commencement of the activity.<br>As a minimum, the CEMP will address the following:<br>• Any requirements associated with statutory approvals<br>• Details of how the project will implement the identified safeguards outlined in the REF<br>• Issue-specific environmental management plans<br>• Roles and responsibilities<br>• Communication requirements<br>• Induction and training requirements<br>• Procedures for monitoring and evaluating environmental performance, and for corrective action<br>• Reporting requirements and record-keeping<br>• Procedures for emergency and incident management<br>• Procedures for audit and review.<br>The endorsed CEMP will be implemented during the undertaking of the activity. | TfNSW, Construction Contractor | Pre-construction / detailed design | Section 3 of *G36 Environment Protection* |

| | | | | | |
|---|---|---|---|---|---|
| GEN2 | General – notification | All businesses, residential properties and other key stakeholders (e.g. schools, local councils) affected by the activity will be notified at least five days prior to commencement of the activity. | TfNSW, Construction Contractor | Pre-construction | Project specific control |
| GEN3 | General – environmental awareness | All personnel working on site will receive training to ensure awareness of environment protection requirements to be implemented during the project. This will include up-front site induction and regular "toolbox" style briefings. Site-specific training will be provided to personnel engaged in activities or areas of higher risk. These include:<br>• Areas of Aboriginal heritage sensitivity<br>• Threatened species habitat<br>• Adjoining residential areas requiring particular noise management measures. | TfNSW, Construction Contractor | Detailed design / Pre-construction | Project specific control |
| ***Traffic and transport*** | | | | | |
| T1 | Traffic and transport | A Traffic Management Plan (TMP) will be prepared and implemented as part of the CEMP. The TMP will be prepared in accordance with the Roads and Maritime *Traffic Control at Work Sites Manual* (RTA, 2010) and *Specification G10 Control of Traffic* (Roads and Maritime, 2018). The TMP will include:<br>• Confirmation of haulage routes<br>• Measures to maintain access to local roads and properties<br>• Site specific traffic control measures (including signage) to manage and regulate traffic movement<br>• Measures to maintain pedestrian and cyclist access<br>• Requirements and methods to consult and inform the local community of impacts on the local road network<br>• Access to construction sites including entry and exit locations and measures to prevent construction vehicles queuing on public roads | Construction Contractor | Pre-construction | Section 4.8 of *G36 Environment Protection* |

| | | | | | |
|---|---|---|---|---|---|
| | | • A response plan for any construction traffic incident<br>• Consideration of other developments that may be under construction to minimise traffic conflict and congestion that may occur due to the cumulative increase in construction vehicle traffic<br>• Monitoring, review and amendment mechanisms. | | | |
| T2 | Traffic and transport | Undertake consultation with local and regional bus companies prior to and during construction. | Construction contractor | Pre-construction / Construction | Project specific control |
| T3 | Traffic and transport | Undertake consultation with Shoalhaven City Council regarding potential impacts to parking during construction and operation. | TfNSW | Pre-construction | Project specific control |
| T4 | Traffic and transport | Undertake consultation with emergency services and Shoalhaven District Memorial Hospital before and during construction to confirm any diversions during construction. | Construction Contractor | Pre-construction / Construction | Project specific control |
| T5 | Traffic and transport | Undertake consultation with property owners regarding changes to access arrangements. Targeted notification to affected residents and businesses will be conducted prior to the completion of altered local road connections, where road closures and detours are proposed. | Construction Contractor | Pre-construction / Construction | Project specific control |
| T6 | Traffic and transport | Notifications will be issued to the local community regarding changes to pedestrian and cycle path access, diversions or alternative routes and any proposed changes to parking. | Construction Contractor | Pre-construction / Construction | Project specific control |
| T7 | Traffic and transport | Schedule partial road closures to avoid peak holiday periods. | Construction Contractor | Construction | Project specific control |
| T8 | Traffic and transport | Provide advance notification to the community where impacts to on-street and off-street parking is unavoidable. | Construction Contractor | Construction | Project specific control |

| | | | | | |
|---|---|---|---|---|---|
| T9 | Traffic and transport | Obtain a Road Occupancy Licence where required. | Construction Contractor | Pre-construction / Construction | Project specific control |
| T10 | Traffic and transport | In the event that temporary restrictions on maritime traffic movements are required during construction, the community will be notified in advance and any temporary restrictions will be in accordance with applicable TfNSW requirements. | Construction Contractor | Construction | Project specific control |
| ***Noise and vibration*** | | | | | |
| NV1 | Construction noise and vibration | A Noise and Vibration Management Plan (NVMP) will be prepared and implemented as part of the CEMP. The NVMP will be in accordance with the *Roads and Maritime Construction Noise and Vibration Guideline* (RMS, 2016) and will identify:<br>• All potential significant noise and vibration generating activities associated with the activity<br>• Feasible and reasonable mitigation measures to be implemented, taking into account Beyond the Pavement: urban design policy, process and principles (Roads and Maritime, 2014)<br>• A monitoring program to assess performance against relevant noise and vibration criteria<br>• Arrangements for consultation with affected neighbours and sensitive receivers, including notification and complaint handling procedures<br>• Contingency measures to be implemented in the event of non-compliance with noise and vibration criteria. | Construction Contractor | Detailed design / pre-construction | Section 4.6 of *G36 Environment Protection* |
| NV2 | Construction noise | Where feasible, use structures to shield residential receivers from noise such as site shed placement; earth bunds; fencing; and consideration of site topography when situating plant. | Construction Contractor | Construction | Project specific control |

| | | | | | |
|---|---|---|---|---|---|
| NV3 | Construction noise and vibration | All sensitive receivers likely to be affected will be notified of construction impacts at least seven calendar days prior to the commencement of any works that may generate noise levels above the Noise Management Level or high vibration impacts. The notification will provide details of:<br>• The project<br>• The construction period and construction hours<br>• Contact information for project management staff<br>• Complaint and incident reporting<br>• How to obtain further information. | Construction Contractor | Pre-construction | Project specific control |
| NV4 | Out of hours work | Out of hours works will be carried out in accordance with the *Construction Noise and Vibration Guideline* (Roads and Maritime 2016). Amendments to allowable high impact noise and vibration activities and OOHW as listed in section 6.2.4 take precedence to the Guideline due to the community consultation outcomes. | Construction Contractor | Construction | Project specific control |
| NV5 | Works with high noise levels | Where feasible and reasonable, construction should be carried out during the standard daytime working hours. Work generating high noise levels should be scheduled during less sensitive time periods, such as after 8.00 am and before 6.00 pm. | Construction Contractor | Construction | Project specific control |
| NV6 | Construction respite periods | High noise generating activities near receivers should be carried out in blocks that do not exceed three hours each, with a minimum respite period of one hour between each block. The duration of each block of work and respite should be flexible to accommodate the usage and amenity at nearby receivers.<br>For high noise activities occurring out of hours, unless Duration Respite is negotiated with the community with consultation documented and approved by Roads and Maritime project manager or permitted under the licence there should be no more than:<br>• Two consecutive evenings or nights per week<br>• Three evenings or nights per week; and | Construction Contractor | Construction | Project specific control |

| | | | | | |
|---|---|---|---|---|---|
| | | • Six evenings or nights per month.<br><br>For night work these periods of work should be separated by not less than one week<br><br>The aforementioned measures for construction respite periods must be considered in relation to the outcome of community consultation for night work scheduling. The community would prefer 'multiple focused blocks of night work' which would involve:<br><br>Up to three months of work at a time in one location, five nights a week. | | | |
| NV7 | Construction noise<br><br>and vibration | Shield stationary noise sources such as pumps, compressors, fans, etc. Stationary noise sources should be enclosed or shielded where feasible and reasonable while ensuring that the occupational health and safety of workers is maintained. Appendix D of AS 2436:2010 lists materials suitable for shielding. | Construction<br><br>Contractor | Construction | Project specific control |
| NV8 | Damage to structures | Attended vibration monitoring should be undertaken at sensitive receivers during works with potential for vibration to cause structural damage and human response in order to confirm appropriate site-specific minimum working distances.<br><br>Site-specific minimum working distances should be determined whenever significant vibration generating plant will be working close to or within the recommended minimum working distances listed in Appendix D to the REF. | Construction<br><br>Contractor | Construction | Project specific control |
| NV9 | Damage to structures | Dilapidation surveys will be conducted at all residential and other vibration sensitive receivers within 50 metres of the construction site. | Construction<br><br>Contractor | Pre-construction | Project specific control |
| NV10 | Construction vibration | Notification of residences potentially affected by vibration by letterbox drop will be carried out for all occupied buildings within 100 metres of the construction site. | Construction<br><br>Contractor | Pre-construction /<br><br>Construction | Project specific control |

| | | | | | |
|---|---|---|---|---|---|
| NV11 | Potential damage to heritage listed structures | Attended vibration monitoring will be carried out during periods where construction plant and equipment are operating within the minimum working distance for the heritage listed structures identified in Table 6-24 of the REF. | Construction Contractor | Pre-construction / Construction | Project specific control |
| NV12 | Potential damage to rock shelters | Vibration monitoring will be carried out during periods where high vibration plant and equipment are operating in close proximity to the rock shelters to determine appropriate site-specific vibration levels. | Construction Contractor | Construction | Project specific control |
| NV13 | Operational noise mitigation | Operational noise mitigation requirements will be reviewed during detailed design. At-property treatments will be agreed upon and implemented in consultation with property owners. | TfNSW, Designer | Detailed design | Project specific control |
| NV14 | Operational noise Mitigation | Where practical, operational noise treatments will be implemented at the start of the construction period. | Construction Contractor | Pre-construction | Project specific control |
| NV15 | Operational noise | Post-construction noise monitoring will be undertaken in accordance with *Noise Criteria Guideline* (Roads and Maritime 2016) and *Noise* *Mitigation Guideline* (Roads and Maritime 2016) within 2–12 months of proposal completion, at selected representative locations along the proposal route. | TfNSW | Post-construction | Project specific control |
| ***Aboriginal heritage*** | | | | | |
| AH1 | Aboriginal heritage | An Aboriginal Heritage Management Plan (AHMP) will be prepared in accordance with the *Procedure for Aboriginal cultural heritage consultation and investigation* (Roads and Maritime, 2012) and *Standard Management Procedure – Unexpected Heritage Items* (Roads and Maritime, 2015) and implemented as part of the CEMP. It will provide specific guidance on measures and controls to be | Construction Contractor | Pre-construction | Section 4.9 of *G36 Environment* |

| | | | | | |
|---|---|---|---|---|---|
| | | implemented for managing impacts on Aboriginal heritage. The AHMP will be prepared in consultation with all relevant Aboriginal groups. | | | *Protection* |
| AH2 | Unexpected finds | *The Standard Management Procedure – Unexpected Heritage Items* (Roads and Maritime, 2015) will be followed in the event that an unknown or potential Aboriginal object/s, including skeletal remains, is found during construction. This applies where TfNSW does not have approval to disturb the object/s or where a specific safeguard for managing the disturbance (apart from the Procedure) is not in place. Work will only re-commence once the requirements of that Procedure have been satisfied. | Construction Contractor | Construction | Section 4.9 of *G36 Environment Protection* |
| AH3 | AHIP | An Aboriginal heritage impact permit (AHIP) will be sought for the overall proposal area. Collection of surface artefacts and salvage excavations will be completed in accordance with an AHIP prior to any activities (including pre-construction activities) which may harm Aboriginal objects at these locations. | TfNSW, Construction Contractor | Detailed design / Pre-construction | Cultural Heritage Assessment Report (CHAR), Artefact Heritage Services, 2018) |
| AH4 | Aboriginal heritage | Where possible, all subsurface impact to Graham Lodge Aboriginal Artefact Scatter (AHIMS ID 52-5-0879) will be avoided. Where impacts are unavoidable, salvage excavations will be undertaken in accordance with an AHIP and a Section 60 permit. | TfNSW, Construction Contractor | Detailed design / Pre-construction / Construction | Cultural Heritage Assessment Report (CHAR), Artefact Heritage Services, 2018) |
| AH5 | Aboriginal heritage | Collection of surface artefacts across Nowra Bridge 1 (AHIMS ID 52-5-0852) and Nowra Bridge 2 (AHIMS ID 52-5-0853) will be conducted prior to construction, in accordance with an AHIP. | TfNSW, Construction Contractor | Detailed design / Pre-construction / Construction | Cultural Heritage Assessment Report (CHAR), Artefact Heritage Services, 2018) |
| AH6 | Aboriginal heritage | Targeted salvage excavation will be conducted within Nowra Bridge 2 (AHIMS ID 52-5-0853), Nowra Bridge 7 (AHIMS ID 52-5-0875), Nowra Bridge 8 (AHIMS ID 52-5-0876), and Nowra Bridge 9 | TfNSW, Construction Contractor | Detailed design / Pre-construction / Construction | Cultural Heritage Assessment Report (CHAR), Artefact |

| | | | | | |
|---|---|---|---|---|---|
| | | (AHIMS ID 52-5-0874) prior to construction in accordance with an AHIP. | | | Heritage Services, 2018) |
| AH7 | Aboriginal heritage | Long term arrangements for the management of excavated artefacts, such as reburial or a keeping place, will be determined in accordance with the recommendations of registered Aboriginal stakeholders and OEH. | TfNSW, Construction Contractor | Pre-construction / Construction / Post construction | Cultural Heritage Assessment Report (CHAR), Artefact Heritage Services, 2018) |
| AH8 | Aboriginal heritage | Prepare and implement a Heritage Interpretation Strategy that addresses the cultural significance of the proposal location within the Dharawal landscape and archaeological finds from the study area. Develop the strategy in consultation with the Registered Aboriginal Parties. | TfNSW, Construction Contractor | Pre-construction / Construction / Post construction | Cultural Heritage Assessment Report (CHAR), Artefact Heritage Services, 2018) |
| AH9 | Aboriginal heritage | Maintain ongoing consultation with the Registered Aboriginal Parties during detailed design and construction. | TfNSW, Construction Contractor | Pre-construction / Construction | Cultural Heritage Assessment Report (CHAR), Artefact Heritage Services, 2018) |
| ***Non-Aboriginal heritage*** | | | | | |
| NAH1 | Non-Aboriginal heritage | A Non-Aboriginal Heritage Management Plan (NAHMP) will be prepared and implemented as part of the CEMP. It will provide specific guidance on measures and controls to be implemented to avoid and mitigate impacts to Non-Aboriginal heritage.<br>The NAHMP will include:<br>• Provisions to appropriately protect and manage significant fabric during the proposed.<br>• Provision of a heritage induction for all workers being carried out prior to commencement of works.<br>• The induction will include values of the sites, avoidance procedure, and contacts (site manager, Road and Maritime | Construction Contractor | Detailed design / Pre-construction | Section 4.10 of *G36 Environment Protection* |

| | | | | | |
|---|---|---|---|---|---|
| | | environment officer) for reporting unexpected archaeological finds, or inadvertent impact to heritage items. | | | |
| NAH2 | Non-Aboriginal heritage | *The Standard Management Procedure – Unexpected Heritage Items* (Roads and Maritime, 2015) will be followed in the event that any unexpected heritage items, archaeological remains or potential relics of Non-Aboriginal origin are encountered. Work will only re-commence once the requirements of that Procedure have been satisfied. | Construction Contractor | Detailed design / Pre-construction | Section 4.10 of *G36 Environment Protection* |
| NAH3 | Non-Aboriginal heritage | Where practicable, impacts to Graham Lodge and curtilage will be avoided. Where subsurface works which may impact significant archaeological remains within Graham Lodge are unavoidable and justifiable, an Archaeological Research Design will be prepared to support a Section 60 application. | TfNSW, Construction Contractor | Detailed design / Pre-construction | Statement of Heritage Impact (SoHI), Artefact Heritage Services, 2018 |
| NAH4 | Non-Aboriginal heritage | TfNSW will investigate the technical feasibility and suitable location for relocation of the pavilion structure associated with the Captain Cook Bicentennial Memorial, in consultation with Shoalhaven City Council. Subject to the feasibility and suitable location being determined for relocation, TfNSW will meet all reasonable costs associated with its relocation. | TfNSW, Construction Contractor | Detailed design / Pre-construction | Statement of Heritage Impact (SoHI), Artefact Heritage Services, 2018 |
| NAH5 | Non-Aboriginal heritage | Where practicable, investigate opportunities to minimise impacts to the curtilage of 'Lynburn' (LEP No.130) and ''Illowra'' (LEP No. 136). Wherever possible, natural screening adjacent to heritage items along the Princes Highway will be retained. Where impact to vegetation cannot be avoided new plantings will be considered. | TfNSW, Construction Contractor | Detailed design / Pre-construction / Post construction | Statement of Heritage Impact (SoHI), Artefact Heritage Services, 2018 |
| NAH6 | Non-Aboriginal heritage | Consideration should be given to the preparation of a heritage interpretation strategy as part of the proposal. An interpretation strategy would consider interpretation opportunities for heritage items located within the study area. A heritage interpretation strategy for the existing southbound bridge will be addressed through the separate adaptive reuse assessment process. | TfNSW | Detailed design | Statement of Heritage Impact (SoHI), Artefact Heritage Services, 2018 |

| | | | | | |
|---|---|---|---|---|---|
| NAH7 | Non-Aboriginal heritage | An archival recording will be prepared for the Captain Cook Bicentennial Memorial, the Nowra Bridge over the Shoalhaven River, ‘‘Illowra’’, ‘Lynburn’ and the potential unlisted heritage item ‘M&M Guesthouse’ prior to impacts occurring. The archival recording will be prepared in accordance with *Photographic Recording of Heritage Items Using Film or Digital Capture* (Heritage Council 2006). | TfNSW | Detailed design / Pre-construction | Statement of Heritage Impact (SoHI), Artefact Heritage Services, 2018 |
| NAH9 | Non-Aboriginal heritage | Consider options for relocation of the unlisted potential heritage item ‘M&M Guesthouse’ in consultation with Shoalhaven Council | TfNSW | Prior to detailed design | Statement of Heritage Impact (SoHI), Artefact Heritage Services, 2018 |
| NAH10 | Non-Aboriginal heritage | Potential impacts of the proposed noise barrier on State heritage listed Graham Lodge (SHR No. 01699) would be assessed during detailed design | Construction Contractor | Detailed design | Project specific control |
| NAH11 | Maritime archaeology | A remote sensing survey using side-scan sonar of the project impact area will be conducted to confirm the presence or absence of submerged archaeological resources within the impact area. In the event that underwater archaeological resources are identified as a result of underwater surveys a diving inspection will be carried out by qualified commercial divers, supervised by a qualified maritime archaeologist, to confirm the nature and significance of the archaeological resource. If archaeological resources of State significance are identified, the Heritage Division, as Delegate of the NSW Heritage Council will be notified in accordance with Section 144 of the NSW Heritage Act 1977. | TfNSW | Pre-construction | Maritime archaeological due diligence assessment, RPS, 2018 |
| NAH12 | Maritime archaeology | If the potential for additional impact of Nowra Wharf is identified, photographic recording will be carried out for the wharf and slip prior to impact in accordance with the *Photographic Recording of Heritage Items using Film or Digital Capture* (Heritage Council, 2006). | TfNSW | Pre-construction / Construction | Maritime archaeological due diligence assessment, RPS, 2018 |

| | | | | | |
|---|---|---|---|---|---|
| NAH13 | Historical archaeology | The existing sandstone embankment to the shoreline associated with the historical archaeological item "Wharf for coasting steamers and stores" is to be fenced-off for the portion of the site adjoining the project boundary to prevent damage during the construction and use of the Fish Shop east of Nowra Bridge abutment ancillary site. | Construction Contractor | Pre-construction | Project specific control |
| **NAH14** | ***'Illowra'* property** | **All landscape features including the circular driveway, garden stones, brick edging, trees, decorative plantings and shrubs, to be modified for the proposal would be reinstated with like-for-like materials following the completion of works to ensure the existing character of the study area is retained.** | **Construction Contractor** | **Construction** | **Project specific control** |
| **NAH15** | ***'Illowra'* property** | **Decorative elements including the decorative garden bed stones would be retained and reused in the proposed landscape design following the completion of works.** | **Construction Contractor** | **Construction** | **Project specific control** |
| **NAH16** | ***'Illowra'* property** | **Vegetation to be removed for the proposal would be retained for replanting in an appropriate location within the study area. Where vegetation cannot be replaced, trees and plantings of similar species would be replanted following completion of the construction program in addition to those proposed in the landscape design plan.** | **Construction Contractor** | **Construction** | **Project specific control** |
| **NAH17** | ***'Illowra'* property** | **During construction works, monitoring of vibration impacts to *'Illowra'* would be undertaken by structural engineers. Assessment and monitoring of vibration impacts would adhere to the:**<br>• **British Standard BS 7385: Part 2: Evaluation and Measurement for Vibrations in Buildings**<br>• **Part 2 Guide to Damage Levels from Ground-Borne Vibration–German Standard DIN 4150 Part 3: Structural Vibration in Buildings: Effects on Structures.** | **Construction Contractor** | **Construction** | **Project specific control** |

| | | | | | |
|---|---|---|---|---|---|
| **NAH18** | ***'Illowra'* property** | **If levels of vibration are found to be damaging significant heritage fabric associated with the item, works must cease and the construction methodology be reviewed by project engineers in consultation with a heritage consultant to mitigate further impacts.** | **Construction Contractor** | **Construction** | **Construction** |
| **NAH19** | ***'Illowra'* property** | **If changes to the current design occur an addendum SoHI would be completed to assess any additional impacts.** | **Construction Contractor** | **Construction** | **Project specific control** |
| ***Landscape character and visual impact*** | | | | | |
| LV1 | Landscape character<br>and visual impact | An Urban Design and Landscape Plan (UDLP) will be prepared to inform detailed design and will form part of the CEMP. Development of the UDLP will draw on the Urban Design Report and Landscape and Visual Assessment prepared for the REF.<br>The UDLP will present an integrated urban design for the project, providing practical detail on the application of design principles and objectives identified in the environmental assessment.<br>The UDLP will include design treatments for:<br>• Location and identification of existing vegetation and proposed landscaped areas, including species to be used<br>• Built elements including retaining walls, bridges, noise walls, and foreshore structures<br>• Pedestrian and cyclist elements including footpath location, paving types and pedestrian crossings<br>• Fixtures such as seating, lighting, fencing and signs<br>• Details of the staging of landscape works taking account of related environmental controls such as erosion and sedimentation controls and drainage<br>• Procedures for monitoring and maintaining landscaped or rehabilitated areas.<br>• The UDLP will be prepared in accordance with relevant guidelines, including: | Designer | Detailed design | Project specific control |

| | | | | | |
|---|---|---|---|---|---|
| | | • Beyond the Pavement urban design policy, process and principles (Roads and Maritime, 2014)<br>• Landscape Guideline (RTA, 2008)<br>• Environmentally Friendly Seawalls' (OEH, 2009)<br>• Bridge Aesthetics (Roads and Maritime, 2012)<br>• Noise Wall Design Guidelines (RTA, 2006)<br>• Shotcrete Design Guideline (RTA, 2005). Landscape Guideline (RTA, 2008)<br>• Bridge Aesthetics (Roads and Maritime, 2012)<br>• Noise Wall Design Guidelines (RTA, 2006)<br>• Shotcrete Design Guideline (RTA, 2005). | | | |
| LV2 | Retention of existing vegetation | The proposal will be designed to avoid impact to prominent trees and vegetation communities as far as practicable possible. Water quality structures and drainage lines will be designed to avoid existing vegetation where practicable. | Designer | Detailed design | Project specific control |
| LV3 | Bridge form | The proposed bridge design will aim to achieve a slender and less visually intrusive form and be visually harmonious with the existing bridges. | Designer | Detailed design | Project specific control |
| LV4 | Impacts on existing vegetation | Investigate introducing retaining walls in the following locations to provide the opportunity to retain existing tree plantings, improve the visual and pedestrian amenity, and reduce the scale of the highway:<br>• Either side of the Princes Highway between Bolong Road and Bomaderry Creek bridge.<br>• The new northbound bridge approach road<br>• Either side of the Princes Highway south of the Bridge Road intersection | Designer | Detailed design | Landscape Character and Visual Impact Assessment |

| | | | | | |
|---|---|---|---|---|---|
| LV5 | Impacts on vegetation | Consider the proposed drainage swale design and location to minimise cutting as well as provide additional space for planting near the corner of the Princes Highway and Illaroo Road | Designer | Detailed design | Landscape Character and Visual Impact Assessment |
| LV6 | Impact on Rotary Park | Consider the proposed footpath alignment and stair design of the path beneath the bridge structures and in Rotary Park to better reflect its parkland setting | Designer | Detailed design | Landscape Character and Visual Impact Assessment |
| LV7 | Impacts on existing vegetation | Consider the alignment of the footpath on the north eastern corner of the existing southbound bridge, in consultation with adjacent land owners, to avoid impact to existing trees. | Designer | Detailed design | Landscape Character and Visual Impact Assessment |
| LV8 | Active transport | Investigate the design of the entrance to properties on the north eastern corner of the existing southbound bridge to prioritise pedestrians and cyclists over vehicles and facilitate ease of travel. | Designer | Detailed design | Landscape Character and Visual Impact Assessment |
| LV9 | Visual impact of piers | Consider the proposed pier designs to strengthen the complementary relationship between the proposed bridge piers and the piers of the existing northbound and southbound bridges. In particular, it will consider tapering the piers at their long elevation | Designer | Detailed design | Landscape Character and Visual Impact Assessment |
| LV10 | Site restoration | Construction work sites and ancillary sites will be returned to at least their pre-construction state, unless otherwise detailed in the project design, once construction activities are complete or will be progressively remediated throughout the construction program where possible | Designer | Detailed design | Landscape Character and Visual Impact Assessment |
| LV11 | Retention of existing vegetation | Existing trees to be retained within construction facilities areas will be identified, protected and maintained for the duration of the construction works | Designer | Detailed design | Landscape Character and |

| | | | | | |
|---|---|---|---|---|---|
| | | | | | Visual Impact Assessment |
| LV12 | Light spill | Temporary lighting will be screened, diverted or minimised to avoid unnecessary light spill | Designer | Detailed design | Landscape Character and Visual Impact Assessment |
| LV13 | Site restoration | Material used for temporary land reclamation will be removed once construction activities are complete. | Designer | Detailed design | Landscape Character and Visual Impact Assessment |
| ***Flooding and hydrology*** | | | | | |
| HY1 | Hydrology | Temporary drainage structures will be designed and constructed in accordance with the *Technical Guideline – Temporary Stormwater Drainage for Road Construction* (Roads and Maritime 2011c). | Construction Contractor | Construction | Project specific control |
| HY2 | Flooding | As part of the CEMP, a flood management plan will be prepared and will include appropriate management measures to manage the risk and impacts of flooding including, but not limited to:<br>• Steps to be taken in the event of a flood warning<br>• Removal or securing of loose material<br>• Storage or removal of plant and equipment<br>• Storage of fuels and chemicals. | Construction Contractor | Pre-construction / construction | Project specific control |
| HY3 | Property impacts | The flooding analysis will be reviewed as part of detailed design, particularly with regard to any changes to the design that could affect flooding behaviour and changes in flood levels from that presently existing. This will consider the incremental impact on residential properties and on other affected development. The | Designer | Detailed design | Project specific control |

| | | | | | |
|---|---|---|---|---|---|
| | | review will include consultation with relevant stakeholders including Shoalhaven City Council and OEH. | | | |
| HY4 | Property impacts | TfNSW will carry out a damage assessment during detailed design for affected properties related to the incremental impact of the proposal, and this will be used to inform consultation with affected residents. | Designer | Detailed design | Project specific control |
| HY5 | Construction within the waterway | In addition to the preparation of a Flood Management Plan (FMP), the following management controls will be implemented to minimise potential impacts of construction activities in Shoalhaven River and Bomaderry Creek in a flood event.<br>Construction and use of temporary rock working platform:<br>• Install heavy-duty silt curtains around the platform during construction and removal<br>• Install geotextile wrapped rock filter bund around platform to capture potential concrete or spoil runoff<br>• Clean rock material comprising the platform will be selected to minimise the risk of fine sediment material entering waterways.<br>• A suitable clean rock material (i.e. bluestone or basalt) is to be selected to resist weathering and erosion under direct impact from plant and equipment and through exposure to the elements.<br>• Provide marine spill kits on the platform, southern banks of Shoalhaven River and banks of Bomaderry Creek.<br>• Enact site lockdown procedures and move potential floating material to higher ground if a flood event is likely.<br>• During removal of the platforms, the first layer of clean rock on the bottom of Shoalhaven River and Bomaderry Creek would remain in-situ to avoid damage and/or disturbance of the riverbed leading to increased turbidity levels.<br>• During removal of the platform, the silt curtains are to remain in-situ to capture any loose debris or accumulated sediment between the rock armour. | Construction Contractor | Construction | Project specific control |

| | | | | | |
|---|---|---|---|---|---|
| | | Use of waterway barges:<br>• Ensure hydraulic hoses are sleeved or wrapped in geofabric or plastic or similar to contain hydraulic oil in case of hydraulic hose breakage<br>• In consideration of weather conditions, warnings and tides, rotate barges to have the bow facing upstream and secure with additional anchor lines<br>• Relocate barges to the southern bank of Shoalhaven River in a major flood event and secure with additional anchor lines<br>• Provide marine spill kits on the barges and banks of Shoalhaven River. | | | |
| HY6 | Consultation regarding construction within the waterway | TfNSW would commit to consultation with affected property owners. Consultation would include potential flood extents, suitable evacuation routes and evacuation procedures in a flood event.<br>TfNSW would undertake consultation with the local community on the flood impact of permanent works, and the Construction Contractor for temporary works. | TfNSW and Construction Contractor | Pre-construction | Project specific control |
| ***Property and land use*** | | | | | |
| PA1 | Property acquisition<br>and relocation issues | TfNSW will continue to consult with directly affected property owners throughout the detail design phase. | TfNSW | Detailed design | Project specific control |
| PA2 | Property acquisition | All property acquisition will be carried out in accordance with the *Land Acquisition Information Guide* (Roads and Maritime, 2014b), the *Land Acquisition (Just Terms Compensation) Act 1991* and the NSW Government Land Acquisition Reform 2016. | TfNSW | Detailed design,<br>Pre-construction | Core standard<br>safeguard<br>PL1 |

| | | | | | |
|---|---|---|---|---|---|
| PA3 | Property acquisition | Acquisition of Crown land will be carried out in accordance with the *Crown Lands Management Act 2016*. | TfNSW | Detailed design, Pre-construction | Project specific control |
| ***Socio-economic*** | | | | | |
| SE1 | Project communications | A Community and Stakeholder Engagement Plan will be prepared and will include:<br>• Procedures and mechanisms that will be implemented in response to the key social impacts identified for the proposal.<br>• Procedures and mechanisms that will be used to engage with affected landowners, business owners, and the wider community to identify potential access, parking, business visibility, and other impacts and develop appropriate management measures.<br>• Procedures to keep the community informed about construction and any associated changes to conditions (e.g. detours or lane closures) such as through advertisements in local media and advisory notices or variable message signs<br>• Procedure for the management of complaints and enquiries, including a contact name and number for complaints.<br>• The plan will be prepared in accordance with the<br>• *Community Involvement and Communications*<br>• *Resource Manual* (RTA, 2008). | TfNSW | Detailed design / pre-construction | Project specific control |
| SE2 | Impacts on council infrastructure | TfNSW will continue to consult with Council regarding impacts to council infrastructure. | TfNSW | Detailed design | Project specific control |
| SE3 | Impacts on social infrastructure – | At least one of the two boat ramps within the proposal area will be available to the public at all times. The public would be notified in advance of any access restrictions during construction. | TfNSW, Construction Contractor | Detailed design, Construction | Project specific control |

| | | | | | |
|---|---|---|---|---|---|
| | maritime activities | | | | |
| SE4 | Impact on Greys Beach Reserve | Use of the Greys Beach Reserve site for temporary construction activities will be planned to consider peak usage periods of the river for recreational users. Access to the boat ramp at Greys Beach will be maintained at all times. Access to parking would be largely maintained between the September/October school holidays to the Monday after Anzac Day. Outside of these times about half of the existing parking area (about 50 spaces) will be available. | TfNSW, Construction Contractor | Detailed design, Construction | Project specific control |
| SE5 | Impacts on social infrastructure – time capsule | TfNSW will endeavour to identify the location of the time capsule in Moorhouse Park and establish an appropriate salvage and/or relocation of this object, in consultation with Council and relevant community members. | TfNSW | Detailed design | Project specific control |
| SE6 | Impact on parking | Consultation will be carried out with Council to identify alternative parking arrangements to replace car parking lost during construction. | TfNSW | Detailed design, Pre-construction | Project specific control |
| SE7 | Impact on access to Shoalhaven River foreshore | The CEMP will include measures to ensure public access to the Shoalhaven River foreshore and pathways is maintained during construction, where possible given safety considerations. | TfNSW, Construction Contractor | Detailed design, Construction | Project specific control |
| SE8 | Construction staff parking | The construction contractor will provide suitable off-street parking to accommodate workers during construction. Construction vehicles would not occupy private parking including Nowra Aquatic Centre and Shoalhaven Entertainment Centre and Visitor Centre. The | Construction Contractor | Pre-construction, Construction | Project specific control |

| | | | | | |
|---|---|---|---|---|---|
| | | Construction TMP will include appropriate measures to prevent construction staff from utilising these public parking areas. | | | |
| SE9 | Business and tourism impacts – operation | Existing businesses with authorised Tourist Attraction Signposting Assessment Committee (TASAC) approved signage will be consulted to develop revised signage if impacted by the proposal. | TfNSW | Detailed design | Project specific control |
| SE10 | Impact on visual amenity | TfNSW will consult with affected residents with regard to the proposed noise barrier on the eastern side of the Princes Highway south of the Shoalhaven River. This will include investigation and consideration of alternative options for noise mitigation. | TfNSW | Detailed design | Project specific control |
| SE11 | Parking during construction | Consultation with Council and the other property owners will be carried out to confirm the suitability of the identified areas proposed for temporary car parking and specific matters relating to their use. | Designer | Detailed design | Project specific control |
| SE12 | Impact on Greys Beach Reserve | Consultation with boat ramp users, Council, and other relevant community groups would be undertaken regarding any changes to the availability of parking at Greys Beach. | Designer, Construction Contractor | Detailed design | Project specific control |
| ***Biodiversity*** | | | | | |
| B1 | General biodiversity | A Flora and Fauna Management Plan (FFMP) will be prepared as part of the Construction Environmental Management Plan (CEMP). The FFMP will be prepared in accordance with the *Roads and Maritime Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (RTA 2011) (Biodiversity Guidelines)<br>and Section 4.8 of Roads and Maritime Specification *G36 Environment Protection* and *G40 Clearing and Grubbing*. The FFMP will include, but not be limited to:<br>• Pre-clearing process<br>• Management of unexpected species finds | Construction Contractor | Prior to construction | Project specific control |

| | | | | | |
|---|---|---|---|---|---|
| | | • Delineation of exclusion zones<br>• Process for weed management<br>• Process for pathogen management<br>• Requirements set out in the Landscape Guideline (RTA 2008). | | | |
| B2 | Removal of native vegetation | Native vegetation removal would be minimised through detailed design. | Designer | Detailed design | Project specific control |
| B3 | Impacts on fauna | Pre-clearing surveys will be undertaken in accordance with *Guide 1: Pre-clearing process of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (RTA 2011). | Construction Contractor | Pre-construction | Project specific control |
| B4 | Removal of vegetation | Vegetation removal will be undertaken in accordance with *Guide 4: Clearing of vegetation and removal of bushrock of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (RTA 2011). | Construction Contractor | Construction | Project specific control |
| B5 | Removal of vegetation | Native vegetation will be re-established in accordance with *Guide 3: Re-establishment of native vegetation of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (RTA 2011). | Construction Contractor | Construction / Post construction | Project specific control |
| B6 | Threatened flora and fauna | The unexpected species find procedure is to be followed under *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (RTA 2011) if threatened ecological communities, not assessed in the biodiversity assessment, are identified in the proposal site. | Construction Contractor | Construction | Project specific control |
| B7 | Removal of vegetation | A mulch management plan will be prepared in accordance with the mulch order 2016 under the *Protection of the Environment Operations Act 1997* (POEO Act) | Construction Contractor | Pre-construction | Project specific control |

| | | | | | |
|---|---|---|---|---|---|
| B8 | Removal of EEC | Exclusion zones will be placed around retained EECs in accordance with *Guide 2: Exclusion Zones* | Construction Contractor | Pre-construction | Project specific control |
| B9 | Removal of aquatic habitat | Removal of aquatic habitat (seagrass) will be minimised through detailed design. It is recommended that all proposed maritime navigation aids and moorings in Shoalhaven River are located in areas absent of seagrass. | Construction Contractor | Pre-construction | Project specific control |
| B10 | Removal of threatened species habitat and habitat features | Habitat will be replaced or re-instated in accordance with *Guide 5: Re-use of woody debris and bushrock* and *Guide 8: Nest boxes of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (RTA 2011). | Construction Contractor | Construction | Project specific control |
| B11 | Aquatic habitat impacts | Aquatic habitat will be protected in accordance with *Guide 10: Aquatic habitats and riparian zones of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (RTA 2011) and Section 3.3.2 *Standard precautions and mitigation measures of the Policy and guidelines for fish habitat conservation and management Update 2013* (DPI (Fisheries NSW) 2013). | Construction Contractor | Construction | Project specific control |
| B12 | Aquatic habitat impacts | DPI (Fisheries) will be consulted with regard to the need for a permit to harm marine vegetation. | Construction Contractor | Construction | Project specific control |
| B13 | Changes to hydrology | Changes to existing surface water flows will be minimised through detailed design. | Designer | Detailed design | Project specific control |
| B14 | Injury and mortality of fauna | Fauna will be managed in accordance with *Guide 9: Fauna handling of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (RTA 2011). | Construction Contractor | Construction | Project specific control |

| | | | | | |
|---|---|---|---|---|---|
| B15 | Invasion and spread of weeds | Weed species will be managed in accordance with *Guide 6: Weed management of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (RTA 2011). | Construction Contractor | Construction | Project specific control |
| B16 | Invasion and spread of pathogens and disease | Pathogens will be managed in accordance with Guide 7: Exclusion zones of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA 2011). | Construction Contractor | Construction | Project specific control |
| B17 | Noise, light and vibration | Shading and artificial light impacts will be minimised through detailed design. | Designer | Detailed design | Project specific control |
| B18 | Aquatic habitats | TfNSW will determine and implement a suitable offset for impacts to affected key fish habitat in accordance with the *Guideline for Biodiversity Offsets* (Roads and Maritime 2016) and the DPI's *Policy and guidelines for fish habitat conservation and management* (DPI 2013), in consultation with DPI (Fisheries). | TfNSW | Pre-construction | Project specific control |
| B19 | Aquatic pests and diseases | All machinery and vessels used within the waterway are to be verified as clean and free of potential weeds, pests and pathogens prior to arrival to site. Procedures to prevent the introduction or spread of aquatic pests, diseases and saltwater weeds will be developed in consultation with DPI Aquatic Biosecurity and implemented during construction. | Construction Contractor | Pre-construction / Construction | Project specific control |
| B20 | Fish kills | TfNSW will immediately notify DPI Fisheries of any fish kills in the vicinity of the works. | Construction Contractor | Construction | Project specific control |
| B21 | Potential roosting habitat | The disused Bomaderry Creek footbridge will be investigated to determine whether there is roosting habitat potential for microchiropteran bat species such as the Little Bentwing-bat | Construction Contractor | Pre-construction | Project specific control |

| | | | | | |
|---|---|---|---|---|---|
| | | (Miniopterus australis), Eastern Bentwing-bat (Miniopterus schreibersii oceanensis) and Southern Myotis (Myotis macropus). | | | |
| B22 | Removal of seagrass | To minimise and monitor impacts to seagrass beds in Shoalhaven River:<br>• Seagrass monitoring must be undertaken prior to construction to confirm the location and extent of the seagrass beds identified in the project REF.<br>• Implement a before-after control-impact (BACI) seagrass monitoring program to detect potential changes in seagrass health and distribution due to construction activities including the construction and use of the temporary rock working platform. | Construction Contractor | Pre-construction and Construction | Project specific control |
| B23 | Fish passage requirements | An approval to obstruct fish passage would be assessed as part of the permit for dredging or reclamation works for the project REF issued under Part 7, Division 3, Section 199 of the FM Act if required. Any impediments to flow must comply with fish passage requirements under the permit.<br>However, a permit would not be required for the blockage of fish passage in Shoalhaven River and Bomaderry Creek if flow velocities are not maintained above 0.3 metres per second over a 24 hour period under normal flow conditions. Rudimentary calculations with the blockage in place would be sufficient to determine flows. | Construction Contractor | Pre-construction | Project specific control |
| **B24** | **Potential roosting GHFF** | **To reduce impacts to the GHFF nearby roost habitats:**<br>• **Toolbox must be carried out for all personnel completing the works on what to do if an injured GHFF is encountered**<br>• **During the day, any activity likely to cause loud noises that could disturb flying foxes, so that they take flight continuously and/or for periods of time in excess of 20 minutes, should be avoided and / or monitored.** | **Contactor** | **During construction** | **Project specific control** |

| | | | | | |
|---|---|---|---|---|---|
| | | • **No tree in which a flying-fox is currently roosting in is to be trimmed or removed until the flying fox vacates the tree in the evening.**<br>• **A person experienced in flying-fox behaviour is to remain onsite to monitor works when canopy trimming/removal is required within 30m of roosting flying-foxes.** | | | |
| ***Water quality*** | | | | | |
| WQ1 | Water quality | A Soil and Water Management Plan (SWMP) will be prepared and implemented as part of the CEMP. The SWMP will identify all reasonably foreseeable risks relating to soil erosion and water pollution and describe how these risks will be addressed during construction. The SWMP will contain as a minimum the following elements:<br>• Site specific Erosion and Sedimentation Control Plans (ESCPs), including detailed consideration of staging and management at ancillary sites, in accordance with the Blue Book<br>• Identification of site conditions or construction activities that could potentially result in erosion and associated sediment runoff<br>• Methods to minimise potential adverse impacts of construction activities on the water quality within surrounding waterways<br>• Details of measures to minimise any adverse impacts of sedimentation on the surrounding environment<br>• Details of measures to minimise soil erosion caused by all construction works including clearing, grubbing and earthworks<br>• Details of measures to make site personnel aware of the requirements of the SWMP by providing information within induction, toolbox and training sessions | Construction Contractor | Pre-construction | Section 2.1 of *G38 Soil and Water Management* |

| | | | | | |
|---|---|---|---|---|---|
| | | • Details of the roles and responsibilities of personnel responsible for implementing the SWMP<br>• Details of measures for the inspection and maintenance of construction phase water treatment devices and structures<br>• Details of water quality monitoring<br>• Detailed construction methodology and environmental work method statement for the proposed bridge works and creek realignment within Shoalhaven River and Bomaderry Creek to minimise the potential for bank instability, scour, flooding, working over water and other adverse impacts of construction activities on the water quality.<br>The SWMP will be reviewed by a soil conservationist on the TfNSW list of Registered Contractors for Erosion, Sedimentation and Soil Conservation Consultancy Services. The SWMP will be revised as required to address the outcomes of the review. | | | |
| WQ2 | Water quality | A site ESCP will be prepared and implemented as part of the SWMP. The ESCP will include arrangements for managing wet weather events, including monitoring of potential high-risk events (such as storms) and specific controls and follow-up measures to be applied in the event of wet weather. Development of the ESCP will take into consideration:<br>• Provision of sediment basins<br>• Temporary surface drainage line controls<br>• Bridge deck and bridge piles working with over water and alkaline waste water management<br>• Over water sediment controls including:<br>• Silt fences along areas of the foreshore that have been cleared<br>• Silt curtains encompassing construction areas disturbing or releasing river bottom sediments (e.g. piling)<br>• Silt booms surrounding barges to ensure leaks /spills are contained. | Construction Contractor | Pre-construction | Section 2.2 of *G38 Soil and Water Management* |

| | | | | | |
|---|---|---|---|---|---|
| WQ3 | Water quality | The SWMP will identify the position of an on-site environmental representative to complete self-audits and monitor implementation of the SWMP. | Construction Contractor | Pre-construction / Construction | Project specific control |
| WQ4 | Water quality | In the event of significant groundwater inflows, undertake further assessment and consultation with DPI (Water) in relation to any licencing requirements. | Construction Contractor | Construction | Project specific control |
| WQ5 | Water quality | During detailed design implement best practice water sensitive urban design (WSUD) measures to provide dissipation of flows and prevent gross pollutants and contaminants entering the study area's waterways. WSUD measures are designed to provide treatment of nutrients and suspended solids prior to discharge to the existing receiving environment. | Designer | Detailed design | Project specific control |
| WQ6 | Water quality | During detailed design, review the drainage design to identify and evaluate opportunities to meet the WSUD water quality objectives, including consideration of:<br>• Improvements to the design of the southern basin to achieve better performance<br>• Inclusion of grass swales on both sides of the highway in the vicinity of Bolong Road (subject to the acquisition area)<br>• Provision of a grassed swale as part of rehabilitation of the ancillary site adjacent to Bridge Road / Scenic Drive. | Designer | Detailed design | Project specific control |
| WQ7 | Water quality | Surface water quality monitoring will be undertaken prior to construction to establish baseline water quality and regularly during construction so that any impacts from the proposal construction phase can be identified and addressed. Sampling locations and monitoring methodology will be determined as part of the CEMP, but as a minimum will be undertaken upstream and downstream of creek crossings and in accordance with the *Guideline for Construction Water Quality Monitoring* (Roads and Maritime, 2003). | TfNSW, Construction Contractor | Pre-construction / Construction | Project specific control |

| | | | | | |
|---|---|---|---|---|---|
| WQ8 | Water quality | Bulk storage of fuels or chemicals should be located greater than 100 metres from any watercourse or mapped EEC. In constrained areas where criteria cannot be achieved, additional risk assessment and additional mitigation measures may need to be considered and implemented to manage risk to sensitive receivers to an acceptable level. | Construction Contractor | Construction | Project specific control |
| WQ9 | Water quality | Vehicles and machinery will be properly maintained to minimise the risk of fuel/oil leaks. | Construction Contractor | Construction | Project specific control |
| WQ10 | Water quality | An Emergency Spill Plan will be developed and incorporated in the CEMP. This will include measures to avoid spillages of fuels, chemicals, and concrete wash or fluids into any waterways. | Construction Contractor | Construction | Project specific control |
| WQ11 | Water quality | The storage, handling and use of fuels or chemicals will be undertaken in accordance with the *Occupational Health and Safety Act 2000* and WorkCover's *Storage and Handling of Dangerous Goods Code of Practice* (WorkCover, 2005). | Construction Contractor | Construction | Project specific control |
| WQ12 | Water quality | If any dewatering or other activities which will impact the local groundwater system are proposed, consultation with the DPI (Water) will be undertaken to determine the requirements for water extraction licenses and approvals. | Construction Contractor | Construction | Project specific control |
| WQ12 | Water quality | Minimise direct and indirect impact to riparian vegetation | Designer, Construction Contractor | Detailed design / Construction | Project specific control |
| WQ13 | Water quality | Split rock used in reclamation works in or adjacent to the waterways must be clean and free of fines. | Construction Contractor | Construction | Project specific control |

| | | | | | |
|---|---|---|---|---|---|
| | | The Contractor must source, thoroughly inspect and then authorise the use of split rock and clean rock material in or adjacent to the waterways. | | | |
| WQ14 | Water quality | The final detailed design plans for the new bridges at Shoalhaven River and Bomaderry Creek, and for water quality treatment devices will be provided to DPI Fisheries for review and comment. TfNSW will consider all comments provided with regard to any further revisions to the final design. | TfNSW, Construction Contractor | Detailed design | Project specific control |
| WQ15 | Water quality | Operational spill containment of a minimum of 20,000 litres will be provided to ensure that spills on the new bridge and approaches can be captured before reaching sensitive environments. | TfNSW, Designer | Detailed design | Project specific control |
| WQ16 | Water quality | Management of water quality during construction will incorporate the following measures:<br>• Where practicable, water from construction sediment basins will be reused in preference to discharge<br>• Construction sediment basin outlets will be rock armoured to meet *Blue Book* design requirements.<br>• Basin dewatering activities will be carried out in accordance with Roads and Maritime's *Environmental Management of Construction Site Dewatering*.<br>• Floating siphon devices will be used where practicable to minimise resuspension of sediment during dewatering operations. | Construction Contractor | Construction | Project specific control |
| WQ17 | Water quality | DPI Fisheries will be consulted with regard to the design and construction of any instream temporary working structures. | Construction Contractor | Construction | Project specific control |
| ***Soils*** | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| SO1 | Contaminated land | A Contaminated Land Management Plan will be prepared in accordance with the *Guideline for the Management of Contamination* (Roads and Maritime, 2013) and implemented as part of the CEMP. The plan will include, but not be limited to:<br>• Capture and management of any surface runoff contaminated by exposure to the contaminated land<br>• Further investigations required to determine the extent, concentration and type of contamination, as identified in the detailed site investigation (Phase 2)<br>• Management of the remediation and subsequent validation of the contaminated land, including any certification required<br>• Measures to ensure the safety of site personnel and local communities during construction. | Construction Contractor | Pre-construction | Section 4.2 of *G36 Environment Protection* |
| SO2 | Contaminated land | If contaminated areas were encountered during construction, appropriate control measures will be implemented to manage the immediate risks of contamination. All other works that may impact on the contaminated area will cease until the nature and extent of the contamination has been confirmed and any necessary site-specific controls or further actions identified in consultation with the TfNSW Environment Manager and/or EPA. | Construction Contractor | Construction | Section 4.2 of *G36 Environment Protection* |
| SO3 | Accidental spills | A site-specific emergency spill plan will be developed and will include spill management measures in accordance with the Roads and Maritime *Code of Practice for Water Management* (RTA, 1999) and relevant EPA guidelines. The plan will address measures to be implemented in the event of a spill, including initial response and containment, notification of emergency services and relevant authorities (including Roads and Maritime and EPA officers). | Construction Contractor | Detailed design / Pre-construction | Section 4.3 of *G36 Environment Protection* |
| SO4 | Acid sulfate soils | During geotechnical investigations, soil sampling and testing for ASS parameters will be carried out in areas of proposed ground disturbance where there is a low to high probability of encountering PASS/ASS. Assessment of the presence/absence of ASS will be | Designer | Detailed design | Project specific control |

| | | | | | |
|---|---|---|---|---|---|
| | | made with reference to NSW *Acid Sulfate Soils Assessment Guidelines* (ASSMAC,1998). | | | |
| SO5 | Acid sulfate soils | During detailed design, the preferred management strategy for PASS/ASS is to avoid its disturbance wherever possible. Where disturbance of PASS/ASS is unavoidable, preferred design strategies are:<br>• Minimisation of disturbance which may include avoiding/ minimising impact on areas with high levels of sulphides, limiting disturbances so that only shallow disturbances occur and minimising groundwater fluctuations.<br>• Neutralisation with lime<br>• Hydraulic separation of sulphides from the sediment either on its own or in conjunction with dredging<br>• Strategic reburial (re-interment) where material can be permanently placed in anaerobic conditions, for example covered by water and compacted soil to keep it wet and free of oxygen.<br>• Other management measures may be considered during construction stage but must not pose unacceptably high risks. | Designer | Detailed design | Project specific control |
| SO6 | Acid sulfate soils | An ASS Management Plan (ASSMP) will be prepared to identify procedures for mitigation and management of known PASS/ASS areas during construction stage. The ASSMP will include details on:<br>• Identification of specific areas where PASS/ASS are required to be managed<br>• Determine liming rates for neutralisation of PASS/ASS within each area<br>• Details on appropriate construction staging and methods used in relation to PASS/ASS on site<br>• Specific mitigation measures to prevent disturbance of and/or acid generation from PASS/ASS to manage and control environmental issues | Construction Contractor | Pre-construction | Project specific control |

| | | | | | |
|---|---|---|---|---|---|
| | | • Procedures for handling, treatment (including acid neutralisation), containment and disposal of PASS/ASS associated with proposed excavation activities at the site.<br>• Additional testing will be required during construction to determine liming rates relevant to each area of ASS that will be disturbed. The plan will be prepared in general accordance with NSW *Acid Sulfate Soils Assessment Guidelines* (ASSMAC,1998). | | | |
| SO8 | Hazardous materials | A Hazardous Materials (HAZMAT) survey will be carried out to assess the potential for lead-based paints and/or asbestos containing materials including:<br>• Structures identified for demolition<br>• Known buried utilities and service pits<br>• A Hazmat Register will identify the location of all known or suspected hazardous materials. Risk assessments will be carried out to quantify and control potential exposure to human and ecological receptors during construction. | Designer | Detailed design | Project specific control |
| SO10 | Hazardous materials | Any works requiring asbestos removal should be carried out in accordance with an Asbestos Removal Control Plan prepared in accordance with the relevant published guidelines and codes of practice:<br>• Code of Practice. How to safely remove asbestos in the workplace (SafeWork NSW, 2016a)<br>• Code of Practice. How to manage and control asbestos in the workplace (SafeWork NSW, 2016b)<br>• Roads and Maritime Procedure Asbestos Related Work No. 066P25 (Roads and Maritime, 2013).<br>• Prior to works, notifications to SafeWork NSW will be carried out by the appropriate licensed asbestos removal contractor. At the completion of the asbestos removal, clearance certificates will be issued to the contractor confirming the effectiveness of asbestos removal. | Construction Contractor | Construction | Project specific control |

| | | | | | |
|---|---|---|---|---|---|
| SO11 | Hazardous materials | An unexpected finds protocol will be employed if previously unidentified asbestos contamination is discovered during construction. Work in the affected area will cease immediately, and an investigation must be undertaken, and a report prepared to determine the nature, extent and degree of the asbestos contamination. The level of reporting must be appropriate for the identified contamination in accordance with *Guidelines for Consultants Reporting on Contaminated Sites* (OEH, 2011), any relevant SafeWork NSW codes of practice and include the proposed methodology for the remediation of the asbestos contamination.<br><br>Works may only recommence upon receipt of a validation report from a suitably qualified contamination specialist that the remediation activities have been undertaken in accordance with the investigation report and remediation methodology. | Construction Contractor | Construction | Project specific control |
| SO12 | Sedimentation and erosion | During detailed design, the potential impacts associated with bridge construction and operation will be further considered to minimise the likelihood of bank instability and scouring, flow alteration and potential increased risk of flooding. The design and construction methodologies should, wherever possible, minimise direct and indirect impacts to riparian vegetation, and implement best practice water sensitive urban design (WSUD) measures to provide dissipation of flows and prevent gross pollutants and contaminants entering the study area's waterways. WSUD measures are designed to provide treatment of nutrients and suspended solids prior to discharge to the existing receiving environment. | Designer | Detailed design | Project specific control |
| ***Waste management*** | | | | | |
| WA1 | Waste management – general | A Waste Management Plan (WMP) will be prepared and implemented as part of the CEMP. The WMP will include but not be limited to: | Construction Contractor | Pre-construction | Project specific control |

| | | | | | |
|---|---|---|---|---|---|
| | | • Measures to avoid and minimise waste associated with the project<br>• Classification of wastes and management options (re-use, recycle, stockpile, disposal)<br>• Statutory approvals required for managing both on and off-site waste, or application of any relevant resource recovery exemptions<br>• Procedures for storage, transport and disposal<br>• Monitoring, record keeping and reporting.<br>The WMP will be prepared taking into account the *Environmental Procedure – Management of Wastes on Roads and Maritime Services Land* (Roads and Maritime, 2014) and relevant Roads and Maritime Waste Fact Sheets. | | | |
| WA2 | Waste management – general | All wastes will be managed and disposed of in accordance with the POEO Act. All liquid and/or non-liquid waste generated on the site will be assessed and classified in accordance with *Waste Classification Guidelines* (Environment Protection Authority 2014), or any superseding document. | Construction Contractor | Construction | Project specific control |
| WA3 | Waste management – general | Noxious weeds removed during construction will be managed in accordance with Department of Primary Industries requirements and relevant legislation. | Construction Contractor | Construction | Project specific control |
| WA4 | Waste management – general | Site inductions will include waste management and disposal requirements and facilities. | Construction Contractor | Construction | Project specific control |
| WA5 | Waste management – general | Appropriate portable toilets with either pump out facilities or sewer connections will be provided for site personnel and sewage will disposed of appropriately and in accordance with relevant legislation. | Construction Contractor | Construction | Project specific control |

| | | | | | |
|---|---|---|---|---|---|
| WA6 | Fill material | Excavated material will be reused on site where feasible and suitable for the intended reuse to reduce demand on resources. Where excavated material cannot be used on site, opportunities for reuse on nearby projects will be investigated. | Construction Contractor | Construction | Project specific control |
| WA7 | Fill material | Any required additional fill material will be sourced from appropriately licensed facilities and/or other construction projects wherever possible. Additional fill material will be sourced and verified as suitable for use in accordance with relevant EPA and TfNSW guidelines. | Construction Contractor | Construction | Project specific control |
| WA8 | Green waste | Where practicable and suitable for use, cleared vegetation will be mulched for use on site. | Construction Contractor | Construction | Project specific control |
| WA9 | Disposal of waste | Excavated material will be reused on-site where feasible and suitable for the intended reuse to reduce demand on resources. Where excavated material cannot be used on site, opportunities for reuse on nearby projects will be investigated. | Construction Contractor | Construction | Project specific control |
| WA10 | Disposal of waste | All waste will be disposed of to an appropriate licensed facility. All waste materials removed from the site will only be directed to a waste management facility or premises lawfully permitted to accept the materials. | Construction Contractor | Construction | Project specific control |
| WA11 | Management of tannins | A tannin leachate management protocol will be developed in accordance with Roads and Maritime' *Environmental Direction – Management of Tannins from Vegetation Mulch* (Roads and Maritime, 2012) to manage the stockpiling of mulch and use of cleared vegetation and mulch filters for erosion and sediment control | Construction Contractor | Construction | Project specific control |
| WA12 | Waste generation | Waste generated outside the site will not be received at the site for storage, treatment, processing, reprocessing, or disposal on the site, except as expressly permitted by a licence under the | Construction Contractor | Construction | Project specific control |

| | | | | | |
|---|---|---|---|---|---|
| | | *Protection of the Environment Operations Act 1997*, if such a licence is required in relation to that waste. | | | |
| ***Air quality*** | | | | | |
| AQ1 | Air quality | An Air Quality Management Plan (AQMP) will be prepared by a suitably qualified and experienced person(s) in consultation with the EPA and implemented as part of the CEMP. The AQMP will include, but not be limited to:<br>• Potential sources of air pollution<br>• Air quality management objectives consistent with any relevant published EPA and/or OEH guidelines<br>• Mitigation and suppression measures to be implemented<br>• Methods to manage work during strong winds or other adverse weather conditions<br>• A progressive rehabilitation strategy for exposed surfaces. | Construction Contractor | Detailed design / pre-construction | Section 4.4 of G36 *Environment Protection* |
| AQ2 | Dust emissions | Work will cease when levels of visible airborne dust become excessive. | Construction Contractor | Construction | Project specific control |
| AQ3 | Dust emissions | Works that disturb vegetation, soil or stockpiles will not be carried out during winds over 40 km/h when this may affect receivers. | Construction Contractor | Construction | Project specific control |
| AQ4 | Dust emissions | Stockpiled materials will be covered, stabilised or stored in areas not exposed to high winds. | Construction Contractor | Construction | Project specific control |
| AQ5 | Dust emissions | All trucks will be covered when transporting materials to and from the site. | Construction Contractor | Construction | Project specific control |
| ***Climate change and greenhouse gas emissions*** | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| CC1 | Greenhouse gas emissions | The use of alternative fuels and power sources for construction plant equipment will be investigated and implemented, where appropriate | Construction Contractor | Pre-construction | Project specific control |
| CC2 | Greenhouse gas emissions | The energy efficiency and related carbon emissions will be considered in the selection of vehicle and plant equipment | Construction Contractor | Pre-construction | Project specific control |
| CC3 | Greenhouse gas emissions | Construction equipment, plant, and vehicles will be appropriately sized for the task | Construction Contractor | Construction | Project specific control |
| CC4 | Greenhouse gas emissions | Equipment will be serviced frequently to ensure they are operating efficiently | Construction Contractor | Construction | Project specific control |
| CC5 | Greenhouse gas emissions | Where possible, materials will be delivered as full loads and local suppliers would be used | Construction Contractor | Construction | Project specific control |
| ***Cumulative impacts*** | | | | | |
| CU1 | Cumulative construction impacts | Ongoing coordination and consultation will be undertaken between the project teams on Albion Park Rail Bypass, Berry to Bomaderry upgrade, and The Consultation Plan will include consultation with Project Managers of the Batemans Bay Bridge replacement, Berry to Bomaderry upgrade and the Far North Collector Road projects to ensure cumulative traffic impacts are appropriately assessed and managed, particularly during peak holiday periods | Roads and Maritime, Construction Contractor | Pre-construction | Project specific control |
| CU2 | Cumulative construction impacts | Consultation with Shoalhaven City Council will be undertaken regarding the Far North Collector Road to ensure cumulative traffic impacts are appropriately assessed and managed, particularly during peak holiday periods | TfNSW, Construction Contractor | Pre-construction / Construction | Project specific control |
| CU3 | Cumulative impacts | The CEMP will be reviewed regularly and revised as required to reflect surrounding development works as it becomes known. | Construction | Construction | Project specific control |

| | | | | | |
|---|---|---|---|---|---|
| | | | Contractor | | |

## 7.3 Licensing and approvals

The proposed addendum to the Nowra Bridge Project requires no licensing or approvals that are in addition to those already held for the approved project.

# 8 Conclusion

## 8.1 Justification

The proposal would facilitate the objectives stated in Section 2.3 of the project REF and Section 2.2 of this addendum REF.

As stated in Section 2.3, the proposal would:

- Provide access to construct the new retaining wall and provision of a 1.8m high property boundary fence that is within the approved project REF boundary.
- Allow the service driveway to 125 Brinawarr Street to be realigned and reinstated.

It is considered that the impacts of the proposal are relatively minor.

The safeguards and management measures described in Section 7 would avoid, minimise or mitigate potential impacts to the extent that the proposal would outweigh potential impacts. Therefore, the proposal is considered to be justified.

## 8.2 Objects of the EP&A Act

| Object | Comment |
|---|---|
| 1.3(a) To promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources. | The proposal would facilitate the delivery of the project through additional construction activities and access tracks. The project would improve the efficiency of traffic movements along a key section of the Princes Highway, promoting the social and economic welfare of the NSW South Coast community. |
| 1.3(b) To facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment. | Ecologically sustainable development is considered in Sections 8.2.1 to 8.2.4. The proposal would comply with the principles of ecologically sustainable development. |
| 1.3(c) To promote the orderly and economic use and development of land. | The proposal is to help facilitate construction of the project. |
| 1.3(d) To promote the delivery and maintenance of affordable housing. | Not relevant to the project. |
| 1.3(e) To protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats. | Potential impacts on biodiversity are discussed in Section 6.2. Potential impacts would be minimised through safeguards and management measures in Section 7. |
| 1.3(f) To promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage). | The proposal would not impact any listed heritage items nor likely impact Aboriginal sites. The proposal is outside the Aboriginal Heritage Impact Permit (AHIP) area described in the project REF. The AHIP will not be amended for these works based on the results and recommendations of the due diligence assessment. |
| 1.3(g) To promote good design and amenity of the built environment. | Potential landscape character and visual amenity impacts are described in Section 6.4. |
| 1.3(h) To promote the proper construction and maintenance of buildings, including the protection of the health and safety of their occupants. | Not relevant to the proposal. |

| Object | Comment |
|---|---|
| 1.3(i) To promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State. | Not relevant to the project. |
| 1.3(j) To provide increased opportunity for community participation in environmental planning and assessment. | The proposal is on private property. Consultation with the landowner has been completed. |

### 8.2.1 Ecologically sustainable development

Ecologically sustainable development (ESD) is development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends. The principles of ESD have been an integral consideration throughout the development of the project.

ESD requires the effective integration of economic and environmental considerations in decision-making processes. The four main principles supporting the achievement of ESD are discussed below.

**The precautionary principle**

A summary of the assessment based on the precautionary principle is provided in Section 8.2.1 of the project REF. The proposal is consistent with this principle.

The detailed assessment of the proposal is provided in Section 6 of this addendum REF. The updated safeguards and management measures for the project and proposal are provided in Section 7.

**Intergenerational equity**

A summary of the assessment based on intergenerational equity is included in Section 8.2.2 of the project REF. The proposal is consistent with this principle.

**Conservation of biological diversity and ecological integrity**

A summary of the assessment based on conservation of biological diversity and ecological integrity is provided in Section 8.2.3 of the project REF. The proposal is consistent with this assessment. The proposal would not have a significant impact on biological diversity and ecological integrity.

**Improved valuation, pricing and incentive mechanisms**

The principle of internalising environmental costs into decision making requires consideration of all environmental resources which may be affected by the carrying out of a project, including air, water, land and living things.

A summary of the assessment based on improved valuation, pricing and incentive mechanisms is provided in Section 8.2.4 of the project REF. The proposal is consistent with this assessment.

## 8.3 Conclusion

The proposed change to the project boundary to complete property works at the Nowra Bridge Project is subject to assessment under Division 5.1 of the EP&A Act. The REF has

examined and taken into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the proposed activity.

This has included consideration (as relevant) of conservation agreements and plans of management under the NPW Act, biodiversity stewardship sites under the BC Act, wilderness areas, areas of outstanding value, impacts on threatened species and ecological communities and their habitats and other protected fauna and native plants. It has also considered potential impacts to matters of national environmental significance listed under the EPBC Act.

A number of potential environmental impacts from the proposal have been avoided or reduced during the concept design development and options assessment. The proposal as described in the AREF best meets the project objectives but would still result in some impacts on non-Aboriginal heritage, biodiversity and noise and vibration. Safeguards and management measures as detailed in this REF would ameliorate or minimise these expected impacts. The proposal would involve construction activities to facilitate the delivery of the project and ultimately improve the efficiency of traffic movements along a key section of the Princes Highway. On balance the proposal is considered justified and the following conclusions are made.

### Significance of impact under NSW legislation

The proposal would not result in a significant change to the findings of the project REF and submissions report and would be unlikely to cause a significant impact on the environment. Therefore, it is not necessary for an environmental impact statement to be prepared and approval to be sought from the Minister for Planning under Division 5.2 of the EP&A Act. A Biodiversity Development Assessment Report or Species Impact Statement is not required. The proposal is subject to assessment under Division 5.1 of the EP&A Act. Consent from Council is not required.

### Significance of impact under Australian legislation

The proposal would not likely cause a significant impact on matters of national environmental significance or the environment of Commonwealth land within the meaning of the EPBC Act. A referral to the Australian Government Department of the Environment and Energy is not required.

# 9 Certification

This addendum review of environmental factors provides a true and fair review of the proposal in relation to its potential effects on the environment. It addresses to the fullest extent possible all matters affecting or likely to affect the environment as a result of the proposal.

Mitchell Bryson

Environment Coordinator

Fulton Hogan

Date:

I have examined this review of environmental factors and accept it on behalf of Transport for NSW.

Ryan Whiddon

Project Manager

Southern and Western Project Office

Date:

# 10 References

Department of Environment and Climate Change (2009) Interim Construction Noise Guideline.

Department of Urban Affairs and Planning (1996) Roads and Related Facilities EIS Guideline.

Department of Urban Affairs and Planning (1999) Is an EIS Required?

Department of Environment & Climate Change (2009) Interim Construction Noise Guideline.

SMEC Australia Pty Ltd and Roads and Maritime Services (2018) Nowra Bridge Project Review of Environmental Factors.

Renzo Tonin & Associates (2018) Nowra Bridge Project – Princes Highway Upgrade Noise and Vibration Assessment.

Roads and Maritime Services (2019) Nowra Bridge Project Submissions Report.

Roads and Maritime Services (2016) Construction Noise and Vibration Guideline

Transport for NSW (May 2020) Addendum Review of Environmental Factors

# Terms and acronyms used in this REF

| Term/ Acronym | Description |
|---|---|
| AHIP | Aboriginal Heritage Impact Permit |
| ASS | Acid Sulfate Soils |
| AusLink | Mechanism to facilitate cooperative transport planning and funding by Commonwealth and state and territory jurisdictions |
| BC Act | *Biodiversity Conservation Act 2016* (NSW). |
| CEMP | Construction / Contractor's environmental management plan |
| CM Act | *Coastal Management Act 2016* |
| DPI&E | NSW Department of Planning, Industry & Environment |
| DPI | NSW Department of Primary Industries |
| EEC | Endangered Ecological Community |
| EIA | Environmental impact assessment |
| EWMS | Environmental Work Method Statement |
| EPA | NSW Environment Protection Authority |
| EP&A Act | *Environmental Planning and Assessment Act 1979* (NSW). Provides the legislative framework for land use planning and development assessment in NSW |
| EPBC Act | *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth). Provides for the protection of the environment, especially matters of national environmental significance, and provides a national assessment and approvals process. |
| EPL | *Environment Protection Licence* |
| ESD | Ecologically sustainable development. Development which uses, conserves and enhances the resources of the community so that ecological processes on which life depends, are maintained and the total quality of life, now and in the future, can be increased |
| FM Act | *Fisheries Management Act 1994* (NSW) |
| Heritage Act | *Heritage Act 1977* (NSW) |
| ICNG | Interim Construction Noise Guideline |
| ISEPP | State Environmental Planning Policy (Infrastructure) 2007 |
| LALC | Local Aboriginal Land Council |
| LGA | Local Government Area |
| LEP | Local Environmental Plan. A type of planning instrument made under Part 3 of the EP&A Act. |
| LoS | Level of Service. A qualitative measure describing operational conditions within a traffic stream and their perception by motorists and/or passengers. |
| NES | Matters of national environmental significance under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. |
| NPW Act | *National Parks and Wildlife Act 1974* (NSW) |
| Roads and Maritime | NSW Roads and Maritime Services |

| Term/ Acronym | Description |
|---|---|
| PASS | Potential Acid Sulfate Soils |
| PCT | Plant Community Type |
| POEO Act | *Protection of the Environment Operations Act 1997* |
| SEPP | State Environmental Planning Policy. A type of planning instrument made under Part 3 of the EP&A Act. |
| SEPP 14 | State Environmental Planning Policy No.14 – Coastal Wetlands |
| SEPP 2 6 | State Environmental Planning Policy No.26 – Littoral Rainforests |
| SEPP 71 | State Environmental Planning Policy No. 71 – Coastal Protection |
| TfNSW | Transport for NSW |
| TSC Act | *Threatened Species Conservation Act 1995* (NSW) |
| QA Specifications | Specifications developed by Roads and Maritime Services for use with road work and bridge work contracts let by Roads and Maritime Services. |

# Appendix A

## Consideration of clause 228(2) factors and matters of national environmental significance and Commonwealth land

# Clause 228(2) Checklist

In addition to the requirements of the *Is an EIS required?* guideline (DUAP 1995/1996) and the *Roads and Related Facilities EIS Guideline* (DUAP 1996) as detailed in the REF, the following factors, listed in clause 228(2) of the Environmental Planning and Assessment Regulation 2000, have also been considered to assess the likely impacts of the proposal on the natural and built environment.

| Factor | Impact |
|---|---|
| a) Any environmental impact on a community?<br>Construction activities would have potential environmental impacts on the local community in terms of biodiversity, heritage and noise and vibration. Potential impacts would be managed through the implementation of safeguards and management measures in Section 7. | Short-term negative |
| b) Any transformation of a locality?<br>The proposal would result in short-term changes of the visual amenity. Potential impacts would be managed through the implementation of safeguards and management measures in Section 7. | Short-term negative |
| c) Any environmental impact on the ecosystems of the locality?<br>Some minor clearing of vegetation would be required. Potential impacts would be managed through the implementation of safeguards and management measures in Section 7. | Short-term negative |
| d) Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality?<br>The removal of trees would impact on views of mature vegetation. This would be mitigated through landscape replanting. | Medium-term negative |
| e) Any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations?<br>The proposal may impact listed heritage items. | Short-term negative |
| f) Any impact on the habitat of protected fauna (within the meaning of the *National Parks and Wildlife Act 1974)?*<br>The proposal is not likely to impact habitat of protected fauna. | Neutral |
| g) Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air?<br>The proposal is not likely to endanger any species of animal, plant or other form of life. | Neutral |
| h) Any long-term effects on the environment?<br>The proposal would unlikely have long-term effects on the environment. | Neutral |
| i) Any degradation of the quality of the environment?<br>The proposal would have the potential to degrade the quality of the environment through inadequate erosion and sediment control measures, and scouring. Potential impacts would be managed through the implementation of safeguards and management measures in Section 7. | Short-term negative |
| j) Any risk to the safety of the environment? | Long-term positive |

| Factor | Impact |
|---|---|
| During operation, the proposal would ultimately improve local traffic flow along a key section of the Princes Highway. | |
| k) Any reduction in the range of beneficial uses of the environment?<br>The proposal would not reduce the beneficial use of the environment. | Neutral |
| l) Any pollution of the environment?<br>During construction, the proposal would have the potential to pollute the environment. Potential impacts would be managed through the implementation of safeguards and management measures in Section 7. | Short-term negative |
| m) Any environmental problems associated with the disposal of waste?<br>The proposal would unlikely have significant environmental issues associated with the disposal of waste. Safeguards and management measures for the reuse and recycling of waste including demolition materials, where possible, are described in Section 7. | Neutral |
| n) Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply?<br>Resources required for the proposal would not be in short supply and would be readily available. | Neutral |
| o) Any cumulative environmental effect with other existing or likely future activities?<br>The proposal is not likely to have cumulative environmental effect. | Neutral |
| p) Any impact on coastal processes and coastal hazards, including those under projected climate change conditions?<br>The proposal is not likely to impact on coastal processes and coastal hazards. | Neutral |

# Matters of National Environmental Significance and Commonwealth land

Under the environmental assessment provisions of the EPBC Act, the following matters of national environmental significance and impacts on the Commonwealth land are required to be considered to assist in determining whether the proposal should be referred to the Australian Government Department of Agriculture, Water and Environment.

A referral is not required for proposed actions that may affect nationally listed threatened species, endangered ecological communities and migratory species. Impacts on these matters are still assessed as part of the REF in accordance with Australian Government significant impact criteria and taking into account relevant guidelines and policies.

| Factor | Impact |
|---|---|
| a) Any impact on a World Heritage property?<br>There are no World Heritage properties within or near the proposal. | Nil |
| b) Any impact on a National Heritage place?<br>There are no National heritage places within or near the proposal. | Nil |
| c) Any impact on a wetland of international importance?<br>There are no wetlands of international importance on the proposal. | Nil |
| d) Any impact on a listed threatened species or communities?<br>The proposed is not likely to impact on listed threatened species or communities. | Nil |
| e) Any impacts on listed migratory species?<br>The proposal would unlikely have an impact on listed migratory species. | Nil |
| f) Any impact on a Commonwealth marine area?<br>There are no Commonwealth marine areas within or near the proposal. | Nil |
| g) Does the proposal involve a nuclear action (including uranium mining)?<br>The proposal does not involve a nuclear action. | Nil |
| h) Additionally, any impact (direct or indirect) on the environment of Commonwealth land?<br>There is no Commonwealth land within or near the proposal. | Nil |

# Appendix B

## Statutory consultation checklists

# Infrastructure SEPP

### Certain development types

| Development type | Description | Yes/No | If 'yes' consult with | ISEPP clause |
|---|---|---|---|---|
| Car Park | Does the project include a car park intended for the use by commuters using regular bus services? | No | Shoalhaven City Council | ISEPP cl. 95A |
| Bus Depots | Does the project propose a bus depot? | No | Shoalhaven City Council | ISEPP cl. 95A |
| Permanent road maintenance depot and associated infrastructure | Does the project propose a permanent road maintenance depot or associated infrastructure such as garages, sheds, tool houses, storage yards, training facilities and workers' amenities? | No | Shoalhaven City Council | ISEPP cl. 95A |

### Development within the Coastal Zone

| Issue | Description | Yes/No /NA | If 'yes' consult with | ISEPP clause |
|---|---|---|---|---|
| Development with impacts on certain land within the coastal zone | Is the proposal within a coastal vulnerability area and is inconsistent with a certified coastal management program applying to that land? | No | Shoalhaven City Council | ISEPP cl. 15A |

Note: See interactive map here: https://www.planning.nsw.gov.au/policy-and-legislation/coastal-management. Note the coastal vulnerability area has not yet been mapped.

Note: a certified coastal zone management plan is taken to be a certified coastal management program

### Council related infrastructure or services

| **Issue** | **Potential impact** | **Yes/No** | **If 'yes' consult with** | **ISEPP clause** |
|---|---|---|---|---|
| Stormwater | Is the work likely to have a *substantial* impact on the stormwater management | No | Shoalhaven City Council | ISEPP cl.13(1)(a) |

| Issue | Potential impact | Yes/No | If 'yes' consult with | ISEPP clause |
|---|---|---|---|---|
| | services which are provided by council? | | | |
| Traffic | Is the work likely to generate traffic to an extent that will *strain* the capacity of the existing road system in a local government area? | No | Shoalhaven City Council | ISEPP cl.13(1)(b) |
| Sewerage system | Will the work involve connection to a council owned sewerage system? If so, will this connection have a *substantial* impact on the capacity of any part of the system? | No | Shoalhaven City Council | ISEPP cl.13(1)(c) |
| Water usage | Would the work involve connection to a council owned water supply system? If so, would this require the use of a *substantial* volume of water? | No | Shoalhaven City Council | ISEPP cl.13(1)(d) |
| Temporary structures | Would the work involve the installation of a temporary structure on, or the enclosing of, a public place which is under local council management or control? If so, would this cause more than a *minor* or *inconsequential* disruption to pedestrian or vehicular flow? | No | Shoalhaven City Council | ISEPP cl.13(1)(e) |
| Road & footpath excavation | Would the work involve more than *minor* or *inconsequential* excavation of a | No | Shoalhaven City Council | ISEPP cl.13(1)(f) |

| Issue | Potential impact | Yes/No | If 'yes' consult with | ISEPP clause |
|---|---|---|---|---|
| | road or adjacent footpath for which council is the roads authority and responsible for maintenance? | | | |

### Local heritage items

| Issue | Potential impact | Yes/No | If 'yes' consult with | ISEPP clause |
|---|---|---|---|---|
| Local heritage | Is there is a local heritage item (that is not also a State heritage item) or a heritage conservation area in the study area for the work? If yes, does a heritage assessment indicate that the potential impacts to the heritage significance of the item/area are more than *minor* or *inconsequential?* | Yes | Shoalhaven City Council | ISEPP cl.14 |

### Flood liable land

| Issue | Potential impact | Yes/No | If 'yes' consult with | ISEPP clause |
|---|---|---|---|---|
| Flood liable land | Is the work located on flood liable land? If so, would the work change flood patterns to more than a *minor* extent? | No | Shoalhaven City Council | ISEPP cl.15 |
| Flood liable land | Is the work located on flood liable land? (to any extent). If so, does the work comprise more than minor alterations or additions to, or the demolition of, a building, emergency work or routine maintenance | No | State Emergency Services<br><br>Email: erm@ses.nsw.gov.au | ISEPP cl.15AA |

Note: Flood liable land means land that is susceptible to flooding by the probable maximum flood event, identified in accordance with the principles set out in the manual entitled *Floodplain Development Manual: the management of flood liable* land published by the New South Wales Government.

### Public authorities other than councils

| Issue | Potential impact | Yes/No | If 'yes' consult with | ISEPP clause |
|---|---|---|---|---|
| National parks and reserves | Is the work adjacent to a national park or nature reserve, or other area reserved under the *National Parks and Wildlife Act 1974*, or on land acquired under that Act? | No | Environment, Energy and Science, DPIE | ISEPP cl.16(2)(a) |
| National parks and reserves | Is the work on land in Zone E1 National Parks and Nature Reserves or in a land use zone equivalent to that zone? | No | Environment, Energy and Science, DPIE | ISEPP cl. 16(2)(b) |
| Aquatic reserves | Is the work adjacent to an aquatic reserve or a marine park declared under the *Marine Estate Management Act 2014*? | No | Department of Planning, Industry and Environment | ISEPP cl.16(2)(c) |
| Sydney Harbour foreshore | Is the work in the Sydney Harbour Foreshore Area as defined by the *Place Management NSW Act 1998?* | No | Property NSW | ISEPP cl.16(2)(d) |
| Bush fire prone land | Is the work for the purpose of residential development, an educational establishment, a health services facility, a correctional centre or group home in bush fire prone land? | No | Rural Fire Service *[Refer to the NSW Rural Fire Service publication Planning for Bush Fire Protection (2006)]* | ISEPP cl.16(2)(f) |
| Artificial light | Would the work increase the amount of artificial light in the night sky and that is on land within the dark sky region as identified on the dark sky region map? (Note: the dark sky region is within 200 | No | Director of the Siding Spring Observatory | ISEPP cl.16(2)(g) |

| Issue | Potential impact | Yes/No | If 'yes' consult with | ISEPP clause |
|---|---|---|---|---|
| | kilometres of the Siding Spring Observatory) | | | |
| Defence communications buffer land | Is the work on buffer land around the defence communications facility near Morundah? (Note: refer to Defence Communications Facility Buffer Map referred to in clause 5.15 of Lockhardt LEP 2012, Narrandera LEP 2013 and Urana LEP 2011. | No | Secretary of the Commonwealth Department of Defence | ISEPP cl. 16(2)(h) |
| Mine subsidence land | Is the work on land in a mine subsidence district within the meaning of the *Mine Subsidence Compensation Act 1961*? | No | Mine Subsidence Board | ISEPP cl. 16(2)(i) |

# Growth Centres SEPP

| Issue | Potential impact | Yes/No | If 'yes' consult with | ISEPP clause |
|---|---|---|---|---|
| Clearing native vegetation | Does the work involve clearing native vegetation (as defined in the *Local Land Services Act 2013)* on land that is not **subject land** (as defined in clause 17 of schedule 7 of the *Threatened Species Conservation Act 1995)?* | No | Department of Planning, Industry and Environment | SEPP 18A |

# Appendix C

## Aboriginal Heritage Due Diligence Assessment

# NOWRA BRIDGE PROJECT
# BOUNDARY ADJUSTMENTS

## Aboriginal Heritage Due Diligence Assessment

Prepared for Fulton Hogan

Shoalhaven Local Government Area

November 2020

Ref. 2014

**KELLEHER NIGHTINGALE CONSULTING PTY LTD**
**Archaeological and Heritage Management**
ACN 120 187 671

Level 10, 25 Bligh Street
SYDNEY NSW 2000
Phone 02 9232 5373
Fax 02 9223 0680

## Document Information

| | |
|---|---|
| Project Name | Nowra Bridge Project, Boundary Adjustments: Aboriginal Heritage Due Diligence Assessment |
| Project Number | 2014 |
| Version | v1 |
| Client Name | Fulton Hogan |
| Recipient | Nathan Russell |
| Prepared by | Matthew Kelleher; Tristram Miller; Madeline Harding; Ben Anderson |
| Approved by | Matthew Kelleher |

## Contents



## Figures



## Tables

# 1 Introduction

## 1.1 Project background

Fulton Hogan propose boundary adjustments to support the construction of the Nowra Bridge at Bomaderry, NSW. The proposal primarily includes the removal of existing boundary fencing and construction of new boundary fencing. The location of the proposed is hereafter referred to as the 'study area' and is shown on Figure 1. The scope of works for the proposal are shown on Figure 2.

Kelleher Nightingale Consulting Pty Ltd (KNC) were engaged by Fulton Hogan to undertake an Aboriginal heritage due diligence assessment of the study area to identify if Aboriginal objects were likely to be located in the study area and if so whether the proposed works were likely to harm those objects.

This report presents the findings of a due diligence Aboriginal heritage assessment of the study area. This assessment has been conducted in accordance with the Heritage NSW *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (OEH 2010).

## 1.2 Assessment process

The due diligence assessment process is a step by step method designed to give proponents a baseline level of information outlining opportunities and constraints related to Aboriginal heritage. The relevant steps are:

- Determining if the activity will disturb the ground surface or any culturally modified trees (Step 1)
- Database search: Aboriginal heritage information management system (AHIMS) and known information sources (Step 2a)
- Landscape assessment (Step 2b)
- Impact avoidance assessment (Step 3)
- Desktop assessment and visual inspection (Step 4).

The *Code of Practice* specifies that if the initial assessment process identifies that Aboriginal objects will be or are likely to be harmed, then further investigation and impact assessment is required (Step 5).

The Heritage NSW process involves "taking *reasonable and practical measures* to determine whether your actions will harm an Aboriginal object and, if so, what measures can be taken to avoid that harm" (OEH 2010:4).

## 1.3 Summary of findings

The due diligence assessment and associated visual inspection of the proposed works did not identify any Aboriginal archaeological sites, objects or areas of archaeological potential within the study area. The study area displays low archaeological potential due to disturbance and modification from extensive landscaping and ground levelling activities, as well as driveway construction. There is a very low likelihood of any intact archaeological deposit remaining within the study area.

It is reasonable to assume that no Aboriginal objects would be harmed by the proposed works and according to the Heritage NSW *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales,* the proposed works can proceed with caution.

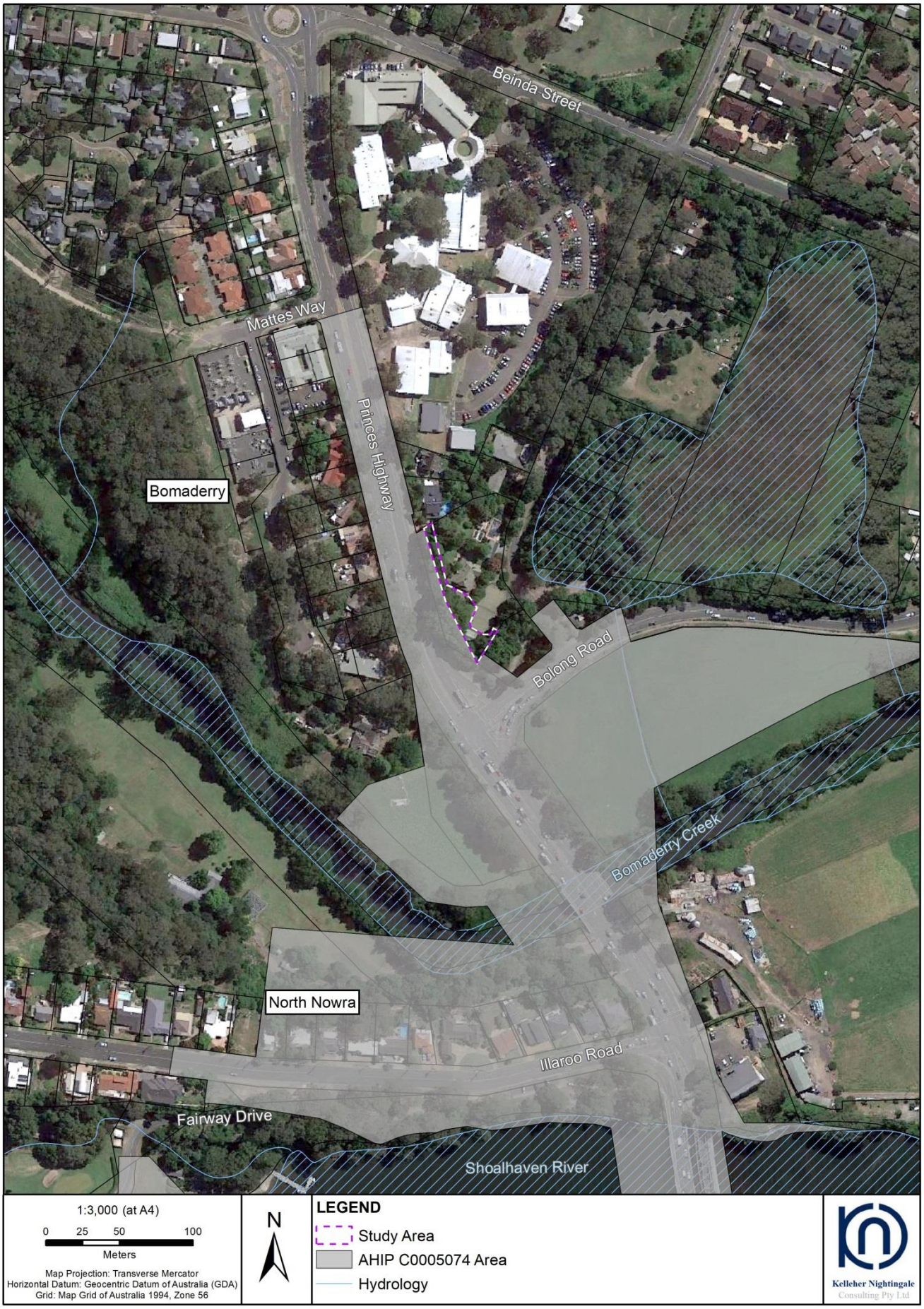


**Figure 1. Location of study area**

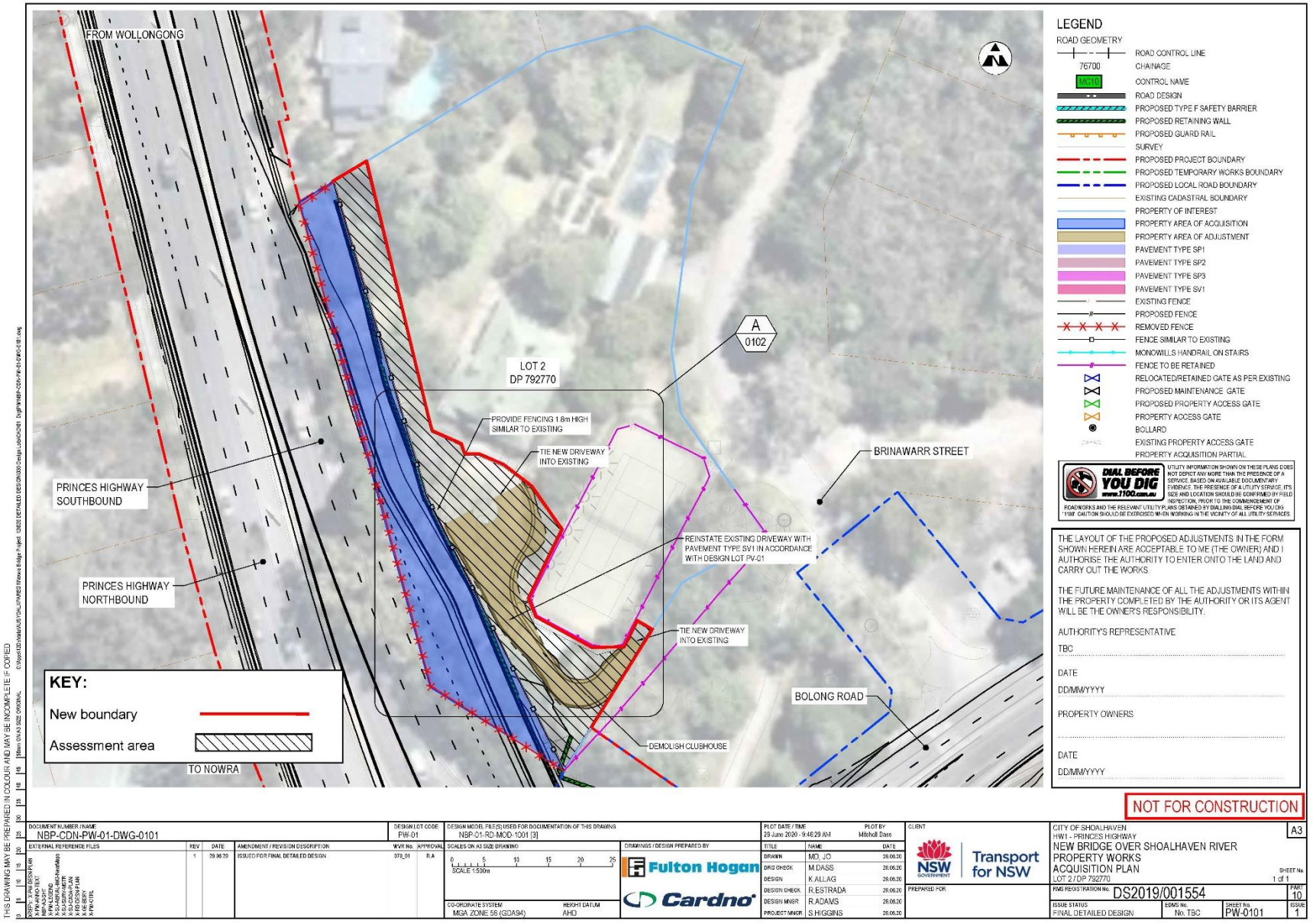


**Figure 2. Detail of study area and proposed works**

# 2 Assessment Process

## 2.1 Identify if the proposed activity will disturb the ground surface

The proposal would involve the removal of existing boundary fencing and construction of new boundary fencing, as well as related works shown on Figure 2. The proposal requires excavation and construction which would disturb the ground surface and have the potential to impact on Aboriginal objects. As a result, the due diligence process progressed to the next step.

## 2.2 Database searches (AHIMS) and known information sources

### *2.2.1 AHIMS web service*

The Aboriginal Heritage Information Management System (AHIMS) is a database operated by Heritage NSW and regulated under section 90Q of the *National Parks and Wildlife Act 1974*. AHIMS contains information and records pertaining to registered Aboriginal archaeological sites (Aboriginal objects, as defined under the Act) and declared Aboriginal places (as defined under the Act) in NSW. A search of AHIMS was conducted on 29 October 2020 to identify registered (known) Aboriginal sites or declared Aboriginal places within or adjacent to the study area (AHIMS Client Service ID: 546303). The search results are attached as Appendix A.

The AHIMS Web Service database search was conducted within the following coordinates (GDA, Zone 56):

| | |
|---|---|
| Eastings: | 280286 - 280836 |
| Northings: | 6139637 - 6140232 |
| Buffer: | 0 metres (coordinates included a buffer around the study area) |

The AHIMS search results showed:

| | |
|---|---|
| **6** | **Aboriginal sites are recorded in or near the above location** |
| **0** | **Aboriginal places have been declared in or near the above location** |

The location of registered Aboriginal sites within these coordinates is shown on Figure 3. The frequencies of site types ('site features') within the AHIMS database search area are listed in Table 1.

**Table 1. Site features and context from AHIMS database search**

| Site Context | Site Feature | Number | *Frequency (%)* |
|---|---|---|---|
| Open | Artefact | 4 | *66.7* |
| | Potential Archaeological Deposit (PAD) | 2 | *33.3* |
| ***Total*** | | ***6*** | ***66.6*** |

AHIMS records show that there are no previously registered sites located within the study area. The AHIMS results and previous archaeological investigations in the area are discussed further in section 2.2.3.

### *2.2.2 Other heritage registers and databases*

A search was undertaken of the following statutory and non-statutory heritage registers for Aboriginal heritage items:

- Shoalhaven Local Environment Plan (LEP) 2014
- S.170 Heritage Conservation Registers
- State Heritage Register and State Heritage Inventory
- Commonwealth Heritage List
- National Heritage List
- Australian Heritage Database
- Australian Heritage Places Inventory and
- Register of the National Estate - note the Register was closed in 2007 and is no longer a statutory list. It is maintained on a non-statutory basis as a publicly available archive and educational resource.

No Aboriginal archaeological sites or Aboriginal heritage items were recorded on these databases within the study area.

One historic heritage item, 'Illowra' (Listing no. 136) is located within the study area. The item was gazetted onto the Shoalhaven LEP 2014 on 22 April 2014 as an item of local significance due to its local historic and aesthetic value.


**Figure 3. AHIMS search results**

### *2.2.3 Previous archaeological investigations in the vicinity of the study area*

Several archaeological investigations have been conducted within and in the vicinity of the study area. Previous Aboriginal heritage assessments in the local area have primarily been undertaken for large scale infrastructure projects. The pertinent studies are discussed below.

**Nowra Bridge Project**

Aboriginal heritage assessment was undertaken for the Nowra Bridge Project by Artefact Heritage Pty Ltd (Artefact) in 2017-2018 (2018a; 2018b; 2019). The assessment undertaken by Artefact included archaeological surveys, a test excavation program, a process of Aboriginal community consultation and the preparation of a Cultural Heritage Assessment Report. The entirety of the current study area was assessed during early archaeological investigations as having low archaeological potential based upon the disturbed nature of the area resulting from construction of the existing Princes Highway corridor and adjacent private residences.

Archaeological survey of the assessment corridor was undertaken in four survey units on both sides of the Shoalhaven River extending east and west of the Princes Highway road corridor. A total of five Aboriginal archaeological sites were recorded during the survey: Nowra Bridge 1, Nowra Bridge 2, Nowra Bridge 3, Nowra Bridge 4 and Nowra Bridge 5. Sites identified comprised low density artefact scatters and isolated finds, one rockshelter site with archaeological deposit and one culturally modified tree. Five PAD areas were also identified and represented areas assessed as having high archaeological sensitivity. These included Nowra Bridge PAD 1, Nowra Bridge PAD 2, Nowra Bridge PAD 3, Nowra Bridge PAD 4 and Nowra Bridge PAD 5. One PAD area, Nowra Bridge PAD 5 (AHIMS 52-5-0854) was located within proximity to the current study area. The PAD area was identified on the elevated landform located above and adjacent to Bomaderry Creek.

A test excavation program was undertaken for the project. The test program included testing within portions of the newly identified PAD areas and sites identified during survey which would be impacted by the proposal. Five new subsurface artefact scatter sites were identified as a result of the test excavation program; these included sites Nowra Bridge 6, Nowra Bridge 7, Nowra Bridge 8, Nowra Bridge 9 and Nowra Bridge 10. A total of 362 artefacts were recovered from 69 test squares excavated across the entirety of the assessed impact area. A diverse range of raw materials were present, however artefacts predominantly comprised quartz and silcrete material. Quartzite, mudstone, dolerite, chert, chalcedony, basalt and ironstone raw materials were also identified. Artefact types identified consisted of complete flakes, flake fragments, cores and core fragments, and debris. Examples of mullers and geometric microliths were also present in the overall assemblage.

One site, Nowra Bridge 10 (52-5- 0873) was identified through the test excavation program as a result of archaeological testing undertaken within a portion of Nowra Bridge PAD 5. The site was located approximately 100 metres south of the current study area on the raised alluvial floodplain north of Bomaderry Creek and east of the Princes Highway corridor. The site comprised a subsurface artefact scatter site consisting of 11 artefacts identified within one 50 x 50 centimetre test square. Test excavation at this site location revealed a disturbed archaeological deposit, heavily impacted by fluvial disturbance and previous land use activity. All artefacts recovered from the site consisted of complete flakes; the majority of artefacts (n=9) were of quartz raw material, one chalcedony flake and one silcrete flake were also recorded. The site was assessed as having low archaeological significance given its location in a disturbed and modified environment.

A CHAR was prepared to support an application for an AHIP for impacts to sites within the Nowra Bridge Project impact area. Several sites identified as a result of the Nowra Bridge Project were avoided as a result of design refinements. CHAR assessment proposed mitigation for impacted sites of moderate and high significance, Nowra Bridge 1, Nowra Bridge 2, Nowra Bridge 7, Nowra Bridge 8 and Nowra Bridge 9. Community collection of surface artefacts was recommended for sites Nowra Bridge 1 and Nowra Bridge 2. Given the moderate significance of sites Nowra Bridge 8 and Nowra Bridge 9, and the high significance of Nowra Bridge 2 and Nowra Bridge 7; a program of salvage excavation was recommended to offset the loss of information caused by impact to the sites. No mitigation was proposed for low significance sites Nowra Bridge 6 and Nowra Bridge 10. AHIP C0005074 was subsequently issued on 27 August 2019 for the Nowra Bridge Project.

An Aboriginal archaeological assessment of an addendum assessment area for the Nowra Bridget Project was undertaken in May 2019 (KNC 2019). The assessment was undertaken to assess two locations identified for additional design refinements. Design refinements consisted of the inclusion of an additional area located east of the Princes Highway, adjacent to Bomaderry Creek (approximately 150 metres south of the current study area) and the removal of an area west of the Princes Highway, immediately north of Illaroo Road (approximately 260 metres southwest of the current study area).

The assessment identified one newly registered site, Bomaderry Creek/Illaroo Road Rockshelter (AHIMS 52-5-0920) within the assessment area and determined that one registered AHIMS site Nowra Bridge PAD 5 (52-5-0854) did not extend into the assessment area. Bomaderry Creek/ Illaroo Road Rockshelter was located approximately 260 metres southwest of the current study area.

The rockshelter site was recorded positioned on the mid, north facing slopes of a long, broad east-west oriented ridgeline running parallel to Bomaderry Creek. Six artefacts including one shell fragment were observed within an eroded section of the dripline, mid-way across the front of the shelter. Based on the eroded exposure along the dripline and depth of the surrounding bedrock it was determined that the deposit was approximately 20cm in depth and in reasonable condition. No art or grinding patches were observed on the wall or boulders of the shelter. The site was determined to be of moderate archaeological significance.

Transport for NSW adjusted the project boundary to avoid Bomaderry Creek/Illaroo Road Rockshelter (52-5-0920). As a result, it was determined that no Aboriginal archaeological objects/sites would be impacted by the proposed works within the addendum assessment area. Significant disturbance of ground surfaces in the addendum study area was found to have impacted on the survival of archaeological deposit across the majority of the area and the presence of Aboriginal objects was considered unlikely.

**Berry to Bomaderry – Princes Highway Upgrade**

A series of Aboriginal archaeological investigations have been undertaken for the Berry to Bomaderry Princes Highway Upgrade project. Initial Aboriginal heritage assessment was undertaken for the project by Navin Officer Heritage Consultants (NOHC) in 2012. The assessment identified a number of archaeological sites and 'Potentially Archaeologically Sensitive Areas' or PASAs along the project alignment. Archaeological test excavation was subsequently undertaken at 16 areas along the project alignment. Of the 16 PASAs subject to test excavation, 14 were found to contain Aboriginal objects and became registered archaeological sites. No Aboriginal archaeological sites associated with the assessment are located within or in the vicinity of the current study area.

A total of 243 artefacts were recovered from 278 test squares across the overall program. Artefacts generally consisted of flakes and flake fragments (72.8%), followed by flaked pieces (16.5%). A small number of retouched flakes and cores were also identified (4.9%) with two small errailures also recovered. Test excavation results indicated that a relatively high archaeological sensitivity could be associated with certain micro-topographies within a 200 metre corridor surrounding former wetland basins (NOHC 2013). Excavation results were used to inform significance and impact assessments for the Review of Environmental Factors (REF).

AHIP C0000846 was issued in January 2015 for the project and included provision for salvage excavation at eight sites which were to be at least partially impacted by the proposal: G2B A42, G2B A44, G2B A45, G2B A47, G2B A51, G2B A53, G2B A54 and G2B A55, with surface collection to take place at site G2B A1. Following the determination of the project REF, Kelleher Nightingale Consulting (KNC) were engaged to revise the proposed salvage excavation program previously prepared by NOHC, based on changes to proposed impacts and locations of ancillary sites. KNC recommended that nine of the identified Aboriginal sites should be targeted by salvage excavation. The aim of salvage excavation was to further investigate the nature and extent of Aboriginal archaeological deposits at these locations and to mitigate against impacts associated with the proposed works. Surface collection was also recommended at two sites. Prior to the commencement of the program, TfNSW advised that one of the nine sites earmarked for salvage excavation was no longer expected to be impacted by the proposed works.

Artefact Heritage was subsequently engaged to undertake the salvage program under AHIP C0000846. Eight sites were salvaged and two sites were subject to surface collection (Artefact Heritage 2016). A total of 3066 artefacts were recovered from the eight salvaged sites. Very high artefact densities (between 50 and 100 artefact per square metre) were recovered from three of the salvaged sites (G2B151, G2B A54 and G2B A55).

Three flaked glass artefacts identified at sites G2B A54 and G2B A55 were also interpreted as indicating the presence of possible contact sites at these site locations. General trends drawn from the site assemblages included consistently low proportions of retouched artefacts, small variation in proportions of cores and significant variations in artefact densities (Artefact Heritage 2016: 109). The Berry to Bomaderry assemblage largely comprised fine grained sedimentary stone varieties (predominantly good quality chert and chalcedony) with retouched artefacts also comprising high quality silcrete. General trends supported the assessment that the salvaged sites likely represented secondary knapping sites. This was supported by the overall very low proportion of cortex, micro-debitage, and retouch identified at all sites, as well as the low proportion of cores and the relatively small size of cores overall.

Following completion of the program, TfNSW identified that adjustments to the project footprint would be required, including additional work areas outside the existing AHIP boundary. Artefact Heritage undertook an archaeological assessment of the additional areas and identified seven Aboriginal sites within the new boundary ('addendum study area'), considered to comprise archaeologically sensitive landforms which had not been subject to investigation during the previous archaeological programs (Artefact Heritage 2017a). It was recommended that four of these be subject to a mitigatory salvage program and a salvage methodology was prepared (Artefact Heritage 2017b).

A variation to AHIP C0000846 was granted by OEH in May 2017 to extend the AHIP area (OEH Notice No. C0002726). Variation was also made to allow for the mitigatory salvage excavation within the new impact area at the four site extensions identified by Artefact Heritage 2017a: G2B A48, G2B A50, G2B A59 and G2B A61. KNC was subsequently engaged to undertake the addendum salvage excavations in accordance with the approved Salvage Methodology

(Artefact Heritage 2017b). A total of 157 artefacts were recovered during the salvage excavations (Phase 1 and Phase 2 combined). A total of 52m$^2$ was excavated across the four sites. Overall artefact densities were low: one third of squares (33%) yielded zero artefacts, with 48% of squares yielding less than 1-5 artefacts and 19% yielding 6-11 artefacts. The highest density squares were at sites G2B A48 (Area 1 and Area 2) and G2B A50 (Phase 1 squares TS2 and TS3) where the density peaked at 10-11 artefacts/m$^2$. The mean artefact density at all the sites was low, peaking at 5.4/m$^2$ for the Phase 1 program at G2B A50, closely followed by the Phase 2 areas at G2B A48 where the mean density was 4.6/m$^2$. The remaining sites (G2B A59 and G2B A61) recorded much lower densities of between 1.1 and 2.1 artefacts/m$^2$.

The archaeological record salvaged from the sites G2B A48, B2B A50, G2B A59 and G2B A61 suggested casual resource gathering along the margins of Wiley's Creek, Abernethy's Creek and connecting spur lines (KNC *in prep*). The evidence of domestic activity did not suggest intensive use of any of these locations. The artefacts resulting from core reduction formed a mainly low density assemblage, and consisted of knapping debris related to the secondary reduction of cores. Site G2B A61 yielded the highest mean artefact density of the four sites under investigation. However, sites in similar environmental contexts, excavated for the Berry to Bomaderry Upgrade, yielded much higher artefact densities of between three and ten times the mean artefact density compared to G2B A61. The peak artefact density at G2B A61 was modest in comparison to the peak densities recorded for sites with larger assemblages, also in creek-side contexts within the Berry to Bomaderry Upgrade corridor. Overall, the salvage results were comparable with those from the previous salvage program undertaken by Artefact Heritage for the project.

**Foxground and Berry Bypass Project**

Archaeological investigations were also undertaken by NOHC (2012) for the Foxground and Berry Bypass - Princes Highway Upgrade project located northeast of the current study area. Initial investigations were completed for the Environmental Assessment (EA) and included a review of background information, development of a predictive model and completion of an archaeological field survey. This identified 29 Aboriginal cultural heritage items within the project area. These included two surface artefact sites, four non-archaeological places considered to hold Aboriginal cultural significance and 23 locations designated as PASAs. No Aboriginal archaeological sites associated with the assessment are located within or in the immediate vicinity of the current study area.

Twenty one PASAs were selected for test excavation across the project area. In total, 298 test pits were excavated yielding 236 artefacts. Eighteen PASAs subject to test excavation were determined to contain subsurface archaeological deposit. The most frequent raw material was chert (71%), followed by quartz (27%), with smaller frequencies of silcrete, chalcedony, mudstone/tuff, quartzite, sandstone and volcanics.

Results of the test excavation revealed that higher artefact incidence and/or assemblage richness tended to coincide with major spur lines and low gradient basal slopes above, and set back from, the valley floor, whereas the valley floors (and in particular the alluvial flats) were generally characterised by intermittent and low incidences of artefacts. Ten sites were identified as displaying low significance with no further investigation warranted. Nine sites displayed moderate archaeological potential and were located on spur lines, basal slopes bordering valley floors and locally elevated micro-topographic features within the valleys. Three sites were determined to display moderate to high archaeological significance. The majority of sites with moderate archaeological significance, and all sites to be impacted by the proposal with moderate to high significance were recommended for mitigatory salvage excavation.

New South Wales Archaeology Pty Ltd (2013) was engaged to conduct an archaeological salvage excavation program at sites where geotechnical works were proposed in preparation for construction of the highway upgrade. Seventy six proposed geotechnical work locations were found to occur within the boundaries of known Aboriginal sites. Eighteen of these fell within Aboriginal site areas which had been recommended for archaeological salvage in the EA (cf. NOHC 2012). An Aboriginal Heritage Impact Permit (AHIP) #1132202 was issued to allow the geotechnical works to impact on the specified Aboriginal sites ahead of project approval, with provision for further salvage excavation for these sites required to mitigate project impacts. A total of 215 artefacts were recovered from the salvage program. Recovered artefact densities were generally low to moderate. Artefact raw materials were dominated by chert (61%), followed by silcrete (12%) and quartz (11%). Key issues identified by the assessment included the importance of considering geomorphology and the influence of fluvial and erosive processes on archaeological sites within the creek valley landscape context.

KNC (2016) were engaged to complete an archaeological excavation program for the 12 salvage sites and nine ancillary sites (21 total sites) identified in the Navin Officer investigations for the Foxground and Berry bypass project. The program involved the hand excavation of 383m$^2$ resulting in the recovery of 5,260 artefacts. Archaeological and cultural investigations identified a range of Aboriginal places from the mundane and domestic to selective and specialised. Evidence included a clear differentiation between the archaeology of the identified Aboriginal Battleground (Little Mountain or Dicky Woods Meadow Battleground Cultural Area) and the surrounding support camps. The activities in the Battleground were seen to be physically different, which reinforced and extended the cultural interpretation of the area. Three radiocarbon samples were analysed for the Foxground and Berry bypass project. Dates ranged from 11,937 years ago to 903 years ago. The time span between these dates indicates the project area was being used intermittently over a time span of at least 11,000 years.

**Implications for Study Area**

A review of the database searches and associated background information did not identify any Aboriginal objects or sites within the study area. Previously identified Aboriginal archaeological sites within the wider area consist of artefact scatters and isolated artefact, culturally modified (scarred) trees and rockshelter sites with archaeological deposit.

Site types recorded around the study area demonstrate that the local landscape retains archaeological evidence of varied Aboriginal activities and landscape uses. Large scale excavations have demonstrated that where limited disturbance is present, sites retain important information on Aboriginal landscape use history. Excavation undertaken immediately south of the study area identified a disturbed deposit of low archaeological significance. The current study area has been subject to land use disturbance, leading to a low likelihood of any intact archaeological deposit remaining within the study area.

## 2.3 Landscape Assessment

The Heritage NSW *Code of Practice* identifies several landscape features that were often used by Aboriginal people in the past and consequently are often associated with Aboriginal objects, provided that the landscape has not been significantly disturbed. An evaluation of landscape features within the study area aids in assessing whether Aboriginal archaeology is likely to exist.

The study area is located on the southern Illawarra Coastal Plain, a sub-region of the Sydney Basin. The Sydney Basin is a large geological feature that stretches from Batemans Bay to Newcastle and west to Lithgow. The formation of the basin began between 300 to 250 million years ago when river deltas gradually replaced the ocean that had extended as far west as Lithgow.

The underlying geology of the southern part of the Basin is Permian in age, with geology of the study area consisting of the Nowra Sandstone Member of the Shoalhaven Group (Figure 4). Tthe Nowra Sandstone Formation consists of fine to coarse-grained, often pebbly, quartzose sandstone (Psn) (Bowman et al. 1972). South of the study area consists of more recent geologies developed and deposited during the Quaternary Period and is characterised by a Quaternary alluvial plain system (Qhal/Qhab). This geological unit comprises a Holocene levee consisting of fluvial sand, silt and clay (Troedson and Hashimoto 2013).

Nowra soils occur within the study area (Figure 4). The Nowra soil landscape is characterised by medium- to coarse-grained quartz sandstones which contain rounded pebbles scattered throughout the beds as a result of the underlying geology (Hazelton 1992). Soils are moderately deep (50-100cm). Brown Podzolic Soils occurring on crests and upper slopes. Soloths and/or Yellow Earths occur midslope. Yellow Podzolic soils occur on lower slopes and drainage lines. The erosion hazard for non-concentrated flows is moderate to high and it is unlikely that intact archaeological deposit will survive in these soils.

Topography in the region is characterised by rolling hills interspersed with valley floors, drainage channels and floodplains below the basal ranges and spurs of the Cambewarra Range. Topography around the study area in the region includes moderately to gently undulating rises to undulating low hills on sandstone on the Coastal Plain. The study area is primarily located on a broad north to south orientated ridgeline and slope overlooking the floodplain of Bomaderry Creek. The study area is located within proximity to Bomaderry Creek which joins the Shoalhaven River to the east of the study area. Contemporary land use practices including the construction of a long circular driveway, ornamental gardens beds and ground levelling have contributed to disturbance across the study area. Native vegetation has been cleared with regrowth native vegetation and exotics covering parts of the study area.

**Summary**
The study area is located within proximity to landform features (watercourses and ridgelines) which are associated with Aboriginal occupation/activity as determined by the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (OEH 2010).

Aboriginal objects (artefacts) have previously been identified on both the broad ridgelines surrounding the study area and on more elevated ground bordering the Bomaderry Creek and Shoalhaven River watercourses within the vicinity of the study area. Aboriginal objects have also been previously identified along the Princes Highway corridor, even in areas of moderate to high disturbance. Accordingly, the due diligence process progressed to the next step.

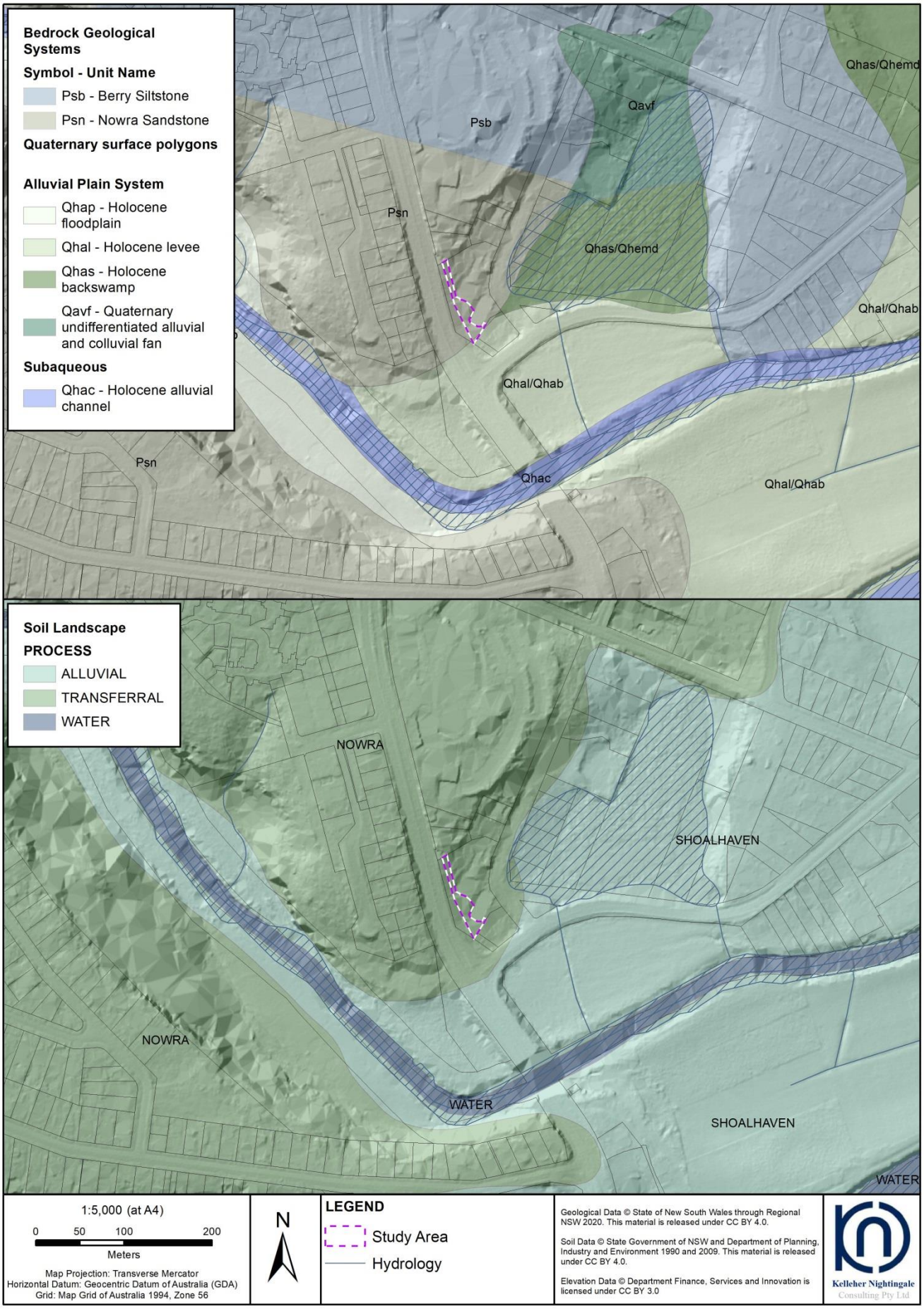


**Figure 4. Geology and soil landscapes**

## 2.4 Impact avoidance

Background research did not identify any Aboriginal archaeological sites in the current study area. Landscape assessment identified landscape features considered archaeologically sensitive by Heritage NSW under the *Due Diligence Code of Practice* (proximity to watercourses).

Activities associated with the proposed works would impact the ground surface to some degree and therefore have the potential to harm Aboriginal objects which may be present. Some level of ground disturbance to archaeologically-sensitive landforms is unavoidable for the proposal as a whole. As a result, the due diligence process progressed to the next step.

## 2.5 Desktop review summary

The desktop review and assessment combined the results of heritage register searches, previous investigations and landscape assessment. Background research has confirmed that no previously identified Aboriginal archaeological sites occur within the study area.

Previously recorded sites within the vicinity of the study area comprise low density surface and subsurface artefact scatter sites. The desktop assessment identified the potential for Aboriginal sites in the form of stone artefact scatters (open camp sites), isolated artefacts and PADs to occur within the study area, especially on elevated landforms in proximity to Bomaderry Creek and the Shoalhaven River. Previously recorded sites of this type have been recorded in the general vicinity of the study area.

The Nowra soil landscapes is not generally conducive to the preservation of archaeological deposits in open context where vegetation clearance and modern land use contributes to increased erosion and soil movement. Overall, disturbance levels across the study area appear to range between moderate and high and are associated with use of the study area as a private residence. Slope gradients across the study area are generally gentle to moderate.

Nonetheless, Heritage NSW identifies particular landscape features that are often linked with the presence of Aboriginal objects, including waterways and ridgelines. These features are known to occur in and around the study area, necessitating a visual inspection to identify the spatial relation to the proposed works and assess the level of landscape disturbance and archaeological potential.

Visual inspection of the study area was therefore the next step of the due diligence assessment process.

## 2.6 Visual Inspection

The study area was inspected and assessed on 15 October 2020 by Tristram Miller (KNC). The visual inspection aimed to identify Aboriginal objects or sites and assess the potential of the archaeologically sensitive landforms identified within the study area to contain Aboriginal objects.

The study area comprised private property located immediately east of the Princes Highway corridor, north of Bolong Road. The property was characterised by gentle slope descending south, with visible evidence of ground surface modification and disturbance present as a result of driveway construction and landscaping works.

The study area contained a bitumen driveway and building structure in the south. The building structure bordered a large tennis court located outside of the study area. Ornamental garden beds lined the driveway, with occasional large exotic and native trees also observed. Mature native trees were inspected for any evidence of cultural modification; no culturally modified trees were identified. Ground surface visibility within the southern part of the study area was very low to zero. No Aboriginal objects or areas of archaeological sensitivity were identified within this part of the study area.

**Plate 1. Facing north, photo showing ground surface disturbance resulting from driveway construction.**

**Plate 2. Photo showing building structure and example of ornamental garden bed cut into slope landform.**

Further north, the study area comprised a large circular gravel driveway with a fountain in the centre. The ground surface displayed visible evidence of disturbance and modification to level the natural slope landform. Small exposures present on the gravelly driveway were inspected for any evidence of Aboriginal objects, however none were identified. The northern part of the study area contained additional vegetated areas containing a mixture of native regrowth and exotic weeds. A cleared grassed slope was also present within the northern part of the study area. No Aboriginal artefacts were identified on small patchy exposures present at this location.

**Plate 3. View of northern portion of study area. Note evidence of ground levelling for circular driveway.**

**Plate 4. Example of cleared slope landform within landscaped garden in northern part of study area.**

Visual inspection confirmed that no Aboriginal objects or areas of Aboriginal archaeological potential were located within the study area. The study area had been heavily modified as a result of landscaping, ground levelling activities and the construction of the existing driveway.

# 3 Statutory Requirements

The *National Parks and Wildlife Act 1974* (NPW Act) is the primary statutory control dealing with Aboriginal heritage in New South Wales. Items of Aboriginal heritage (Aboriginal objects) or Aboriginal places (declared under section 84) are protected and regulated under the NPW Act.

An "Aboriginal object" is defined under the Act as "any deposit, object or material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of the area that comprises New South Wales, being habitation before or concurrent with (or both) the occupation of that area by persons of non-Aboriginal extraction and includes Aboriginal remains". As such, Aboriginal objects are confined to physical evidence and are commonly referred to as Aboriginal sites.

Aboriginal objects are protected under section 86 of the Act. It is an offence to harm or desecrate an Aboriginal object, either knowingly [section 86 (1)] or unknowingly [section 86 (2)]. Harm includes to destroy, deface, damage or move. An Aboriginal heritage impact permit (AHIP) issued under section 90 (1) of the Act is required for any activity which will harm an Aboriginal object or declared Aboriginal place.

Section 87 (2) of the Act provides a defence against prosecution under section 86 (2) if "the defendant exercised due diligence to determine whether the act or omission constituting the alleged offence would harm an Aboriginal object and reasonably determined that no Aboriginal object would be harmed". This defence appears to specifically relate to Aboriginal objects.

This due diligence assessment report was commissioned to:

- exercise due diligence in relation to Aboriginal objects;
- comply with the requirements of the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales*;
- identify if the proposal would harm an Aboriginal object and, if so, what measures can be taken to avoid that harm; and
- reasonably determine that no Aboriginal object would be harmed.

# 4 Conclusions and Recommendations

No Aboriginal heritage was identified within the Nowra Bridge Boundary adjustments study area located at Bomaderry, NSW. The proposed works were assessed under the Heritage NSW *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales*.

The due diligence desktop assessment and visual inspection did not identify any Aboriginal objects or areas of potential for subsurface deposits within the study area. Landform and disturbance assessment found that landscaping and ground levelling activities, as well as driveway construction has led to high levels of disturbance within the study area.

Based on the results of this assessment, there are no archaeological constraints to the proposal and according to the Heritage NSW *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* the proposed works can proceed with caution.

## References

Artefact Heritage Pty Limited (Artefact), 2016. Berry to Bomaderry Upgrade Aboriginal Archaeological Salvage Excavation and Surface Collection Report. Report prepared to Arcadis.

Artefact, 2017a. Berry to Bomaderry Upgrade. Archaeological Survey Report - Additional Areas. Report to Arcadis

Artefact, 2017b. Berry to Bomaderry Upgrade: Archaeological Salvage Excavation Methodology. Report to Arcadis.

Artefact, 2018a. Nowra Bridge Project: Archaeological Survey Report (PACHCI Stage 2). Report prepared for SMEC.

Artefact, 2018b. Nowra Bridge Project: Archaeological Technical Report (PACHCI Stage 3). Report prepared for SMEC.

Artefact, 2019. Nowra Bridge Project: Aboriginal Cultural heritage Assessment Report (PACHCIC Stage 3). Report prepared for SMEC.

Bowman, H.N., Harper, L.F., Jaquet, J.B., Rose, G., 1972. *Nowra-Toolijooa 1:50 000 Geological Map, 9028-III & 9028-II.* Geological Survey of New South Wales, Sydney (unpublished).

Hazelton, P. A. 1992. Soil Landscapes of the Kiama 1:100,000 Sheet. Department of Conservation and Land Management, Sydney.

Kelleher Nightingale Consulting (KNC), *in prep.* Berry to Bomaderry Upgrade Aboriginal Archaeological Salvage Addendum Report: Excavations at G2B A48 (52-5-0740), G2B A50 (52-5-0742), G2B A59 (52-5-0751) & G2B A61 (52-5-0753). Report prepared for Roads and Maritime Services.

KNC, 2019. Nowra Bridge Project, Aboriginal Archaeological Assessment: Addendum to Stage 3 PACHCI Report. Report prepared for Roads and Maritime Services.

Navin Officer Heritage Consultants Pty Ltd, 2013. Berry to Bomaderry Upgrade. Technical paper: Aboriginal cultural heritage assessment report. Report prepared for Roads and Maritime Services on behalf of AECOM.

New South Wales Archaeology Pty Ltd, 2013. Gerringong to Bomaderry Princess Highway Upgrade, Foxground and Berry bypass, Geotechnical Testing Program Draft. Prepared for Roads and Maritime Services.

OEH, September 2010. *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales*. Office of Environment and Heritage, Sydney.

Troedson A.L. & Hashimoto T.R. 2013. Shoalhaven 1:100 000 and 1:25 000, Coastal Quaternary Geology Map Series. Geological Survey of New South Wales, Maitland.

## Appendix A – AHIMS Search Results

Office of Environment & Heritage

### AHIMS Web Services (AWS)
**Extensive search - Site list report**

Your Ref/PO Number : 2014
Client Service ID : 546303

| SiteID | SiteName | Datum | Zone | Easting | Northing | Context | Site Status | SiteFeatures | SiteTypes | Reports |
|---|---|---|---|---|---|---|---|---|---|---|
| 52-5-0858 | Nowra Bridge PAD 4 | GDA | 56 | 280356 | 6139758 | Open site | Valid | Potential Archaeological Deposit (PAD) : - | | 103860 |
| | **Contact** | **Recorders** | Artefact - Cultural Heritage Management - Pyrmont,Artefact - Cultural Heritage Mai | | | | | **Permits** | | |
| 52-5-0920 | Bomaderry Creek / Illaroo Road Rockshelter | GDA | 56 | 280416 | 6139685 | Closed site | Valid | Artefact : - | | |
| | **Contact** | **Recorders** | Kelleher Nightingale Consulting Pty Ltd,Miss.Kristen Taylor | | | | | **Permits** | | |
| 52-5-0874 | Nowra Bridge 9 | GDA | 56 | 280492 | 6139686 | Open site | Valid | Artefact : - | | |
| | **Contact** | **Recorders** | Kelleher Nightingale Consulting Pty Ltd,Artefact - Cultural Heritage Management - . | | | | | **Permits** | 4479 | |
| 52-5-0876 | Nowra Bridge 8 | GDA | 56 | 280531 | 6139772 | Open site | Valid | Artefact : - | | |
| | **Contact** | **Recorders** | Artefact - Cultural Heritage Management - Pyrmont,Mr ryan taddeucci | | | | | **Permits** | 4479 | |
| 52-5-0873 | Nowra Bridge 10 | GDA | 56 | 280623 | 6139812 | Open site | Valid | Artefact : - | | |
| | **Contact** | **Recorders** | Artefact - Cultural Heritage Management - Pyrmont,Mr ryan taddeucci | | | | | **Permits** | 4479 | |
| 52-5-0854 | Nowra Bridge PAD 5 | GDA | 56 | 280757 | 6139797 | Open site | Valid | Potential Archaeological Deposit (PAD) : - | | 103860 |
| | **Contact** | **Recorders** | Kelleher Nightingale Consulting Pty Ltd,Artefact - Cultural Heritage Management - . | | | | | **Permits** | | |

**Report generated by AHIMS Web Service on 29/10/2020 for Matthew Kelleher for the following area at Datum : GDA, Zone : 56, Eastings : 280286 - 280836, Northings : 6139637 - 6140232 with a Buffer of 0 meters. Additional Info : Arch Assessment. Number of Aboriginal sites and Aboriginal objects found is 6**

This information is not guaranteed to be free from error omission. Office of Environment and Heritage (NSW) and its employees disclaim liability for any act done or omission made on the information and consequences of such acts or omission.

Page 1 of 1

# Appendix D

## Biodiversity Assessment Report

# Review of Environmental Factors Addendum- Nowra Bridge Project

## Prepared for Fulton Hogan Construction Pty Ltd

ecological AUSTRALIA
A TETRA TECH COMPANY

1300 646 131
www.ecoaus.com.au

## DOCUMENT TRACKING

| | |
|---|---|
| **Project Name** | Review of Environmental Factors Addendum - Nowra Bridge Project |
| **Project Number** | 19WOL-13586 |
| **Project Manager** | Rodney Armistead |
| **Prepared by** | Rodney Armistead |
| **Reviewed by** | **Alex Gorey** |
| **Approved by** | **Beth Medway** |
| **Status** | **Draft** |
| **Version Number** | **1** |
| **Last saved on** | **11 November 2020** |

This report should be cited as 'Eco Logical Australia 2020. *Review of Environmental Factors Addendum - Nowra Bridge Project*. Prepared for Fulton Hogan Construction Pty Ltd.'

### ACKNOWLEDGEMENTS

This document has been prepared by Eco Logical Australia Pty Ltd with support from David Lamb and Nathan Russell.



Template 2.8.1

# Contents



# List of Figures

## List of Tables



## Abbreviations

| Abbreviation | Description |
|---|---|
| BC Act | *Biodiversity Conservation Act 2016* |
| EP&A Act | *Environmental Planning and Assessment Act 1979* |
| EPBC Act | *Environment Protection and Biodiversity Act 1999* |
| DAWE | Department of Agriculture, Water and the Environment |
| FFA | Flora and Fauna Assessment |
| Fulton Hogan | Fulton Hogan Construction Pty Ltd |
| GHFF | Grey-headed Flying-Fox |
| HBT | Habitat Bearing Tree |
| MNES | Matters of Environmental Significance |
| PCTs | Plant Community Types |
| REF | Review of Environmental Factors |
| RMS | Roads and Maritime Service |
| SIC | Significant Impact Criteria test in accordance with the *Environment Protection and Biodiversity Act 1999* |
| WONS | Weeds of National Significance |
| TEC | Threatened Ecological Community |
| ToS | Tests of Significance tests undertaken in accordance with the *Biodiversity Conservation Act 2016* |

# Executive Summary

This Addendum - Review of Environmental Factors (REF) assesses the environmental impacts associated with the proposed removal of 0.08 hectares of planted exotic and native flora species. The planted exotic and native flora species form part of the Illowra – Berry estate garden, which is located on the corner of Princes Highway and Bolong Rd, Nowra (the subject site). The original REF, to which this report forms an addendum, was prepared by Roads and Maritime Services (2018b). The current proposal has been assessed under Part 5 of the *Environment Planning and Assessment 1979* (EP&A Act). The relevant legislative requirements are outlined in Appendix A.

The desktop review and the site assessment revealed that subject had been historically disturbed and that no Threatened Ecological Communities (TEC) or Endangered Populations were present or were deemed likely to be present within or near to the subject site. No fauna habitats in the form of habitat bearing trees (HBTs), cave like structures, large fallen logs or continues patches of native remnant vegetation that would typically support threatened fauna species were recorded at the subject site. The site assessment revealed the presence of two threatened entities, including:

- Planted *Syzygium paniculatum* (Magenta Lilli Pilly)
- *Pteropus poliocephalus* (Grey-headed Flying-fox) - listed as vulnerable under the BC Act and EPBC Act. GHFFs were observed roosting nearby during the day.

The *S. paniculatum,* which is a common horticultural species that has been planted at the subject site to provide a barrier between the existing Princes Highway and Illowra Homestead. Impact assessments for this individual were deemed unnecessary, as planted individuals are not considered to meet the threatened species listing under the BC Act or EPBC Act. The proposed works will not lead to a long-term decrease in the size of any naturally occurring important populations of the species.

The *Biodiversity Conservation Act 2016* and *Environment Protection and Biodiversity Conservation Act 1999* listed *Pteropus poliocephalus* (Grey-headed Flying-fox (GHFF)) camp is located within 50 m of the subject site. The exotic and native canopy trees that are to be removed in the subject site do not form part of the core roost habitat for this species. The Grey-headed Flying-fox was subjected to the appropriate BC Act Test of Significance (ToS) in accordance with Section 7.3 of the BC Act and EBPC Act Significance Impact Criteria (SIC) tests. These tests concluded that the proposed works are unlikely to result in a significant impact to this threatened fauna species, as such further assessments in the form of Species Impact Statement (SIS), Biodiversity Development Assessment Report (BDAR) or a referral to the Department of Agriculture, Water and Environment (DAWE), are not required.

An outline of the methods, results of the site assessment, conclusions and recommendations are provided in greater detail below.

# 1. Introduction

## 1.1 Project description

Eco Logical Australia Pty Ltd (ELA) has been commissioned by Fulton Hogan Construction Pty Ltd (Fulton Hogan) to prepare this addendum to the existing Nowra Bridge Project (the project) Review of Environmental Factors (REF) report that was prepared Roads and Maritime Services (RMS) (2018b).

The proposed works will involve the clearing of 0.08 hectares of planted exotic and native flora species that form a European style garden that is located within Illowra – Berry homestead estate residence and garden (the subject site) (Figure 1). The subject site will form part of the works to construct the A1 Princes Highway bridge over the Shoalhaven River, Nowra. This additional vegetation removal falls out of the of the existing approvals for the project, and consequently an assessment of the ecological values at the subject site is necessary.

## 1.2 Purpose of this report

This Addendum provides the methods and results of the database search and literature review and field survey, a summary of the relevant statutory considerations and an assessment of how the proposed works could impact upon the ecological values of the subject site.

# 2. Methods

## 2.1 Data and literature review

The available literature and databases pertaining to the ecology and environmental features of the subject site, and surrounding locality were reviewed to identify key ecological values relevant to the subject site and surrounding locality. This involved a review of the following databases and literature:

- BioNet Atlas database search (5 km radius)
- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Protected Matters Search Tool (DoEE 2018) (5 km radius)
- Illawarra Plant Community Type Vegetation Map, 2016. VIS_ID 4678 (Office of Environment and Heritage (OEH) 2016)
- Roads and Maritime Services (RMS) (2018a). Nowra Bridge Project – Biodiversity report
- Roads and Maritime Services (RMS) (2018b). Nowra Bridge Project – Review of Environmental Factors.
- Eco Logical Australia (2020). Shoalhaven District Memorial Hospital Planning Project – Ecological Constraints Assessment. Prepared for Health Infrastructure NSW.
- Eco Logical Australia (2020). Flora and Fauna Assessment - Celland Lodge Aged Care Facility North Nowra. A report to Linear Project Management.

The BioNet Atlas and Protected Matters Search Tool (5 km radius) searches were performed around the coordinates -34.85987 and 150.59979 on 30 October 2020. The results of these searches were combined to produce a list of threatened flora, fauna and ecological communities known or considered likely to occur in, or utilise, the subject site. The likelihood of occurrence for each species was determined using recent records, the likely presence of suitable habitat and knowledge of the species

ecology. A list of species (defined as "yes", "likely" or having "potential") was then used to determine which species should be targeted during the site assessment. The terms for the likelihood of occurrence are listed in **Appendix B**. Obligate migratory marine and coastal wading species, were excluded from this list. These species were excluded because it was deemed that it would not use the subject site due to an absence of any suitable habitat. Therefore, it would also be equally unlikely for them to be affected by the proposed works.

A full list of the threatened communities, populations, flora and fauna recorded during the desktop and literature review has not been provided in this report, but one can be issued if deemed necessary.

## 2.2 Site inspection

Following the desk top assessment, a site assessment was conducted by ELA ecologist Rodney Armistead, with David Lamb from Fulton Hogan for a total of 1.5 person hours on 23 October 2020. The site assessment involved traversing through or near to the subject site on foot to:

- Validate the results of the desktop assessment and identify any ecological matters that require further investigation, could constrain or impede opportunities for future development.
- Identify and map the extent of Threatened Ecological Communities that are present (or not present) within or near to the subject site.
- Conduct a search for threatened flora and fauna (determined by collection of scats, owl pellets, scratch marks, nests, tree hollows and nest boxes), threatened species, or individuals from an Endangered Populations.
- Conduct a search for potential threatened species habitat and determine the likelihood that a threatened species could occur within the subject site.
- Conduct a search for priority or weeds of concern listed under the *Biosecurity Act (2015)* and Weeds on National Significance (WONS).

The location and type of important habitat features (e.g. hollow bearing trees, bird nests, large fallen logs, dense and continuous patches of native vegetation) and signs of fauna such as scats, scratches and tracks when present, were recorded using a hand-held GPS unit. It is noted that these GPS units can have errors in the accuracy approximately ± 10 m (subject to availability of satellites on the day).

## 2.3 Impact assessment tests

Using the information collected during the desktop search, literature review and site assessment, Tests of Significance (ToS) were undertaken in pursuant of s7.3 of the BC Act on those threatened entities that are listed under the BC Act and considered likely to impacted by the proposed works. In addition, EPBC Act Significant Impact Criteria (SIC) tests were also conducted on those Matters of National Environmental Significance (MNES) that are likely to be impacted by the proposed works.

If a significant impact is determined as being likely through these tests, the proponent may be required to address the proposal under the Biodiversity Offsets Scheme (BOS), and / or refer the proposal to the DotEE.

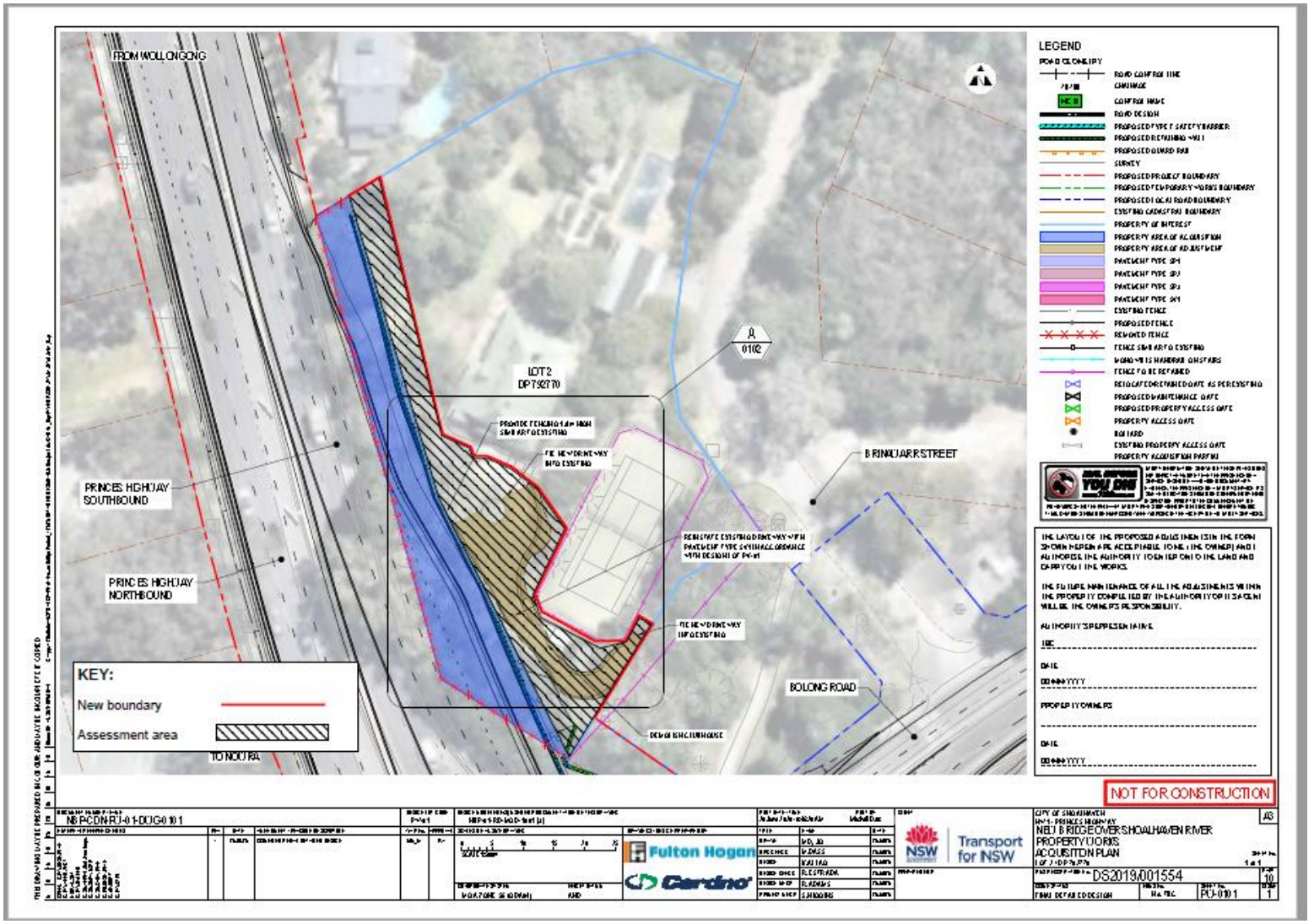


**Figure 1: Location and extent of the proposed works (shown in cross hatched section)**

# 3. Results

## 3.1 Desk top assessment

The NSW BioNet Atlas of Wildlife and EPBC Protected Matters Search Tool identified seven TECs, one endangered population, 34 threatened flora species, 61 threatened fauna and migratory (excluding obligate migratory marine and coastal wading fauna species) that have either been recorded or are predicted to occur within a 5 km radius of the subject site (Figure 2, Figure 3 and Figure 4).

As stated previously, a full list of the threatened communities, populations, flora and fauna recorded during the desktop and literature review can be provided upon request.

### 3.1.1 Endangered populations

The database search indicated that one Endangered Population, *Eucalyptus langleyi population north of the Shoalhaven River in the Shoalhaven Local Government Area* is present within a 5km radius of the subject site. Individuals of this Endangered Population of *Eucalyptus langleyi* (Albatross Mallee) occupy a series of fragmented stands in the Bomaderry Creek Regional Park, which is located approximately 200m away from the subject site (Figure 3).

### 3.1.2 Threatened flora species

The desktop review identified 34 threatened flora species listed under the BC or EPBC Acts, that have the potential to occur within a 5 km radius of the subject site (Figure 3). *Syzygium paniculatum* (Magenta Lilly-Pilli), listed as endangered under the BC and EPBC Acts, is present at the subject site. Typically, *S. paniculatum* prefers wet gullies, littoral rainforest communities and mosaic eucalyptus forest (OEH 2014; NSW Scientific Committee 2016). However, *S. paniculatum* is a popular urban horticultural species that has been planted in many gardens across NSW. The historic photographs of the homestead suggest that entire yard was devoid of vegetation (Figure 5).

Nineteen other planted *S. paniculatum* trees were identified, assessed and approved for removal in the original REF RMS (2018b) and the projects Biodiversity Study (RMS 2018a).

### 3.1.3 Threatened fauna species

The desktop review identified 61 threatened fauna species listed under the BC and EPBC Acts, which may have the potential to occur within a 5 km radius of the subject site (Figure 4). Of the 61 species predicted to occur, *Pteropus poliocephalus* (Grey-headed Flying Fox) was the only species identified as likely to occur in the subject site due to the presence of suitable foraging resources and nearby records for the species.

## 3.2 Field assessment

### 3.2.1 Site description

The subject was historically cleared of the native vegetation prior to the 1901 when the Illowra homestead was constructed. Figure 5 shows the homestead after it was construction and the lack of any vegetation in the background of the photograph is noteworthy.

### 3.2.2 Vegetation communities within the subject site

No TECs were identified within or near to the subject site. The survey identified two distinct vegetation types within the subject site, including:

- Cleared, mown, planted exotic garden plants
- Planted native and exotic vegetation

A description of each vegetation community is provided below.

#### *3.2.2.1 Cleared, mown and planted exotic garden plants*

A small section of the subject site consists of cleared, mown and mixed native and exotic species. The vegetation in this area included a broad range of exotic grasses that are regularly mown and / or under-scrubbed (Figure 6, Figure 7 and Figure 8).

#### *3.2.2.2 Planted native and exotic vegetation*

Planted exotic and native species that were planted to form gardens were interspersed throughout the subject site (Figure 6, Figure 7 and Figure 8). Fifty-one (51) flora species were recorded during the site assessment (Table 1). Twenty-one (21) exotic plants were recorded, which included *Agapanthus praecox* (Agapanthus), *Agave attenuate* (Agave), several *Camellia* species (Camellia), *Cinnamomum camphora* (Camphor Laurel), *Ginko biloba* (Ginko), *Ligustrum lucidum* (Large-leaved Privet), *Ochna serrulata* (Mickey Mouse Bush), *Tradescantia fluminensis* (Wandering Trad) as well as a number of other European style garden plants (Table 1, Figure 6, Figure 7 and Figure 8).

Thirty (30) native plant species present included *Elaeocarpus reticulatus* (Blueberry Ash), *Glochidion ferdinandi* (Cheese Tree), *Diploglottis cunninghamii* (Native Tamarind), *Brachychiton acerifolius* (Flame Tree) and *Toona ciliata* (Red Cedar) (Table 1). One flora species listed as threatened was identified within the subject site; *Syzygium paniculatum*. At six *S. paniculatum* individuals were recorded within subject site.

Seven weed species listed as either being a priority species under the *Biosecurity Act 2015* and/or as a Weed of National Significance (WONS) were recorded (Table 1). The weeds species listed and the *Biosecurity Act 2015* or WONS include *Asparagus Aethiopicus* (Asparagus Fern), *C. camphora and Ligustrum lucidum.* Under the *Biosecurity Act 2015*, there is a need to conduct the proposed works in a manner that prevents, eliminates or minimises the biosecurity risk that these weed species pose. Endangered Populations within the subject site

Individuals of *Eucalyptus langleyi population north of the Shoalhaven River in the Shoalhaven Local Government Area* were not recorded at the subject site.

### 3.2.3 Fauna and fauna habitat values

Five fauna species, including one threatened species was recorded during the site assessment. The non-threatened species recorded at the subject site include the *Grallina cyanoleuca* (Peewee), *Cracticus tibicen* (Australian Magpie), *Geoplelia cuneata* (Diamond Dove) and *Leusarcia melanoleuca* Wonga Pigeon.

One threatened species, GHFF, which is listed as Vulnerable under the BC and EPBC Act isroost near the subject site. The core roost habitat that belongs to the nearby Bomaderry GHFF camp is located

approximately 50 m from the subject site. Grey-headed Flying-foxes are a highly mobile and migratory species and numbers at the Bomaderry GHFF camp will fluctuate with seasonal climatic conditions and the presence of nearby food resources.

In regard to any other threatened fauna species, the site assessment revealed that the subject site generally lacks fauna habitat in the form of structurally rich native vegetation or fallen logs that would support any important life history stages of some threatened fauna species.

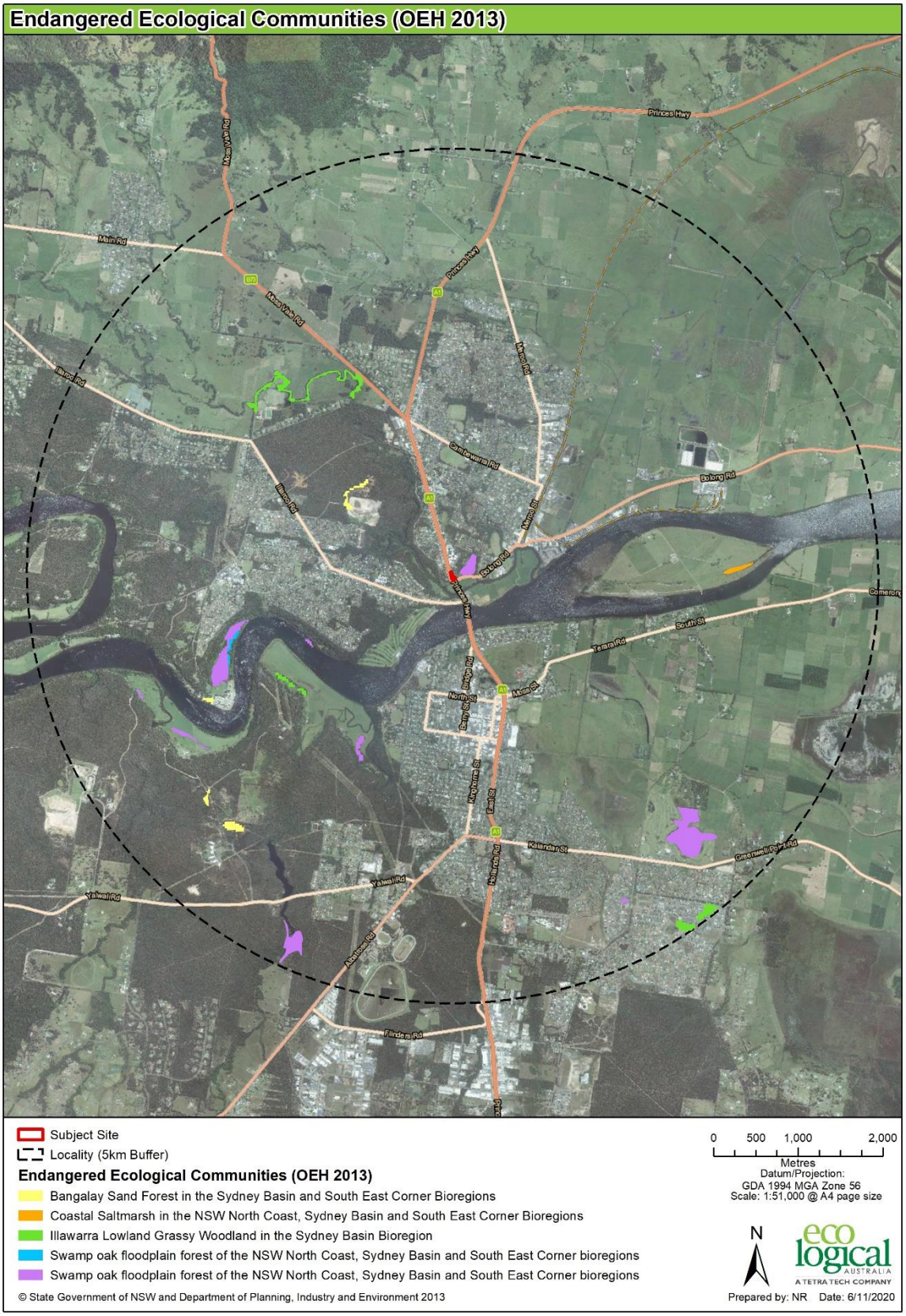


**Figure 2. Location and extent of Endangered (Threatened) Ecological Communities within a 5 km radius of the subject site.**


**Figure 3. Location of threatened flora species records within a 5 km radius of the subject site.**

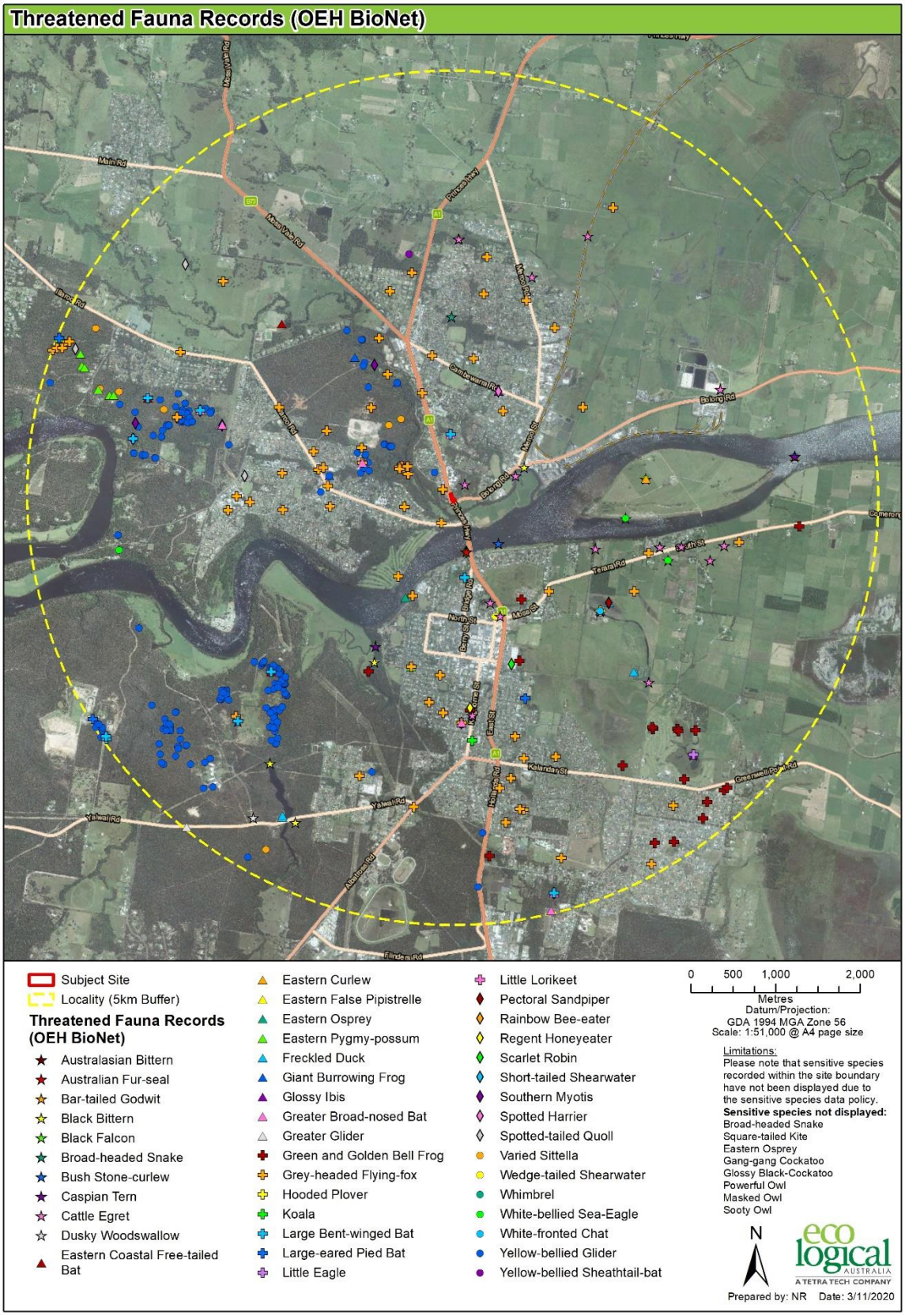


**Figure 4. Location of threatened fauna species records within a 5 km radius of the subject site.**

**Figure 5. Historical photograph of the Illowra homestead taken after 1901 when it was built. Please note the absence of native vegetation in the background.**

**Figure 6: Stone driveway and examples of the mostly exotic plant garden beds present within the subject site**

**Figure 7. Examples of the mostly mixed exotic and native plant garden beds present within the subject site**

**Figure 8. Examples of the mostly mixed exotic and native plant garden beds present within the subject site**

**Table 1. Flora species listed on site.**

| Species name | Common name | Exotic / Native | Threatened / Not Threatened | Weed status |
|---|---|---|---|---|
| *Agave attenuata* | Agave | Exotic | | |
| *Agonis flexuosa* | Western Australian Peppermint | Native to Australia, but not to this region | Not threatened | |
| *Alphitonia excelsa* | Red Ash | Native | Not threatened | |

| Species name | Common name | Exotic / Native | Threatened / Not Threatened | Weed status |
|---|---|---|---|---|
| *Asparagus aethiopicus* | Ground Asparagus Weed | Exotic | | Priority Weed, WONS |
| *Asparagus virgatus* | Asparagus Fern | Exotic | | Priority Weed, WONS |
| *Asplenium nidus* | Bird Nest Fern | Native to Australia, but not to this region | Not threatened | |
| *Brachychiton acerifolius* | Flame Tree | Native | Not threatened | |
| *Callicoma serratifolia* | Black Wattle | Native | Not threatened | |
| *Calochlaena dubia* | False Bracken | Native | Not threatened | |
| *Camellia* species | Camellia | Exotic | | |
| *Celtis paniculata* | Native Celtis | Native | Not threatened | |
| *Cinnamomum camphora* | Camphur laurel | Exotic | | Priority Weed (NSW) |
| *Clerodenron tomentosum* | Hairy Clerodendrum | Native | Not threatened | |
| *Conzya* species | Fleabane | Exotic | | |
| *Copromsa quadrifida* | Prickly Coprosma | Native | Not threatened | |
| *Diploglottis cunninghamii* | Native Tamarind | Native | Not threatened | |
| *Doryanthese excelsa* | Gymea Lilly | Native | Not threatened | |
| *Elaeocarpus reticulatus* | Blueberry Ash | Native | Not threatened | |
| *Ficus coronata* | Sandpaper Fig | Native | Not threatened | |
| *Ficus macrophylla* sp. *macrophylla* | Morton Bay Fig | Native | Not threatened | |
| *Ginko biloba* | Ginko | Exotic | | |
| *Glochidion ferdinandi* | Cheese Tree | native | Not threatened | |
| *Hedycarya angustifolia* | Native Mulberry | Native | Not threatened | |

| Species name | Common name | Exotic / Native | Threatened / Not Threatened | Weed status |
|---|---|---|---|---|
| *Hymenosporum flvum* | Native Frangipani | Native | Not threatened | |
| *Ligustrum lucidum* | Broad Leaf Privet | Exotic | | Priority Weed, WONS |
| *Ligustrum sinense* | Small Leaved Privet | Exotic | | Priority Weed, WONS |
| *Macadamia* species | Macadamia | Native to Australia, but not to this region | Not threatened | |
| *Ochna serrulata* | Mickey Mouse Bush | Exotic | | |
| *Olea europaea* | European Olive | Exotic | | |
| *Omalanthus populifolius* | Bleeding Heart | Native | Not threatened | |
| *Pittosporum revolutum* | Rough-fruit Pittosporum | Native | Not threatened | |
| *Polyscias murrayi* | Pencil Cedar | Native | Not threatened | |
| *Ginko biloba* | Ginko | Exotic | | |
| *Glochidion ferdinandi* | Cheese Tree | native | Not threatened | |
| *Hedycarya angustifolia* | Native Mulberry | Native | Not threatened | |
| *Hymenosporum flvum* | Native Frangipani | Native | Not threatened | |
| *Ligustrum lucidum* | Broad Leaf Privet | Exotic | | Priority Weed, WONS |
| *Ligustrum sinense* | Small Leaved Privet | Exotic | | Priority Weed, WONS |
| *Macadamia* species | Macadamia | Native to Australia, but not to this region | Not threatened | |
| *Ochna serrulata* | Mickey Mouse Bush | Exotic | | |
| *Olea europaea* | European Olive | Exotic | | |

| Species name | Common name | Exotic / Native | Threatened / Not Threatened | Weed status |
|---|---|---|---|---|
| *Omalanthus populifolius* | Bleeding Heart | Native | Not threatened | |
| *Pittosporum revolutum* | Rough-fruit Pittosporum | Native | Not threatened | |
| *Polyscias murrayi* | Pencil Cedar | Native | Not threatened | |
| *Sonchus oleraceus* | Common Sow Thistle | Exotic | | |
| *Strelitzia reginae* | Birds of Paradise | Exotic | | |
| *Syzygium paniculatum* | Magenta Lilly Pilli | Native | Threatened, when present in natural environment environments, but not when planted in European style gardens. | |
| *Tradescantia fluminensis* | Wandering Trad | Exotic | | |
| Unknown species | Cypress Tree | Exotic | | |
| Unknown Tree-Fern species | Tree Fern | Native | Not threatened | |
| *Watsonia* borbonica | Watsonia | Exotic | | |

# 4. Potential impacts

## 4.1 Direct impacts

The primary impact is the proposed removal of 0.08 ha of exotic and native vegetation from a European style garden in the subject site which is also considered to provide potential foraging habitat for the Grey-headed Flying-fox.

## 4.2 Indirect impacts

The following indirect impacts have potential to occur during and following the proposed works:

- the spread of other weeds and plant pathogens via dirty machines (plant), tools or footwear into or from the subject site.
- chemical (fuel, oil or hydraulic oil) spills that may impact on the vegetation being retained in the homesteads garden.
- construction noise may disturb the GHFFs roosting in the nearby camp.
- dust

## 4.3 BC Act Tests of Significance and EPBC Act Significant Impact Criteria

Under section 7.3. of the BC Act, tests of significance must be used to determine whether the proposed works are considered likely to have a significant effect upon a threatened ecological community, population or species (OEH 2018). The objectives of the Test of Significance (ToS) is to provide a standardised and transparent means to determine impacts upon a threatened entity (OEH 2018). This test enables a decision to be made as to whether there is likely to be a significant impact on the species, and, if further assessments are required.

The EPBC Act establishes a process for assessing the environmental impact of activities and developments where "Matters of National Environmental Significance" (MNES) may be affected. Under this Act, any action which "has, will have, or is likely to have a significant impact on a matter of MNES" is defined as a "controlled action", and requires approval from the Department of Agriculture, Water and the Environment (DAWE) which is responsible for administering the EPBC Act.

The GHFF, which is listed as vulnerable under the BC Act and EPBC Act, were recorded at and near to the subject site, and therefore, likely to be impacted by the proposed works. However, considering that the works will involve the thinning of a small amount of understorey vegetation, ELA expects that any impacts will not be significant. The ToS and SIC impact assessment tests are provided in **Appendix B** and concluded that a significant impact is not likely to occur as a result of the proposed works.

# 5. Recommendations

The following recommendations have been developed to avoid, manage or mitigate against any potential impacts of the proposal on threatened entities.

## 5.1 Weed control

Several Weeds of National Significance (WONS), priority weeds listed under the *Biosecurity Act 2015* and agricultural weeds of concern for the Nowra Bridge Project were recorded at the subject site. All efforts must be made to safely dispose of these plants (if they are to be trimmed or removed) or to manage them in situ within the subject site.

## 5.2 Vegetation trimming and or removal

The vegetation being removed will be clearly marked out prior to works commencing, to avoid unintentionally impacting beyond the clearing limits of this addendum.

Mitigation measures should be implemented to reduce the potential impacts on the surrounding vegetation, and they should include, but may not be limited to the following:

It is recommended that the following should be undertaken during the vegetation trimming and / or removal works:

- any larger native trees that are felled should be mulched, and the wood chips used or stockpiled in accordance with Section 5.2 in RMS Specification D&C G40 'Clearing and Grubbing' 2017
- if working in areas containing waterways, no soil or vegetation should be removed from the area, and plant and equipment should be hosed down and checked for fragments when entering and leaving
- if required, fauna handling and procedures are to follow the fauna protection procedure guidelines in Appendix C of the Flora and Fauna Management Plan (Fulton Hogan 2019).

During the works, the environmental control protocols that should be implemented include:

- the no-go zones are to be segregated from the proposed works site by installing a temporary fence made from high visibility flagging
- signs that outline the need for fencing are to be installed at appropriate locations
- care should be taken to limit the spread of weeds into and beyond the subject site. Standard hygiene protocols in accordance with the Construction Environmental Management Plan are to be implemented for the people, plant, and equipment being used to remove these trees.

## 5.3 Management of Grey-headed Flying-foxes

The following recommendation are to be considered whilst the works are clearing the vegetation at the subject site.

- A toolbox talk will be completed for all personnel associated with impacting upon the GHFFs, the disease in which the GHFF and what to do if an injured GHFF is encountered prior to the works beginning on site.

- The use of loud machinery and equipment that produces sudden impacts/noise should where practicable be limited. Where loud equipment (e.g. chainsaws) is required they must be started away from the camp (e.g. at least 50m) and allowed to run for a short time to allow GHFF to adjust.
- During the day, any activity likely to cause loud noises that could disturb flying foxes, so that they take flight continuously and/or for periods of time in excess of 20 minutes, should be avoided and / or monitored.
- No tree in which a flying-fox is currently roost in is to be trimmed or removed. Works may continue in trees adjacent to roost trees only where a person experienced in flying-fox behaviour assesses that no flying-foxes are at risk of being harmed. A person experienced in flying-fox behaviour is to remain on-site to monitor when canopy trimming/removal is required within 30 metres of roosting flying-foxes.
- Noise generated by the works should create a first stage disturbance, to encourage any remaining flying foxes to take flight and move away from the subject site. Works should be paused at this stage to monitor for any remaining flying-foxes (including crèching young) and ensure they will not be impacted.
- Works will not take place in periods of adverse or extreme weather.

# 6. Conclusions

The proposal would result in the clearing of 0.08 ha of planted exotic and native vegetation from the subject site, on the corner of Princes Highway and Bolong Rd, Nowra. No threatened ecological communities, Endangered Populations, food trees or HBTs were recorded.

One threatened flora species, *S. paniculatum* which is listed as vulnerable under both the TSC Act and EPBC Act, was found to occur within the subject site. The five *S. paniculatum* individuals form part of planted garden.

The Bomaderry GHFF camp is located nearby. This species is listed as vulnerable under both the TSC Act and EPBC Act. Assessments of significance were undertaken for GHFF and found it was unlikely that there will be a significant impact to this species. Mitigation measures have been recommended to reduce impact to the previously mentioned threatened entities and the nearby roost habitats.

Impacts to these threatened entities were assessed using tests of significance under the BC Act ToS and EBPC Act SIC tests, and it was concluded the proposed development is not likely to result in a significant impact upon any threatened entity listed under either Act. Consequently, no further assessments in the form of a Species Impact Statement of referral are required.

# 7. References

Fulton Hogan Construction Pty Ltd 2019. Flora and Fauna Management Plan. Nowra Bridge Project. Submitted to Roads and Maritime Services.

Roads & Maritime Services (RMS) 2017. Specification D&C G40 'Clearing and Grubbing'.

Roads & Maritime Services (RMS) 2018a. Nowra Bridge Project: Biodiversity Assessment.

Roads & Maritime Services (RMS) 2018b. Nowra Bridge Project: Review of Environmental Factors

# Appendix A Legislation

| Legislation | Relevance to the project |
|---|---|
| *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) | Under the EPBC Act, proposed actions that have the potential to significantly impact on matters of Matters of National Environmental Significance (MNES) must be referred to the Commonwealth Department of Environment and Energy. A MNES, the GHFF was identified as using being present during their nightly foraging activities at the subject site. This report assesses impacts to MNES and determines if the activity has a significant impact on MNES. |
| *Environmental Planning and Assessment Act 1979* (EP&A Act) | The NSW EP&A Act is the principal planning legislation for NSW. It provides a framework for the overall environmental planning and assessment of development proposals. The proposed works are to be assessed under Part 4 of the EP&A Act. |
| *Biodiversity Conservation Act 2016* (BC Act) | The BC Act provides for the conservation of threatened species, populations and ecological communities. The Act is integrated with the NSW EP&A Act and requires consideration of whether a development or an activity is likely to significantly affect an ecological community, population, threatened species and or their habitat. The land on which the development is proposed is not biodiversity certified and therefore impacts to threatened species, populations and endangered ecological communities listed under the BC Act are required to be assessed in accordance with Part 5 of the EP&A Act. The test of significance for determining whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats is set out in 7.3 of the BC Act |
| *Biosecurity Act 2015* | The *Biosecurity Act 2015* defines the roles of government, councils, private landholders and public authorities in the management of noxious weeds. The Act sets up categorisation and control actions for the various noxious weeds, according to their potential to cause harm to our local environment. |
| *Water Management Act 2000* | The *Water Management Act 2000* (WM Act) defines waterfront land as a bed of any river, lake, estuary and any land within 50 m of a riverbank, shore or estuarine mean high-water mark. |
| SEPP 44 – Koala Habitat Protection | A lack of recent nearby koala records (see Figure 4) and an absence of koala use tree species (as per Schedule 2 of DPIE 2019), absence of potential and core koala habitat and the isolated nature of the subject site, no further aspects of SEPP 44 are relevant to the proposal. |
| **Local Government** | |
| Shoalhaven Local Environment Plan 2014 | The subject land is zoned R1 General Residential under the Shoalhaven LEP. |

# Appendix B Assessments of significance

If a species, population or ecological community listed under Schedules 1 or 2 of the BC Act is likely to be affected, a review of the factors set out to establish if there is likely to be a significant impact on that species, population, ecological community or habitat, must be undertaken. Section 7.3 of the BC Act sets out five factors that must be addressed as part of a Tests of Significance. This enables a decision to be made as to whether there is likely to be a significant impact on the species.

Based on the impact of the proposed development, Tests of Significance were undertaken for the following matter listed under the BC Act:

### *PTEROPUS POLIOCEPHALUS* (GREY-HEADED FLYING-FOX)

*Pteropus poliocephalus* (Grey-headed Flying-fox (GHFF)) is listed as a vulnerable species the BC Act. This species inhabits a wide range of habitats including rainforest, mangroves, paperbark forests, wet and dry sclerophyll forests and cultivated areas (Churchill 1998, Eby 1998). Camps are often located in gullies, typically close to water, in vegetation with a dense canopy (Churchill 1998). The Bomaderry Illowra Wetland and Rainforest GHFF camp exists near (i.e. approximately 50m away) to the proposed subject site.

**a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.**

The subject site is to be located approximately 50m away from the edge of the GHFF camp. Consequently, no core camp or roost habitat will be trimmed or removed during this development. However, a small area of supporting or overflow vegetation will be removed. There will be no direct impacts upon the core camp or roost habitat.

We expect that any noise created during clearing of this vegetation will managed and will occur at night and at time before the juvenile bats are crèched (December to February). In addition, we expect that these noises will also be muted by the ambient noises made by the movement of vehicles in the nearby Princess Highway.

Because of these reasons, the proposed development is unlikely to have an adverse effect on the life cycle of these GHFFs to such a level that will place a viable local GHFF population at risk of extinction.

**b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:**

**(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or**

**(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction**

Not applicable, this species and this colony does not represent an endangered ecological community or critically endangered ecological community.

**c) in relation to the habitat of a threatened species or ecological community:**

**(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and**

The works will be limited to subject site and therefore no core roosting or foraging habitat will be removed or modified. Further, these works will not isolate or fragment the colony from other known GHFF camps. This is because this species is known to migrate, move to other sources of food or move to other camps sites for unexpected reasons.

**(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and**

As stated above, under the proposed works, no camp or roost habitat that serves as perching, roosting or breeding habitat will be removed.

This species is highly mobile and therefore it is very unlikely that the proposal would fragment or isolate or increase the fragmentation or isolation of this species forage or roost habitat.

**(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality**

As stated above, under the proposal, no vegetation, that would serve as perch, roost or breeding habitat for this species.

Given that GHFFs are wide ranging and highly mobile it is not likely that they would rely on this habitat for long term survival of this species.

**d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly).**

No, the camp and the GHFFs that occupy it do not constitute and declared area of outstanding biodiversity value.

**e) whether the proposed development or activity constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

The proposed works do not constitute or is not part of a key threatening process (KTP) and will not result in the operation or increase in the impact of a KTP. This is unlikely to constitutes a key threatening process for this species. Further, the scale of works is considered minor because it represents a very small proportion of the potential habitat that exists for this species region. There are many other GHFF camps that occur nearby that can be easily accessed by this mobile species.

**Conclusion**

It is unlikely that the construction of the proposed board walk will cause a significant impact on the camp or the GHFF that occupy it, given that the species is highly mobile and if adversely impacted, individuals from this colony will move to and use alternative camps, such as the Berry (including Kentia Crescent) and Bomaderry Creek camps which are located within a 10km this camp.

Will not result in the isolation of an area of known habitat from other areas of potential habitat.

Therefore, the proposal is unlikely to have a significant impact on GHFF and a Species Impact Statement (SIS) is not required.

# Appendix C EPBC Act - Significant Impact Criteria Assessments

The EPBC Act Administrative Guidelines on Significance set out Significant Impact Criteria that are to be used to assist in determining whether a proposed action is likely to have a significant impact on matters of national environmental significance. Matters listed under the EPBC Act as being of national environmental significance include:

- Listed threatened species and ecological communities
- Listed migratory species
- Wetlands of International Importance
- The Commonwealth marine environment
- World Heritage properties
- National Heritage places
- Nuclear actions

Specific Significant Impact Criteria are provided for each matter of national environmental significance except for threatened species and ecological communities in which case separate criteria are provided for species listed as endangered and vulnerable under the EPBC Act.

The relevant Significant Impact Criteria have been applied to the following species to determine the significance of the impact of the project:

## *Pteropus poliocephalus* (Grey-headed Flying-fox)

The Grey-headed Flying-fox is listed as a vulnerable threatened species under the EPBC Act. As stated previously, GHFF roost in a wide range of habitats including rainforest, mangroves, paperbark forests, wet and dry sclerophyll forests and cultivated areas (Churchill 2008). However, due to the size (numbers of GHFFs regularly using the colony) of the colony, it does not meet the criteria to be listed as a Nationally Important flying-fox colony under the EPBC Act (Commonwealth of Australia 2015). Further, the proposed developed will not result in multiple dispersal or repeated in situ management over time or result in the loss of roosting habitat (Commonwealth of Australia 2015). Consequently, this SIC assessment was undertaken in accordance with *Matters of National Environmental Significance Significant Impact Guidelines 1.1*. (Commonwealth of Australia 2013) and focused solely on whether the proposed development will impact on a local viable GHFF population.

**Criterion a: lead to a long-term decrease in the size of an important population of a species**

No important GHFF populations have been declared recorded within the subject site. Indeed, the entire extent of GHFFs that exists in eastern southern Australia are considered to form a single population.

**Criterion b: reduce the area of occupancy of an important population**

This is not an important population. As stated above, all GHFFs are believed to form one single widely distributed population.

The proposal is unlikely to reduce an area of occupancy this of GHFF population.

**Criterion c: fragment an existing important population into two or more populations**

This is not an important population. As stated above, all GHFFs are believed to form one single widely distributed population that roost in discrete and highly fragmented GHFF colonies.

The proposal is unlikely to fragment an area of occupancy for this GHFF population.

**Criterion d: adversely affect habitat critical to the survival of a species**

No roost or foraging habitat will be disturbed by the proposal. Therefore, no habitat that is critical to the survival of this species will be adversely impacted.

**Criterion e: disrupt the breeding cycle of an important population**

No important, GHFF populations have been identified in the subject site and the subject site is not known to support 'colonies' of flying foxes previously.

The proposal will not disrupt the breeding cycle of those GHFFs that roost at this roost.

**Criterion f: Adversely affect habitat critical to the survival of a species; modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;**

No roost or foraging habitat will be disturbed by the proposal, therefore, no critical habitat will be modified, destroyed, removed or isolated to make way for this development that would lead to decline in this species.

**Criterion g: Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat;**

The proposal will not result in the establishment of an invasive species that is harmful to the GHFFs.

**Criterion h: Introduce disease that may cause the species to decline;**

The proposed development within will not result in the introduction of a disease that is harmful to the GHFFs.

**Criterion i: Interfere substantially with the recovery of the species;**

Considering the above factors, the proposal is unlikely to interfere substantially with the recovery of the species.

**Conclusion**

The proposal is considered unlikely to have a significant impact on the Grey-headed Flying-fox. Therefore, a referral, in accordance with the Commonwealth of Australia (2015), to the Department of Energy and Environment is not necessary.

eco logical AUSTRALIA
A TETRA TECH COMPANY

1300 646 131
www.ecoaus.com.au

# Appendix E

## Addendum Statement of Heritage Impact

artefact

Ryan Whiddon
Project/Contract Manager
Nowra Bridge Project
Southern & Western Project Office
Transport for NSW

15 January 2021

Dear Ryan,

**RE: Nowra Bridge Relocation Project: Addendum Statement of Heritage Impact - Illowra**

Transport for New South Wales (TfNSW) are proposing to modify the design and scope of approved works associated with the Nowra Bridge Relocation Project (the proposal). Design changes include modifications to an existing driveway, removal of a c1990s shed, removal of vegetation and temporary construction impacts associated with temporary scaffolding for a retaining wall. These works will occur within the Shoalhaven Local Environment Plan (LEP) 2014 listed *Illowra* (Item No. 136) (the study area).

This addendum Statement of Heritage Impact (SoHI) report has been prepared to inform an addendum Review of Environmental Factors (REF) for the proposal. It will identify heritage impacts to the study area as a result of the revised design. It will also determine the level of heritage significance of items proposed to be impacted, assess the potential for archaeological remains to be impacted by the proposal, recommend mitigation measures to reduce the level of heritage impact, and identify other management or statutory obligations.

## Project background

In 2018, TfNSW (formerly Roads and Maritime Services) prepared a REF under Division 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) for the proposed construction of a new bridge on the A1 Princes Highway over the Shoalhaven River at Nowra (the proposal). The REF was approved on 7 May 2020 and construction works began in June 2020.

Artefact Heritage prepared a SoHI to inform the REF in 2018.[1] The SoHI concluded that the proposal would impact a number of heritage items within the project boundary including the LEP 2014 listed *Illowra*. Impacts to *Illowra* comprised minor encroachment of construction works (approximately 3 metres) into the item's heritage curtilage. These works were assessed as a minor physical impact and moderate visual impact to the heritage significance of item.

[1] Artefact Heritage, August 2018. *Nowra Bridge Project: Statement of Heritage Impact*. Report prepared for SMEC and Roads and Maritime Services.

## Study area

The study area for this report comprises the property boundary of *Illowra*, located at 125 Brinawarr Street, Bomaderry, Lot 1 DP 397062 and Lot 2 DP 792770. *Illowra* is listed on the Shoalhaven LEP 2014 as *Illowra - Federation timber Berry Estate residence and garden* (Item No. 136) and has heritage significance at a local level.

*Illowra* is a seven-bedroom timber residence constructed in 1906 for Mark F. Morton. In addition to the main residence, the property includes a pool, tennis court, shed, weatherboard outhouse and various landscape features including a circular driveway and gardens. The location of the study area is shown in Figure 1.

## Terminology

The terms used in this report are consistent with the definitions contained in *The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance*[2], *Heritage Terms and Abbreviations*[3], and those outlined in the *Nowra Bridge Project: Statement of Heritage Impact*.[4]

## Authorship

The addendum SoHI was prepared by Darrienne Wyndham (Heritage Consultant) and Adele Zubrzycka (Senior Heritage Consultant) with management input and review from Dr Sandra Wallace (Managing Director) and Josh Symons (Technical Director).

[2] Australia ICOMOS, 2013.
[3] NSW Heritage Office, 1996.
[4] Artefact Heritage, 2018.


**Figure 1. Location of study area and LEP curtilage**

## Historical background

### Phase 1 – Coolangatta Estate 1822-1906

In the early 19th century, merchant and explorer Alexander Berry visited Shoalhaven while searching for land to graze his stock. [5] Berry and his business partner, Edward Wollstonecraft were particularly impressed by the Shoalhaven region's rich alluvial soils and natural grassy 'meadows'. In 1882, the pair were jointly granted 10,000 acres; this grant would become known as the Coolangatta Estate.[6] Berry and Wollstonecraft's grant included land both north and south of the Shoalhaven River.[7] At this time, the study area was located adjacent to the Coolangatta Estate on a government reserve (Figure 2) with no known activities taking place on the land.

Berry established a residence at the foot of Mount Coolangatta, east of the study area, and slowly acquired additional land. Wollstonecraft died in 1832 and in 1836 Alexander Berry shared control of the Coolangatta Estate to his brothers David and John. During the 1830s, Berry acquired 21,132 additional acres around the Coolangatta Estate, some from Crown Land and others from neighbouring grants. This period is likely when the study area became part of the estate.[8] By 1840, Berry had acquired over 40,000 acres of land on which they grew maize, tobacco, wheat, barley and potatoes as well as grazing stock. Though no historical maps appear from this time, it is likely that the study area, on the western extreme of the Coolangatta Estate, was under similar agricultural use.

In 1855, the *Sydney Morning Herald* reported that the estate was divided into 'comfortable sized farms…with the forest and bush are fast falling in all directions'.[9] However, the expansive estate was only sparsely tenanted, with a total of 300 tenants in residence on 8650 acres.[10] An 1859 map shows a track running east of the study area, which is under the name of John Berry (Figure 3). This track runs along the modern footprint of Bolong Road.

John Berry died in 1848 and Alexander in 1873, with all land passing to David Berry upon his brothers' passing. Berry's own death in 1889 saw the large scale subdivision of his property, which was divided into a number of estates. In 1892, the study area was put up for sale as part of the Berry Estates, also known as the Shoalhaven Estates. The study area, listed as No. 7 on the 'Bomaderry' portion of the Shoalhaven Estates, was evidently sold by Hardie and Gorman in this first auction; a subsequent subdivision notice from 1893 shows the study area as sold (Figure 4). By this time, Bolong Road and Brinawarr Street were established in their original alignments, with Brinawarr Street running through the south-eastern portion of the study area. These roads were likely represented by cleared dirt tracks during this occupation phase.

[5] T. M. Perry, 'Berry, Alexander (1781–1873)', Australian Dictionary of Biography, National Centre of Biography, Australian National University. Accessed online 8/01/2021: http://adb.anu.edu.au/biography/berry-alexander-1773/text1987, published first in hardcopy 1966.
[6] Ibid.
[7] Ibid.
[8] James Jervis. 1941. Alexander Berry, The Laird of Shoalhaven, in The Royal Australian Historical Society Journal and proceedings, vol. 27 part. 1. Accessed online 8/01/2021: http://nla.gov.au/nla.obj-602181525
[9] Ibid.
[10] Ibid.

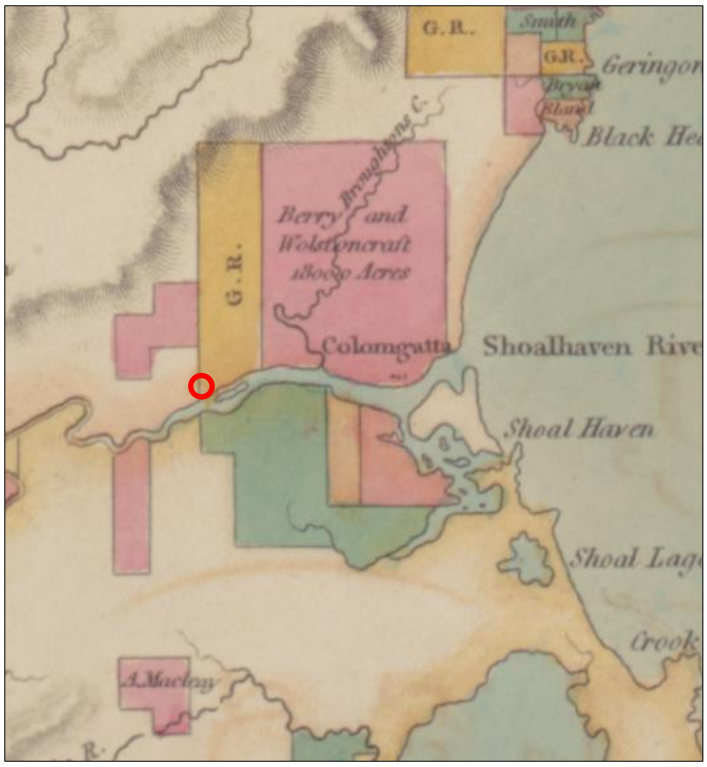


**Figure 2. Detail of a map of Shoalhaven by Robert Dixon, c.1830s. The approximate location of the study area is indicated in red. Source: National Library of Australia**

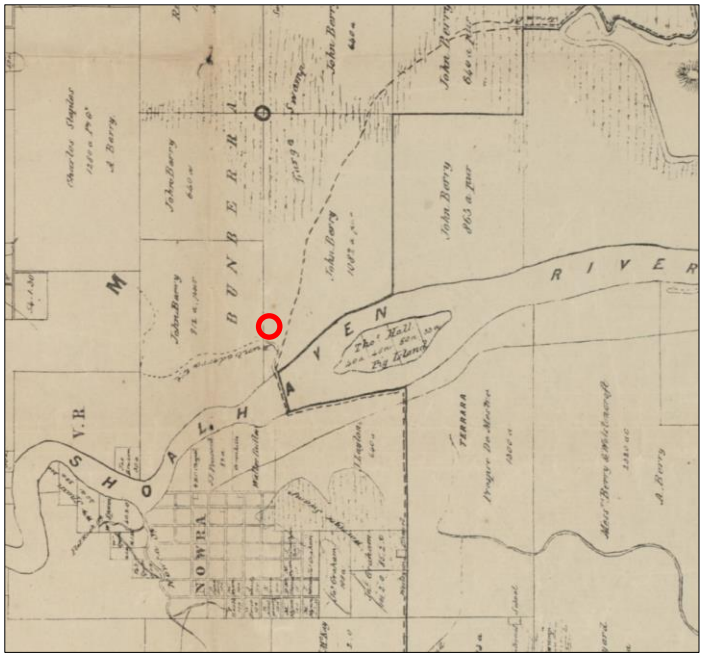


**Figure 3. Detail of 1859 Allan and Wigley map showing the development of a track, possibly an early iteration of Bolong Road, east of the study area. The approximate location of the study area is indicated in red. Source: National Library of Australia**

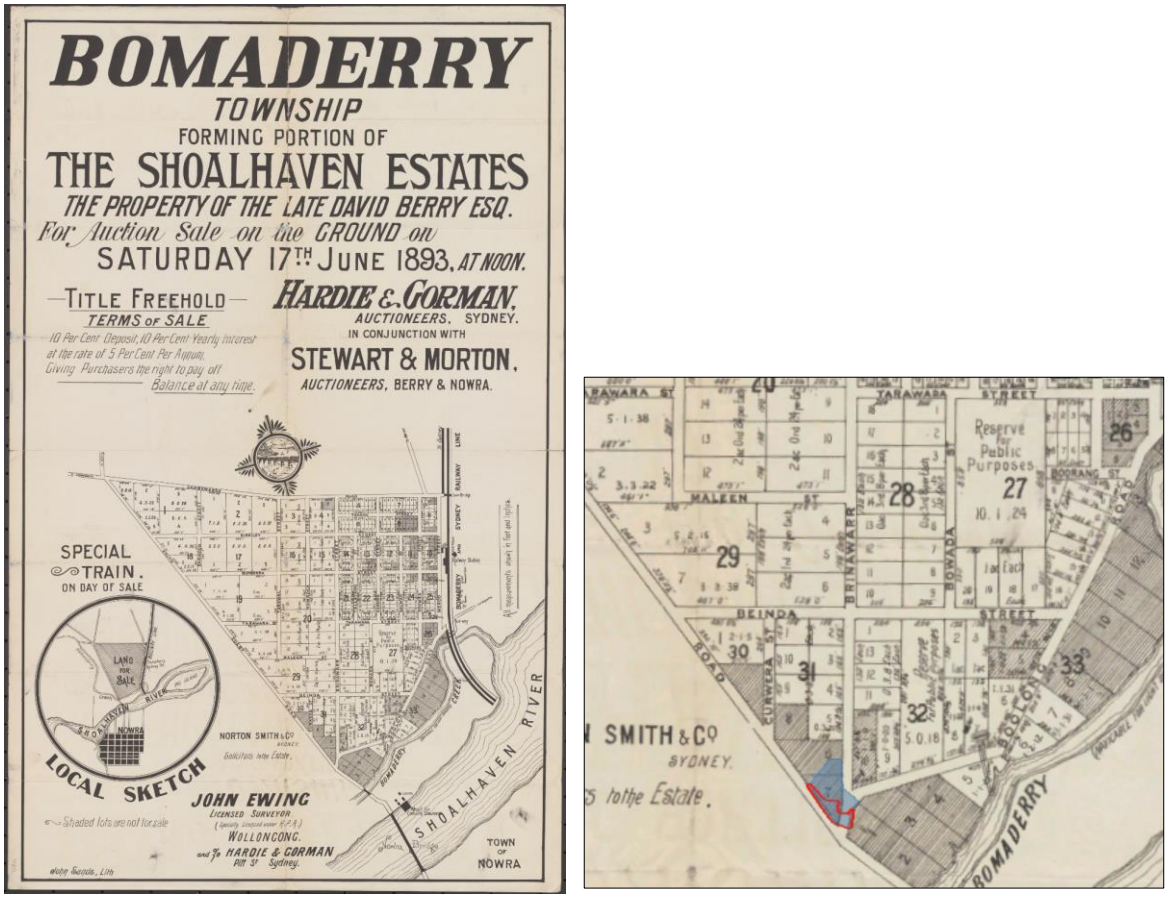


**Figure 4. Detail of 1893 map, showing the study area. Source: National Library of Australia with Artefact markup**

## Phase 2 – Illowra: early development 1906 - 1979

Lot No. 7, including the study area, was purchased by the family of the Berry Estate land steward Henry G. Morton in 1892.[11] Henry's son Mark F. Morton was the business partner of auctioneer John Stewart, and may have assisted with the 1892 auction itself, as suggested in Figure 4. Henry Morton died in 1895, and his widow was given a house on the Berry Estate. Known as Lynburn and designed by celebrated architect Howard Joseland, this would become the Morton family home.[12] In 1906, Mark F. Morton commissioned Joseland to design a house on the study area, to be named Illowra.[13] The house was constructed from weatherboard shingles with an unusual high-pitched jerkin head roof, a protruding gable and a timber skillion verandah.

Shortly after the completion of Illowra, Morton married Minnie Fuller in 1907 and moved into the property.[14] Expansive gardens were planted around the main house, which had been extensively cleared prior to construction (Figure 5). The house was accessible from Brinawarr Street, as seen on a 1931 map of the Shoalhaven area (Figure 6). The map key describes Brinawarr Street as fenced and metalled. Upon Morton's death in 1938, Illowra passed back into the Morton family; it would stay under the Mortons' ownership until the 1980s.

[11] The Berry Estate Land Sale. (1892, April 6). Northern Star (Lismore, NSW: 1876 - 1954), 2. Accessed online 8/01/2021: http://nla.gov.au/nla.news-article71738452
[12] NSW Office of Environment & Heritage, "Illowra" – Federation timber Berry Estate residence and garden'. Accessed online 12/01/2021 at: http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?id=2390819
[13] Ibid.
[14] Ibid.

A 1969 aerial photograph shows the development of the expansive gardens of Illowra, which featured mature trees concentrated in the north-western and southern portions (Figure 7). No outbuildings appear to be present at this time, with an open area, possibly a driveway, located just south of the main house. Brinawarr Street appears to retain its original c.1892 alignment during this time.

In 1979, major roadworks occurred around the study area to facilitate the installation of a second bridge over the Shoalhaven River to the south (Figure 8). These works included the widening of the Princes Highway south-west of the study area and the rerouting of Brinawarr Street. Following the roadworks, Brinawarr Street no longer cut through the study area, instead curving to the east to join Bolong Road. The area previously occupied by Brinawarr Street was acquired by the owners of Illowra and absorbed into the property.

**Figure 5. The main house at Illowra under development, c.1906. Note that land now occupied by a circular driveway comprises a grassed front yard in the photograph. Source: Shoalhaven Sketchbook**


**Figure 6. Detail of 1931 Imperial Forces map of Shoalhaven, showing Illowra and access via Brinawarr Street (fenced and metalled). Source: State Library of NSW**

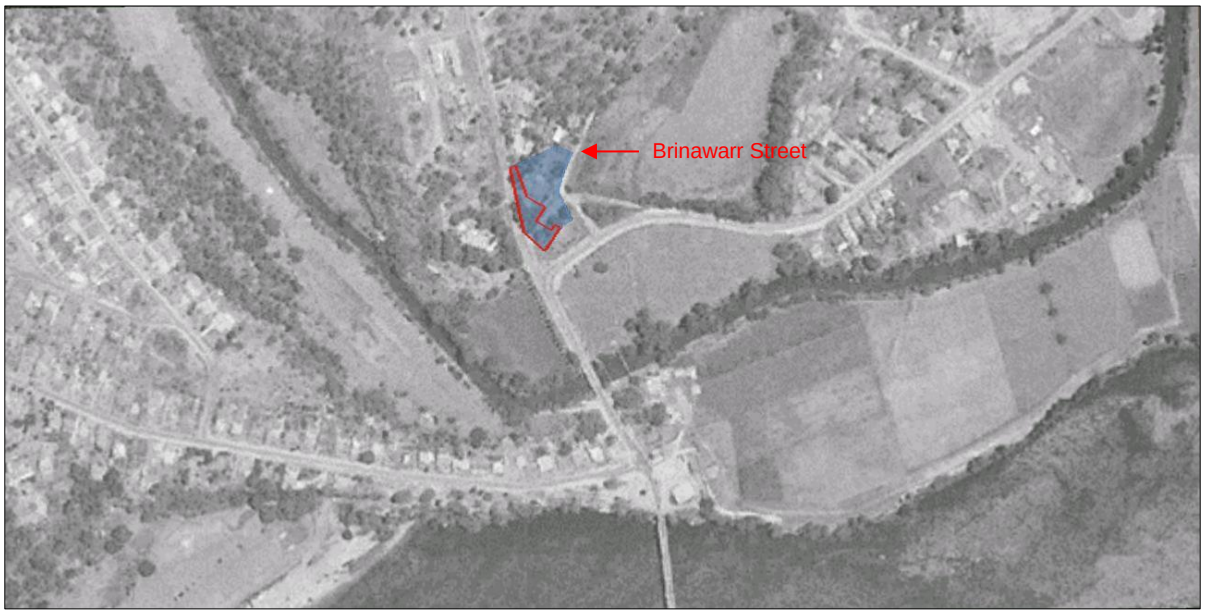


**Figure 7. Detail of 1969 aerial photograph showing the study area with continued access via Brinawarr Street. Source: Spatial Services**

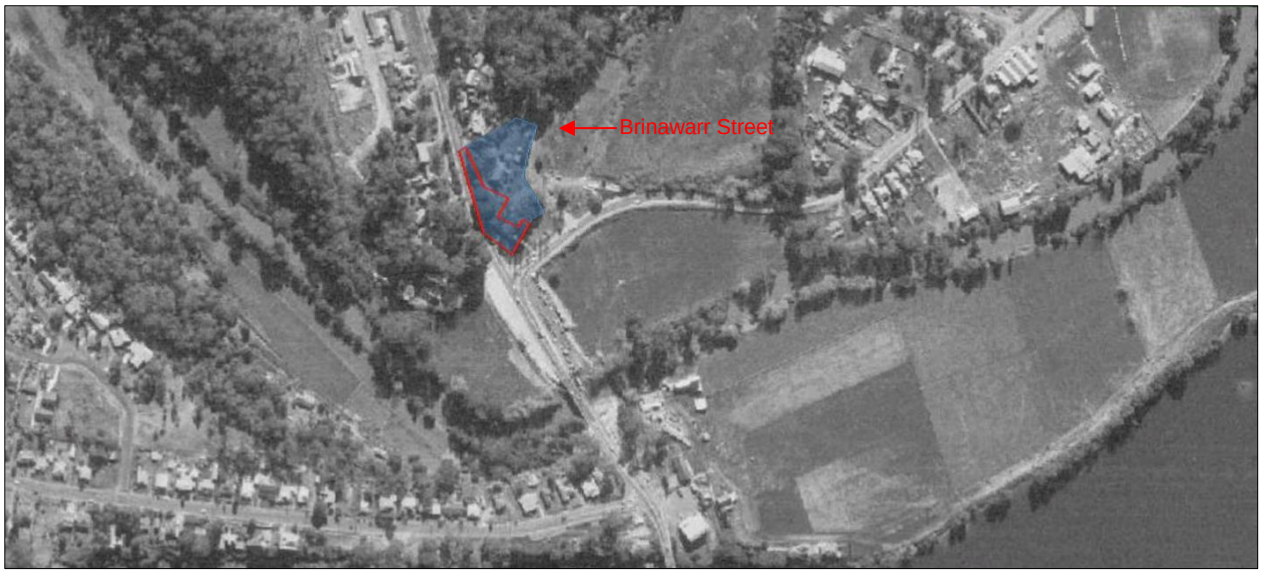


**Figure 8. Detail of 1979 aerial photograph showing the widespread roadworks south of the area and the re-routing of Brinawarr Street, now located outside of the study area. Source: Spatial Services**

## Phase 3 – Illowra: modern development (1980-present)

Following the incorporation of the former alignment of Brinawarr Street into the property, the road footprint at Illowra underwent extensive landscaping. This can be seen in a 1984 aerial photograph, where shrubbery can be seen planted within the former road footprint (Figure 9).

By the early 1990s, a tennis court had been established immediately north-east of the study area boundary as part of extensive restorations to the Illowra property. The court was roughly placed along the former alignment of Brinawarr Street in a north-east/south-west orientation. A shed that presently adjoins the tennis court and is proposed to be removed for the proposal may also have been constructed around this time. The shed is built in a sympathetic style and colour scheme to the main house.

The tennis court is clearly visible in a 1993 aerial photograph (Figure 10), though further details such as the presence of the shed are obscured by vegetation. Similarly, the mature trees on all sides of the study area obscure details of possible outbuildings in a 1997 aerial photograph (Figure 11). The shed and well-maintained tennis court can be plainly observed in an aerial photograph from 2002 (Figure 12).


**Figure 9. Detail of 1984 aerial photograph, with Brinawarr Street's former alignment fully absorbed by the property. Source: Spatial Services**


**Figure 10. Detail of 1993 aerial photograph, with a tennis court appearing for the first time. Source: Spatial Services**


**Figure 11. Detail of 1997 aerial photograph of the study area with mature vegetation. Source: Spatial Services**


**Figure 12. Detail of 2002 aerial photograph of the study area, with the c.1990s shed clearly visible. Source: Spatial Services**

## Existing studies

The following reports of relevance to this addendum SoHI were prepared as part of, and following, the REF assessment and approval process:

- Transport for NSW, December 2020. *Nowra Bridge Project: Addendum Review of Environmental Factors*.
- Extent, September 2019. *Nowra Bridge Archival Recording: Illowra*. Report prepared for Roads and Maritime Services.

- Roads and Maritime Services, August 2018. *Nowra Bridge Project: Review of Environmental Factors.*
- Artefact Heritage, August 2018. *Nowra Bridge Project: Statement of Heritage Impact*. Report prepared for SMEC and Roads and Maritime Services.

## Site inspection

A site inspection of the study area was carried out on Thursday 7 January 2021 by Adele Zubrzycka (Senior Heritage Consultant) and Darrienne Wyndham (Heritage Consultant). The aim of this inspection was to assess the significance and age of the c.1990s shed, nature of the circular driveway and significance of vegetation within the study area, and the overall impact of the proposed works on the heritage item. The following section provides a physical analysis of the study area. All photos were taken by Artefact Heritage.

The study area is bounded by the Princes Highway to the west, Bolong Road to the south and Brinawarr Street to the east, with access via a gravel driveway on Brinawarr Street. The gravel driveway would be modified for the proposal. The surrounds of the study area are characterised by primarily residential development. The Federation residence is largely screened from Bolong Road and Brinawarr Street by mature plantings and hedges. The current road-widening works conducted as part of the Nowra Bridge Replacement project have removed the vegetation screening the item from Princes Highway, with the Federation residence, outbuildings and gardens completely exposed. The current area of works is located along the entire western and south-western boundary of the property, and consists of an exposed, machine-excavated trench (Figure 21).

The driveway runs in a north-south orientation from Brinawarr Street, curving west to form a large circular driveway giving access to the southern elevation of *Illowra* (Figure 13). An elaborate fountain is present in the centre of the circular driveway. The driveway comprises levelled coarse gravel, with established plantings of mature trees, agapanthus and other ground-cover species along its borders. Access to the fenced tennis court and c.1990s shed are provided by the driveway.

The c.1990s shed is located south of the tennis court and is bordered by established gardens on its eastern and western sides (Figure 15, Figure 23). The c.1990s shed would be removed as part of the proposal. Two mature trees are planted within the eastern garden, while the western garden comprises mostly ground-cover plantings and shrubs (Figure 16). Both gardens include retaining walls of brick or wood, with decorative garden bed stones featured prominently in the landscaping design (Figure 18). A stepped brick retaining wall leads from the eastern garden to the brick foundations of the shed.

The shed itself comprises modern weatherboard clad walls on a brick and poured concrete foundation, with a green corrugated iron gabled roof with prominent ornamental gable to the southern elevation (Figure 19, Figure 20). The corrugated iron roof extends over a verandah area to the west and north (Figure 22). The verandah area comprises of two poured concrete slabs on a brick foundation, with five turned wooden columns (Figure 25).

The northern verandah features three poured-concrete stairs in an unusual, curved design (Figure 26). These may represent an earlier iteration of the shed or immediate landscape, as they do not appear to have a direct practical relationship with the current shed or tennis courts. This is most evident thanks to the location of the tennis court's fence, which terminates approximately 50cm from the stairs and does not include a gate or entry point that would allow direct access to the court from the stairs. There are clear sightlines present between these verandahs and the Federation residence and gardens (Figure 29, Figure 30).

The external elevations of the shed are painted in similar colours to the main house and modern outbuildings. The interior of the shed is accessed by a modern roller door and consists of modern

unpainted timber boards with a vinyl tile covering poured-concrete flooring (Figure 27). There is no ceiling present in the interior of the shed, which is currently being used for storage (Figure 28). The shed is connected to electricity and no evidence was observed to suggest that it was constructed at the same time, or soon after, the main residence.

An extensive, narrow garden with ground-cover plantings and shrubbery separates the driveway, tennis court and c.1990s shed from the main house. A second garden with more mature plantings of trees and shrubbery is located to the north and west of the Federation residence (Figure 32 - Figure 35). The plantings in the western portion of the study area, which were removed as part of the Nowra Bridge Replacement project in 2020, are likely to have been similar in character to this second garden, comprising saplings, mature trees and extensive shrubbery and vine coverage.

Land previously occupied by the former Brinawarr Street alignment is presently occupied by the tennis court and c.1990s shed (Figure 15, Figure 18 and Figure 24). No evidence of the former road alignment was observed during the site inspection, which much of the area occupied by the tennis court, c.1990s shed or garden beds.

**Figure 13. View north along original driveway towards Brinawarr Street. The tennis court is visible to the left.**

**Figure 14. View southwest towards garden bed, brick retaining wall, vegetation and c.1990s shed.**

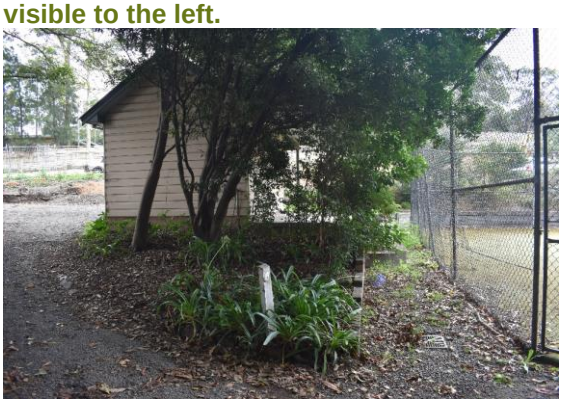

**Figure 15. View towards southern facade of c.1990s shed, tennis court, garden bed and former alignment of Brinawarr Street**

**Figure 16. View of southern facade showing weatherboard cladding and tree coverage around c.1990s shed.**

**Figure 17. View south-east from c.1990s shed towards mature trees and the property's boundary fence.**

**Figure 18. View north-west towards established decorative brick edging located along the southern portion of garden, near the former alignment of Brinawarr Street.**

**Figure 19. View north-east towards facade of c.1990s shed, showing corrugated iron roof with gable, weatherboard cladding and roller door.**

**Figure 20. Detail of wooden gable associated with the c.1990s shed.**

**Figure 21. View south-west from c.1990s shed towards Princes Highway and Nowra Bridge Relocation works.**

**Figure 22. View south-east showing modern poured concrete slab and timber supports for c.1990s shed.**

**Figure 23. View north-west from c.1990s shed to garden and decorative garden bed stones, to be removed as part of the proposed works.**

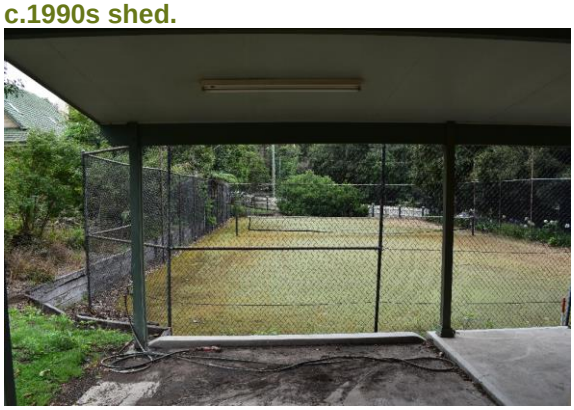

**Figure 24. View north-east from c.1990s shed towards tennis courts and the former alignment of Brinawarr Street**

**Figure 25. View of poured concrete slab, brick foundation and timber support associated with the c.1990s shed.**

**Figure 26. View of poured concrete steps on the north-eastern facade of c.1990s shed. The tennis courts are located immediately to the right.**

**Figure 27. View of interior and carpenters' mark of c.1990s shed.**

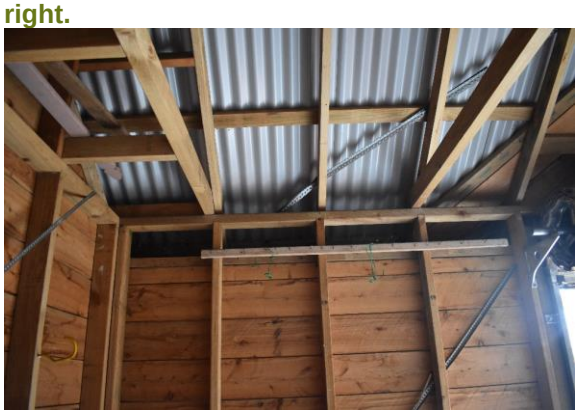

**Figure 28. View of interior and corrugated iron ceiling of c.1990s shed.**

**Figure 29. View towards *Illowra* main house and garden from c.1990s shed.**

**Figure 30. View of extensive gardens and shed from *Illowra* main house.**

**Figure 31. View west towards area of works from driveway.**

**Figure 32. View south towards area of bulk excavation.**

**Figure 33. View east towards area of proposed scaffolding showing extensive garden area.**

**Figure 34. View east towards area of proposed scaffolding showing extensive garden area.**

**Figure 35. View from area of works towards driveway and c.1990s shed.**

**Figure 36. View east of soil profile from area of works.**

**Figure 37. View of soil profile of area of works, looking north.**

**Figure 38. View of soil profile of area of works, looking west.**

## Heritage context

The study area is listed as an item of local significance on the Shoalhaven LEP 2014 (curtilage shown in Figure 1):

- *Illowra – Federation timber Berry Estate residence and garden* – Item No. 136

The State Heritage Inventory (SHI) listing provides the following description for the item:

> *Designed by leading Sydney architect Howard Joseland, "Illowra" was built in 1906 for Mark F. Morton as part of the Berry Estate. The large Federation residence,*

*which features an attic storey, is constructed of weatherboard with tall chimneys in rendered brick and a complex high-pitched jerkin-head roof. The residence is largely concealed from the surrounding streetscape, with plantings and the property fencing concealing the house from view from Princes Highway, Bolong Road and Brinawarr Street.*[15]

A significance assessment for *Illowra* taken from the SHI is provided in Table 1 below:

**Table 1. Significance assessment for *Illowra***

| Criteria | Description |
|---|---|
| **A – Historical Significance** | *The item is of historical significance as an example of a two storey, Edwardian house was built in 1906 for Mark F. Morton, the member for Wollondilly in the NSW Legislative Assembly from 1901 till his death in 1938. The house was named "Illowra" and was designed by Howard Joseland, a leading Sydney architect.* |
| **B – Associative Significance** | *The place has associations with Mark F. Morton the member for Wollondilly in the NSW Legislative Assembly from 1901 till his death in 1938. Morton was a son of Henry Gordon Morton, who had managed the lands of the Berry Estate at Numbaa, and was Mayor of Numbaa Municipality for 30 years. The place also has associations with Howard Joseland (1860-1930), a leading Sydney architect who was commissioned to design most of the buildings erected on the Berry Estate between 1883 and the early 1900s.* |
| **C – Aesthetic or Technical Significance** | *The house is a very good example of a large Edwardian Arts and Crafts house with fine external detailing and was designed by Howard Joseland, a leading Sydney architect who was commissioned to design most of the buildings erected on the Berry Estate between 1883 and the early 1900s.The residence is surrounded by fine old trees and established gardens.* |
| **D – Social significance** | *This item would not reach the threshold of local significance under this criterion* |
| **E – Research potential** | *This item would not reach the threshold of local significance under this criterion* |
| **F – Rarity** | *This item is assessed as aesthetically rare at a State level. This item is assessed as historically rare at a State level.* |
| **G – Representativeness** | *This item is assessed as historically representative at a State level. This item is assessed as aesthetically representative at a State level.* |

**Statement of significance**

*Federation period timber residence designed by noted Sydney architect Howard Joseland. Special historical interest for its long association with the prominent Morton family. Historic and aesthetic value. Local significance (Shoalhaven).*[16]

## Contributing elements

The study area contains a number of individual elements that may contribute to the heritage significance of the Shoalhaven LEP 2014 listed *Illowra*. However, due to ongoing development within

[15] NSW Office of Environment & Heritage, '"Illowra" – Federation timber Berry Estate residence and garden'. Accessed online 12/01/2021 at: http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?id=2390819
[16] NSW Office of Environment & Heritage, 'Illowra" – Federation timber Berry Estate residence and garden.'

the property up until the 1990s, the significance of each element is not consistent. Table 2 summarises the heritage significance of items that will be impacted by the proposal:

**Table 2. Grades of significant elements**

| Element | Description | Significance grading |
|---|---|---|
| Shed | The shed at *Illowra* is not original fabric, having been constructed in the early 1990s as part of renovation and restoration works to the property. It therefore represents changing usage of the item in the late twentieth century yet does not represent its early twentieth century land use.<br><br>The shed is sympathetically designed in modern fabric, with a similar architectural style and colour scheme to the main house and its setting within the garden area contributes to the overall visual character of the item. | Little |
| Driveway | The driveway at *Illowra* is likely to represent a later addition to the property as it is not visible in a photograph taken of the dwelling in 1906 (Figure 5). Today it acts as the sole entry point to the property and provides significant views of the gardens and main house.<br><br>While not original, the layout of the driveway compliments the significant architecture and aesthetic character of the main house. It also forms a central point for the extensive gardens, which are concentrated around its edges. | Moderate |
| Vegetation | The expansive gardens at *Illowra* were first designed in the early 1900s, making a significant contribution to the historical significance and visual character of the item. The gardens have been well-cared for by *Illowra*'s residents for over a hundred years, with different plantings showing the evolution of landscaping ideas throughout the twentieth century. Plantings include flowering ground-cover species such as agapanthus (*Agapanthus spp*.) and both mature and sapling trees.<br><br>The incorporation of the former alignment of Brinawarr Street into the gardens during the late 1970s/1980s would have required significant landscaping works within the study area. This portion of the item, though a later addition, is designed to complement the existing gardens and contributes positively to the size and grandeur of the grounds. | High |

| Element | Description | Significance grading |
|---|---|---|
| Decorative garden bed stones and brick edging | Various decorative garden bed stones and brick edging are featured within the gardens at *Illowra*, marking the borders of the gardens in relation to the driveway, tennis court and main house. The natural patina of the stones and the organic layout complements the cottage-style visual character of the gardens.<br><br>Though it is unknown if the garden bed stones or brick paving represent original fabric, the stones are featured prominently throughout the gardens and form a significant part of the landscaping design. | Moderate |

## Archaeological assessment

### Potential archaeological remains

The 2018 SoHI did not include an in-depth archaeological assessment for land proposed to be impacted by the revised design within the study area.

There are few historical documents relating to the development of *Illowra*, with no historical plans or drawings of the main house and gardens available. Phasing of the land has therefore been determined based on existing evidence, including historic aerials and subdivision plans.

As discussed in the historical background section of this report, the study area has been subject to two historical development phases and one modern development phase. Historical land use phases 1 and 2 and potential archaeological evidence associated with them are discussed in Table 3.

**Table 3. Potential archaeological remains within the study area**

| Phase | Summary | Potential remains |
|---|---|---|
| **Phase 1: 1822-1906** | Occupation phase 1 is associated with the Berry Estate. During this period, land within the study area was cleared and may have been utilized for agricultural and/or pastoral purposes. Although subdivided and sold in 1892, the study area was not used for any documented activities.<br><br>The only significant development during this phase was the establishment of Brinawarr Street, which ran along the southern extent of the study area as shown in Figure 4. Details regarding construction materials used for Brinawarr Street are limited. However, it primarily acted as a private road for residents during this stage, and therefore likely comprised a cleared dirt track, rather than a formalised road built using macadam or Telford road base. | Evidence of the former Brinawarr Street alignment. |
| **Phase 2: 1906-1980** | Occupation phase 2 is associated with the early development of *Illowra*, including the main house and gardens. During this period, land within the study area underwent extensive landscaping and the incorporated the former alignment of Brinawarr Street in the 1970s.<br><br>The most significant development during this phase, such as the construction of the Federation residence, is largely located outside of the study area. The Brinawarr Street road alignment was acquired | Evidence of the former Brinawarr Street alignment |

| Phase | Summary | Potential remains |
|---|---|---|
| | and absorbed into the property in the late 1970s. Prior to that, it was metalled and fenced. | |

## Known disturbance

Land within the study area has been subject to known disturbance activities since *Illowra's* development in the early 1900s. These activities would have involved vegetation clearance and landscape modification to prepare the site for occupation. Later disturbance activities occurred in the late 1970s, when the alignment of Brinawarr Street was modified as a result of major roadworks associated with the redevelopment of Nowra Bridge. At this time, Brinawarr Street was reorientated to the east and the existing road alignment was incorporated into the grounds of the *Illowra* property.

Modern development in the 1990s included the construction of a tennis court and shed, which now occupy part of the former Brinawarr Street road alignment. Their development is likely to have truncated or removed evidence of the former road corridor.

## Assessment of archaeological potential

**Phase 1: 1822-1906**

During much of this period, the study area was a part of the Berry Estate and had no documented structures or usage, though it is likely that it was utilised for similar agricultural or pastoral purposes as the majority of the estate. Brinawarr Street, the main access point of the property, was in place by 1892 as part of the residential subdivisions for the Berry Estate. As this street was a private residential road, it is unknown whether road materials such as a macadam or Telford road base were utilised during its early use. However, it is likely that some kind of road formalisation occurred when it was established. The road alignment of Brinawarr Street was consistent throughout this land use phase, though evidence of road-building may have been removed during its absorption into the *Illowra* property during occupation phase 2.

Overall, there is **nil** potential for remains associated with this occupation phase to be found within the majority of the study area. However, there is **low** potential for the archaeological remains associated with the former Brinawarr Street alignment to survive within south-eastern portion of the study area (see Figure 39).

**Phase 2: 1906-1980**

During this period, the study area was a part of *Illowra* and was utilised as a garden, with the south-eastern portion of the study area forming part of the original alignment of Brinawarr Street. Brinawarr Street was recorded as being metalled and fenced in a 1931 map of the area (Figure 6).

The road alignment of Brinawarr Street was consistent until the late 1970s, when roadworks altered its alignment to the west and it was moved south-east of the study area. The original alignment was subsequently absorbed by *Illowra* and is now part of the curtilage of the heritage item. Following its incorporation into the property, the former road footprint underwent extensive landscaping, with a tennis court and shed established within the footprint in the c.1990s. The current driveway also appears to have been moved into its present location during this period. These activities may have removed evidence of the original Brinawarr Street alignment and its associated materials. However, discreet pockets of the former road surfaces may survive in areas where subsurface impacts have been limited.

Overall, there is **low** potential for the archaeological remains associated with the former Brinawarr Street alignment within the study area.

### Assessment of archaeological significance

An assessment of the archaeological significance for potential remains is assessed in Table 4.

**Table 4. Assessment of archaeological significance against the NSW Heritage Act criteria**

| Criterion | Discussion |
|---|---|
| **A) Historical** | If found to be intact and recognisable, the potential archaeological remains of the former Brinawarr Street alignment may illustrate the early development of transport routes in the area following the subdivision and sale of the Berry Estate in 1892. Brinawarr Street occupied the study area during occupation phases 1 and 2, prior to its realignment in the 1970s. These remains would be associated with the expansion of Nowra and Bomaderry over time, and occupation of the area for residential purposes. However, the likelihood of evidence of the former road alignment or early road construction materials is low.<br><br>Intact evidence of the former Brinawarr Street alignment has potential to meet the threshold of local significance under this criterion. |
| **B) Associative** | *Illowra* and surrounds are closely associated with the Berry and Morton families, important land owners, aldermen and prominent members of the early Bomaderry and Nowra community. However, there nil potential for archaeological remains associated with the families, or phase 1 occupation to survive within the study area.<br><br>In regard to Brinawarr Street, there is no evidence to suggest that the potential archaeological remains of the former Brinawarr Street alignment itself would be directly associated with any particular individual, family or group.<br><br>Therefore, potential archaeological remains associated with the former Brinawarr Street alignment are unlikely to meet the threshold of local significance threshold under this criterion. |
| **C) Aesthetic or Technical** | There is low potential for the original alignment of Brinawarr Street to be present within the south-eastern portion of the study area. Late-nineteenth and early twentieth century road construction techniques have been well documented in the historical and archaeological records and were carried out using increasingly common and formalised techniques from the early twentieth century onwards. Therefore, potential archaeological remains associated with the format road corridor would not be considered to contain aesthetic or technical significance under this criterion.<br><br>Potential archaeological remains associated with the former Brinawarr Street alignment are unlikely to meet the threshold of local significance threshold under this criterion. |
| **D) Social** | There is no evidence to suggest that the original alignment of Brinawarr Street would have significance amongst a particular community group in the area, though the changing road phases may be of some interest to local historical societies.<br><br>Intact evidence of the former Brinawarr Street alignment has potential to meet the threshold of local significance under this criterion. |
| **E) Research Potential** | It is unlikely that potential archaeological remains associated with the former Brinawarr Street alignment would contain significance under this criterion. Late-nineteenth and early twentieth century road construction techniques have been well documented in the historical and archaeological records and were carried out using increasingly common and formalised techniques from the early twentieth century onwards. In addition, remains of the former alignment are likely to be ephemeral, truncated or disturbed, reducing the likelihood for the remains to yield meaningful information or contribute to our understanding of late nineteenth and early twentieth century road construction. |

| Criterion | Discussion |
|---|---|
| | Therefore, potential archaeological remains associated with the former Brinawarr Street alignment are unlikely to meet the threshold of local significance threshold under this criterion. |
| **F) Rarity** | Archaeological remains of late nineteenth and early twentieth century road alignments are well-represented and documented in available literature. The former Brinawarr Street alignment is unlikely to have represented a rare example of this former of transport route in the area as it was established for residential subdivision purposes, rather than an unusual purpose.<br><br>Therefore, potential archaeological remains associated with the former Brinawarr Street alignment are unlikely to meet the threshold of local significance threshold under this criterion. |
| **G) Representativeness** | It is expected that potential archaeological remains of the Brinawarr Street alignment would be truncated and thus unlikely to be representative of nineteenth or early twentieth century road structures. However, if intact and recognisable remains of the road surface were encountered, they have potential to meet the threshold of local significance threshold under this criterion.<br><br>Intact evidence of the former Brinawarr Street alignment has potential to meet the threshold of local significance under this criterion. |

## Statement of significance

Potential archaeological remains that may survive within the study would be associated with the former alignment of Brinawarr Street. If found to be intact and recognisable, these remains would have historical, social and representative significance at a local level for their associations with the first residential subdivisions of the Berry Estate in the late nineteenth century. They would also have significance for their associations with the expansion and development of Bomaderry and Nowra in the nineteenth and twentieth centuries and use of the area for increasingly residential purposes throughout the 1900s.

However, it is noted that there is generally low potential for intact evidence of the former road alignment to survive within the study area due to disturbance associated with ongoing development within the study area. It is noted that the potential archaeological remains likely to be present within the study area would largely be classified as ‘works’, rather than ‘relics’ under the Heritage Act.

## Summary

A summary of the archaeological potential and significance of archaeological remains within the study area is provided in Table 5.

The areas of archaeological potential within the study area are illustrated in Figure 39.

**Table 5. Summary of potential archaeological remains within the study area**

| Occupation phase | Potential archaeological remains | Archaeological potential | Significance | ‘Relics’ or ‘works’ |
|---|---|---|---|---|
| **Phase 1: 1822-1906** | Evidence of activities associated with the Berry Estate | Nil | Not significant | N/A |
| | Evidence of the former Brinawarr Street alignment. | Low | Local (if intact and recognisable) | ‘Works’ |

| Occupation phase | Potential archaeological remains | Archaeological potential | Significance | 'Relics' or 'works' |
|---|---|---|---|---|
| **Phase 2: 1906-1980** | Evidence of the former Brinawarr Street alignment. | Low | Local (if intact and recognisable) | 'Works' |


**Figure 39. Archaeological potential for the study area**

## Proposed works

The revised design will comprise the following works:

- Establishment of scaffolding which will encroach within an additional 2 metres of the study area and approved 2018 REF boundary for the construction of a retaining wall. This will occur along the western boundary of the study area and involve:
  - Removal of vegetation including bushes, ornamental plantings and up to eleven small trees
  - Temporary establishment of scaffolding which would be removed following the completion of the construction program
- Driveway modifications which will involve:
  - Realignment of the driveway to the east of the existing driveway
  - Removal of existing flowerbeds and associated plantings, trees, boundary stones and brick edging
- Demolition of an existing c.1990s shed to accommodate the new driveway alignment
- Construction of new fence line along the western property boundary of the study area
- Some vegetation clearance works extending up to the margin of the *Illowra* residence.

The extent of the proposed works are illustrated in Figure **40** - Figure 44.

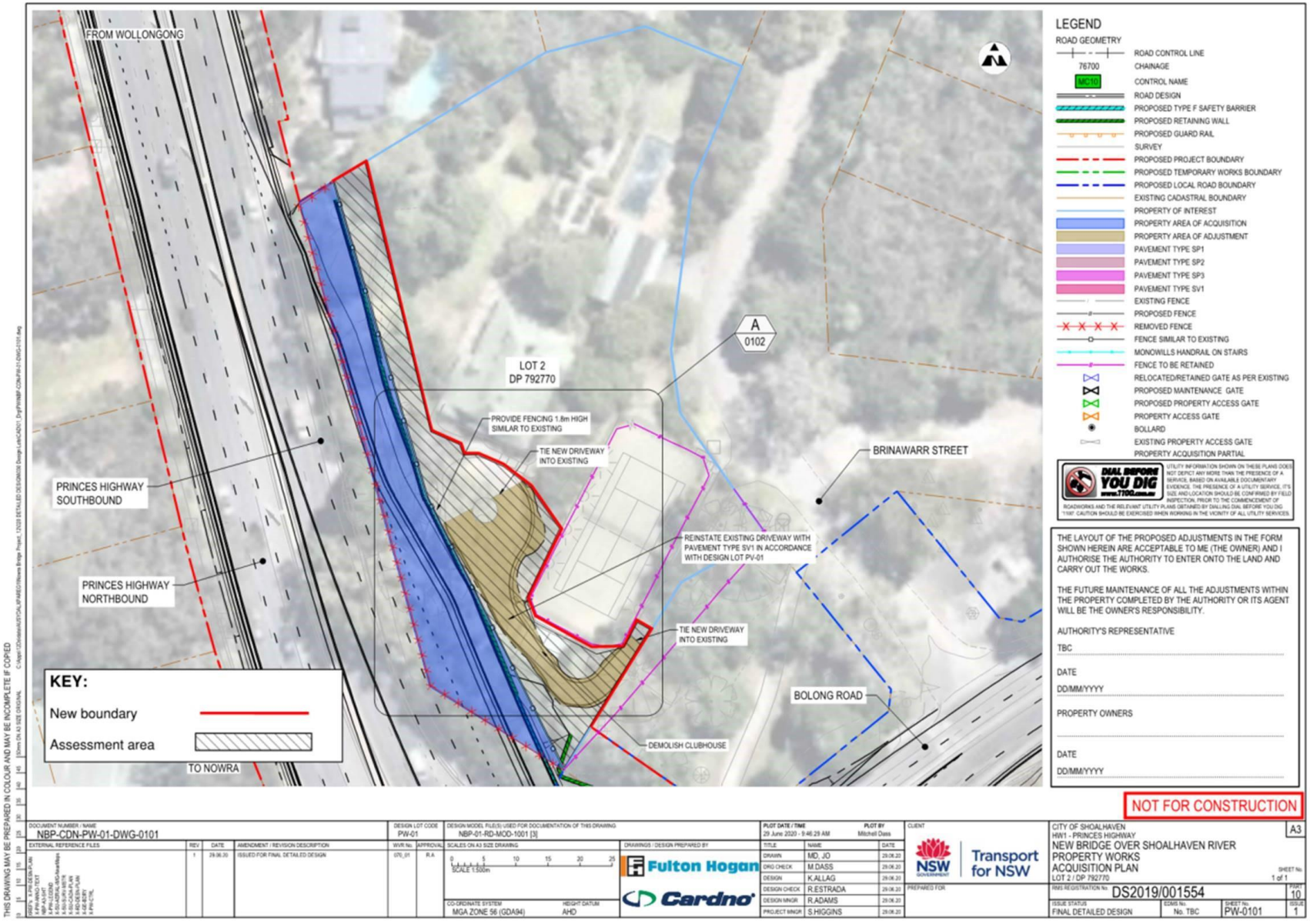


**Figure 40. Proposed property works associated with *Illowra* for the Nowra Bridge Project. Source. TfNSW.**

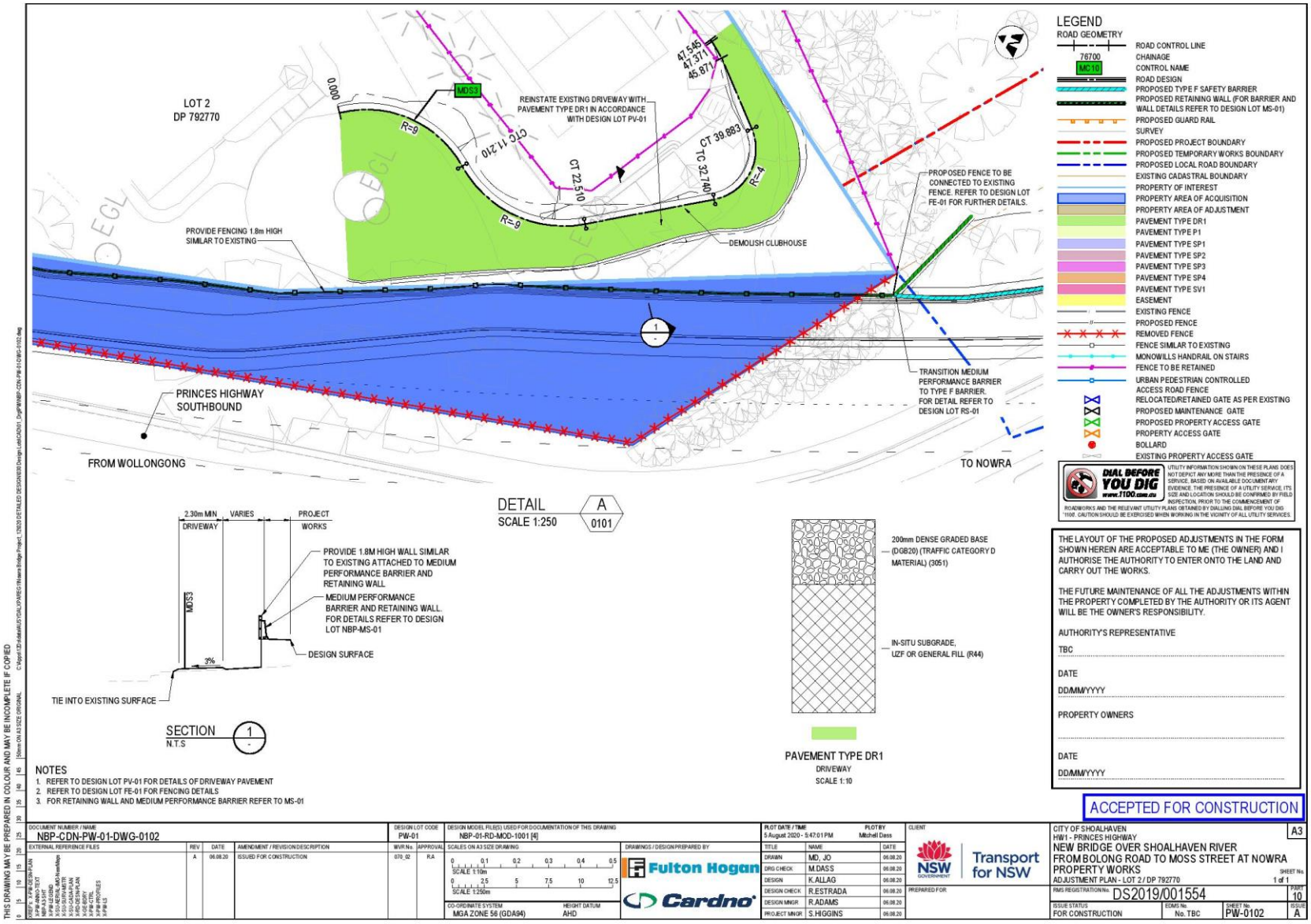


**Figure 41. Detailed description of proposed property works associated with *Illowra* retaining wall and driveway for the Nowra Bridge Project. Source. TfNSW.**

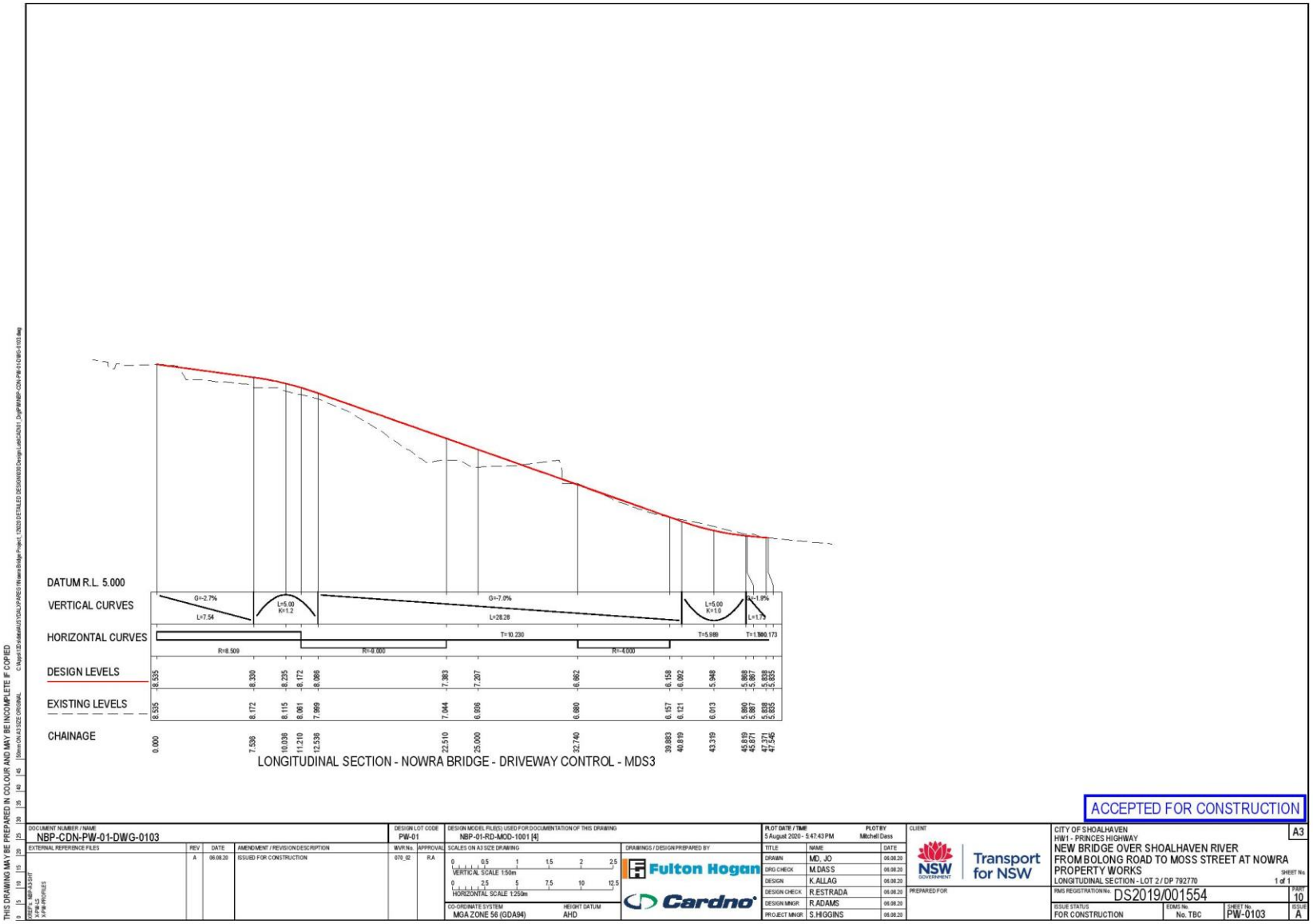


**Figure 42. Longitudinal section of proposed property works associated with *Illowra* for the Nowra Bridge Project. Source. TfNSW.**

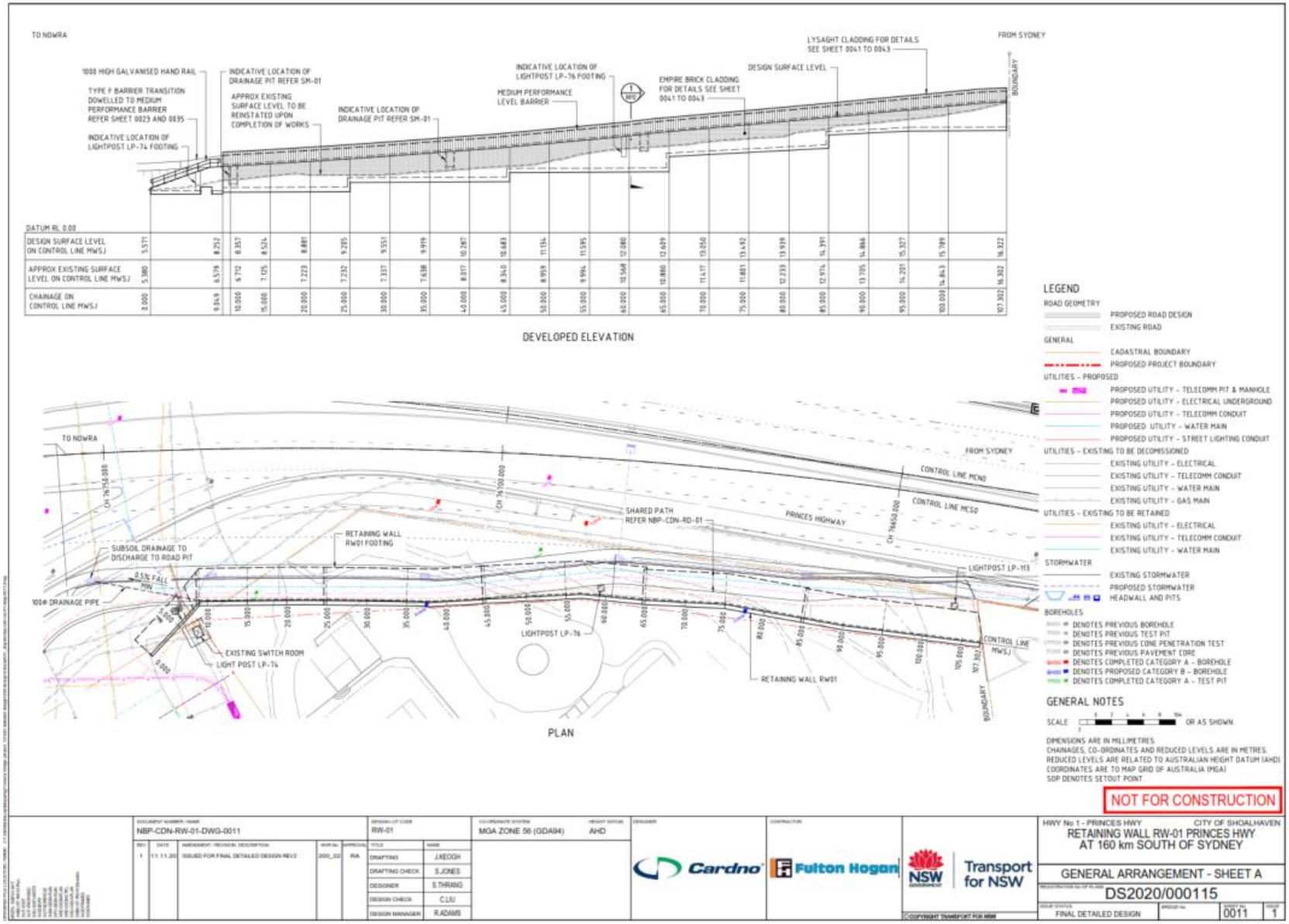


**Figure 43. Longitudinal plan for the proposed retaining wall. Source: TfNSW**

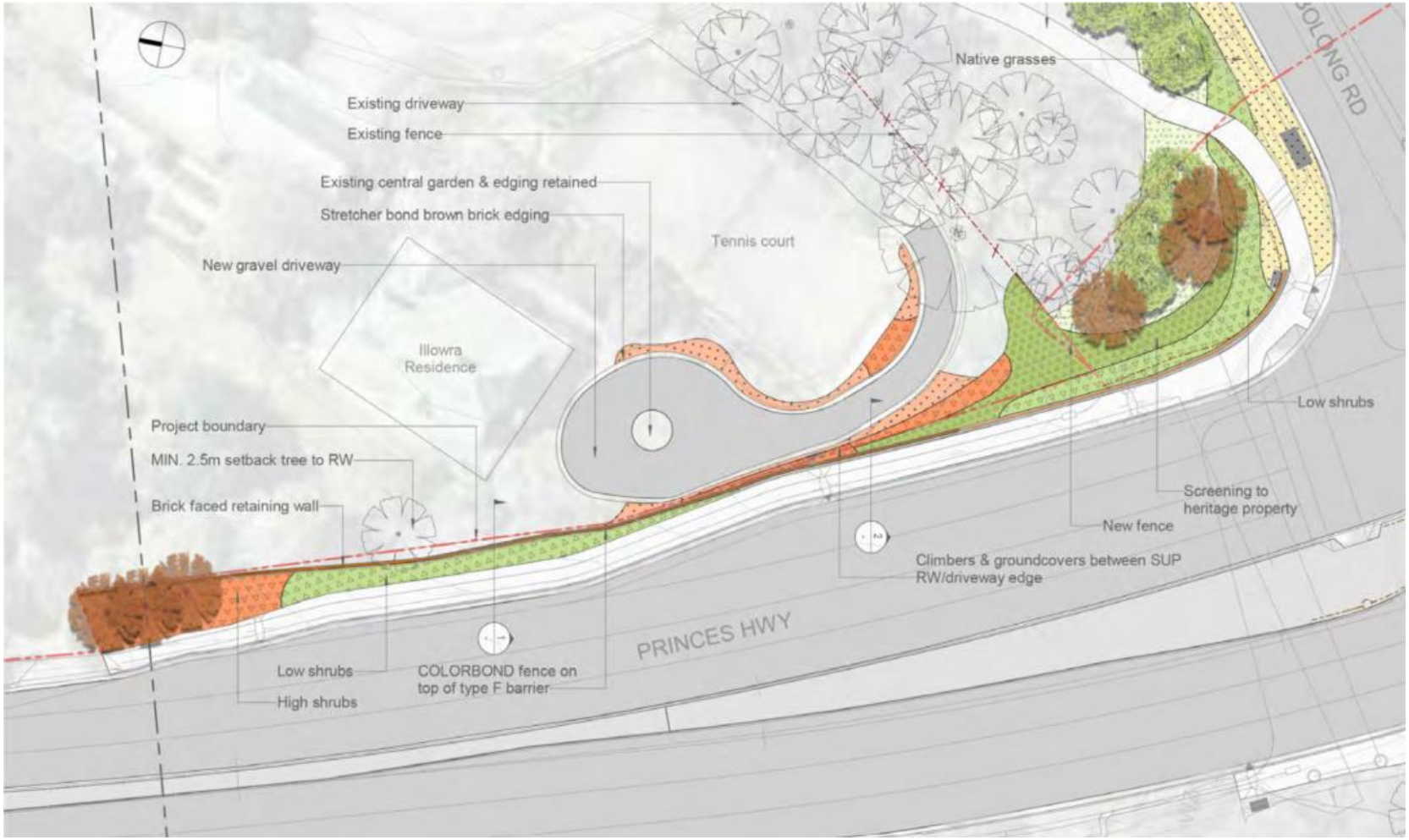


**Figure 44. Detailed landscaping plan for the proposed works. Source: TfNSW**

## Heritage impact assessment

### Direct (physical) impact assessment (shed, driveway, veg)

The proposed works include modifications to the driveway, which will be moved to the north-east and reshaped. This will necessitate the complete demolition and removal of the c.1990s shed, as well as the removal of vegetation including trees, bushes and ornamental plantings. The current layout of the driveway is not original, having incorporated part of the previous alignment of Brinawarr Street during the early 1980s. However, it is an important element of the study area as the main access point to the aesthetically significant southern façade of *Illowra*. The c.1990s shed is also not original fabric and does not substantially contribute to the integrity or significance of the item. The removal of vegetation, boundary stones and brick edging as part of these works will alter the setting of the heritage item. This can be mitigated through the retention or re-use of decorative garden bed border stones and replanting of garden areas within the property following the completion of the main construction program.

Further proposed works include the introduction of temporary scaffolding for the construction of an REF-approved retaining wall along the western boundary, including vegetation removal and the construction of a new fence line. Tall, semi-mature trees, smaller saplings and shrubbery are set to be removed as part of these works, which are additional to the previous large-scale vegetation removal in the area. The gardens on the western boundary of the item are some of the oldest on the property, planted in the early 1900s with mature growth visible on aerials from 1969. The area for the temporary scaffolding, however, contains mostly saplings with few tall mature trees. The removal of further vegetation and installation of a retaining wall will change the setting of the heritage item, which was previously screened from the street by mature vegetation. Current landscaping plans include the planting of low and high shrubbery in this area, with no trees, as shown in Figure 44. The impacts of these works could be further mitigated through the replanting of trees along the western boundary, though these will take some time to reach maturity.

In summary, driveway modifications for the proposal will ensure that physical access to the main house at *Illowra* is sympathetic to the existing character of the property, and will therefore have a **minor** direct (physical) impact on the heritage item. The removal of the shed will have a **negligible** direct (physical) impact on the heritage item, as it is considered to only make a minor contribution to the heritage significance of the heritage listed *Illowra*. Provided mitigation measures associated with tree and vegetation replanting are followed the removal of vegetation for the driveway modifications and construction of temporary scaffolding along the western portion of the study area will have a **moderate** direct (physical) impact on the heritage item.

Overall, the proposal would result in a **minor** to **moderate** direct (physical) impact to the heritage item.

### Indirect (visual) impact assessment (changes to existing landscape and views to and from the item)

The proposed works include modifications to the driveway, which will result in the removal of the c.1990s shed and vegetation including trees, bushes and ornamental planting. Further vegetation will be removed as part of the temporary scaffolding for the construction of the REF-approved retaining wall on the western boundary.

The current layout of the driveway is not original, dating to the early 1980s and it is considered to be a moderate contributary element to the heritage significance of *Illowra*. The view lines afforded by the driveway of the main house and gardens are significant, with the driveway providing access to the Federation residence's southern gabled façade. The reshaping of the driveway is not a major aesthetic change and will provide a similar view of the main house to its current layout.

The c.1990s shed, though designed sympathetically to *Illowra,* is not original and does not substantially contribute to the significance of the item. The sightlines between the shed and the main house at *Illowra* are not considered significant.

The gardens, including shrubbery, large mature trees and saplings and ornamental plantings, and are considered to be a moderate contributory element to the heritage significance of *Illowra*. The design of the former gardens sheltered the residence from the Princes Highway, screening the entirety of the property from the street. The removal of additional vegetation will further alter the original setting of the item, compounding the impact of a previous large-scale removal of vegetation along the western boundary as part of the existing works. Though this will be partially mitigated by landscaping and replanting (as shown in Figure 44), there are no current plans to include trees within the landscaping. Additionally, the shrubbery and vegetation will take time to reach maturity and approach the previous character of the gardens.

In summary, proposed modification of the driveway and removal of the c.1990s shed would result in **negligible** indirect (visual) impacts to the heritage item. Provided mitigation measures are followed, and trees and ornamental plantings are reinstated, the removal of vegetation within the construction footprint will have a **moderate** indirect (visual) impact on the heritage item.

Overall, the proposal would have a **moderate** indirect (visual) impact to the heritage item.

### Indirect (vibration) impact assessment

There is some potential for the main house at *Illowra* to experience vibration impacts above the cosmetic damage screening criteria during the proposed construction program. Vibration guidelines for heritage buildings, in accordance with the *British Standards BS 7385:2 –1993* and the *Transport for New South Wales 2019 Construction Noise and Vibration Strategy*, must not exceed 7.5 millimetres per second peak particle velocity. The extent of vibrations as a result of the proposal are not yet known. If vibration impacts were found to damage significant fabric associated with *Illowra*, there is potential for the proposal to have a **moderate** to **major** impact on its overall heritage significance.

However, provided mitigation measures associated with ongoing inspections by qualified structural engineers are followed for the duration of the proposed construction program, potential vibration impacts would be **negligible** to **neutral**.

### Archaeological impact assessment

Land within the study area has low potential to contain locally significant archaeological remains of the former Brinawarr Street alignment. These would be considered ‘works’ rather than ‘relics’ under definitions outlined in the Heritage Act. The remainder of the study area has nil potential for Phase 1 and 2 archaeological remains.

The proposed works include levelling, tree/vegetation removal and major excavation for the installation of the temporary scaffolding and retaining wall on the western boundary of the property. This area of excavation contains nil potential for significant archaeological remains and would therefore have a negligible archaeological impact.

Surface levelling may occur during modification works for the driveway, including in an area assessed as containing low potential for archaeological remains associated with the former alignment of Brinawarr Street. If intact remains of the former road were encountered and impacted by the proposed works, they would have a **minor** impact on the archaeological remains.

Overall the proposed works may have a **minor** impact on locally significant archaeological remains, if found intact, within the study area.

### Cumulative impacts

Cumulative impacts represent the incremental loss of, or modifications to, a heritage item or archaeological resource over time. These can result from individually minor, but collectively significant, actions and must therefore be considered within the wider development context in order to minimise impacts.

The proposal will require modifications to *Illowra*'s existing landscape, the demolition of shed and removal of trees, ornamental plantings and established garden beds. It also has potential to impact archaeological evidence of the former Brinawarr Street alignment.

The study area has been subject to impacts associated with REF approved works for the Nowra Bridge Relocation project, including the permanent reduction in its property curtilage and removal of mature trees and vegetation along its western boundary. This has resulted in the loss of the established gardens and associated vegetation screening the item from the Princes Highway. Specific reference to the established gardens and mature trees of *Illowra* are made in the LEP listing.

Therefore, the proposed works would further remove vegetation and modify the item's existing landscape. However, original elements of the study area such as its surviving mature trees and structures would be retained and the proposed works would be limited to a small portion of its overall landscape.

Therefore, when the current proposal is considered in tandem with the approved REF works, it would have a **moderate** cumulative impact on the heritage significance of the item.

### Summary

Overall, the project will have **minor** to **moderate** impacts to *Illowra* as a result of modifications to its existing landscape and driveway and the removal of vegetation and potential archaeological remains associated with the item.

### Statement of Heritage Impact

The Statement of Heritage Impact for the proposal is shown in Table 6 below.

**Table 6. Statement of Heritage Impact for the proposed works at *Illowra* (Shoalhaven LEP 2014 Item No. 139)**

| Impact | Discussion |
|---|---|
| **What aspects of the proposal respect or enhance the heritage significance of the study area?** | The modification of the driveway maintains the integrity of the item's visual character by providing access to the architecturally significant southern façade of the *Illowra* Federation residence.<br><br>No mature trees will be removed from the study area as part of the proposed works, with the designated areas containing shrubbery, flowering ground-cover plants and saplings. The extensive gardens will be replanted with similar species following the completion of works to mitigate the loss of vegetation at the site and maintain the significance of the item's gardens. |
| **What aspects of the proposal could have a detrimental impact on the heritage significance of the study area?** | The loss of vegetation throughout the property would result in a moderate visual and physical impact to the heritage significance of the item, which was previously screened from the roadways by sapling trees, shrubbery and ornamental planting. This is planned to be mitigated through extensive replanting, though the species planted will likely take some time to reach maturity. |

| | |
|---|---|
| **Have more sympathetic options been considered and discounted?** | The modification of the driveway and replanting of removed vegetation has been assessed as the most sympathetic option for the proposed works. An alternative design option included relocating the c.1990s shed to another location within the study area; however this was discounted as it would have resulted in further impacts to the item due to further vegetation clearance. A 'do nothing' design option was also considered, however this was discounted as it would have resulted in further impacts to the item due to the removal of access via the driveway and views towards the item from the driveway. |

## Conclusions

- The study area is listed on the Shoalhaven LEP 2014 as the locally significant *Illowra* (Item No. 136).
- The proposal would involve changes to the design and scope of approved works associated with the Nowra Bridge Relocation Project which was approved under Part 5.1 of the EP&A Act.
- These proposed works include:
  - Establishment of temporary scaffolding for the construction of a retaining wall which will encroach 2 metres over the approved 2018 REF boundary and within the *Illowra* curtilage
  - Removal of vegetation including trees, shrubbery and ornamental planting along the western boundary of the study area
  - Driveway modifications
  - Demolition of an existing c.1990s shed
  - Construction of new fence line
  - Vegetation clearance works extending up to the margin of the *Illowra* residence.
- The proposal may impact potential archaeological remains associated with the former Brinawarr Street alignment. If found to be intact and recognisable, these remains may have archaeological significance at a local level. However, the likelihood of these remains in the study area is low and they would be considered 'works' rather than relics' under the Heritage Act.
- Provided all mitigation measures are followed, the proposed works have been assessed as having the following heritage impact to *Illowra*:
  - Minor to moderate direct (physical) impacts
  - Moderate indirect (visual) impacts
  - Negligible/neutral indirect (vibration) impacts to *Illowra*
  - Minor impacts to potential archaeological remains in the study area.
  - Moderate cumulative impacts to *Illowra*
  - Overall, the project will have **minor** to **moderate** impacts to the heritage significance of *Illowra.*

# Recommendations and Mitigation Measures

## Recommendations

- As the proposed works would result in minor to moderate impacts to the locally listed *Illowra* (Shoalhaven LEP 2014 Item No. 136), the proposal is not consistent with general requirements for exempt development under Section 20 of the ISEPP. Therefore, consultation with Council is required prior to any impacts occurring.
- As the proposal would not impact any known archaeological remains that would be considered 'relics' under the Heritage Act, no archaeological excavation permits or exemptions are required for the project.
- However, as there is low potential for archaeological 'works' associated with the former Brinawarr Street alignment to survive within the southern portion of the study area (as shown in Figure 39), all subsurface excavations for the proposal would be managed under the Roads and Maritime (now Transport for NSW) Unexpected Heritage Items Heritage Procedure (2015).[17]
- If intact archaeological remains associated with the former Brinawarr Road alignment were identified during the construction program, the Unexpected Finds Procedure would be followed.
- All relevant staff, contractors and subcontractors should be made aware of their statutory obligations for heritage under *NSW National Parks and Wildlife Act 1974* and *NSW Heritage Act 1977*. This may be implemented as a heritage induction.

## Mitigation Measures

In order to mitigate impacts to the heritage listed *Illowra* as a result of the proposal, the following mitigation measures would be adhered to:

- All landscape features including the circular driveway, garden stones, brick edging, trees, decorative plantings and shrubs, to be modified for the proposal would be reinstated with like-for-like materials following the completion of works to ensure the existing character of the study area is retained.
- Where feasible, elements including the decorative garden bed stones would be retained and reused in the proposed landscape design (shown in Figure 44) following the completion of works.
- Where feasible, vegetation to be removed for the proposal would be retained for replanting in an appropriate location within the study area. Where vegetation cannot be replaced, trees and plantings of similar species would be replanted following completion of the construction program in addition to those proposed in the landscape design plan (shown in Figure 44).
- During construction works, monitoring of vibration impacts to Illowra would be undertaken by structural engineers. Assessment and monitoring of vibration impacts would adhere to the:

[17] Roads and Maritime, 2015. Standard management procedure: Unexpected heritage items.

  - British Standard BS 7385: *Part 2: Evaluation and Measurement for Vibrations in Buildings – Part 2 Guide to Damage Levels from Ground-Borne Vibration*
  - German Standard DIN 4150 *Part 3: Structural Vibration in Buildings: Effects on Structures.*
- If levels of vibration are found to be damaging significant heritage fabric associated with the item, works must cease and the construction methodology be reviewed by project engineers in consultation with a heritage consultant to mitigate further impacts.
- If changes to the current design occur, an addendum SoHI, or revision of this report, would be completed to assess any additional impacts.

## Reference list

Artefact Heritage, August 2018. *Nowra Bridge Project: Statement of Heritage Impact*. Report prepared for SMEC and Roads and Maritime Services (former).

Australia ICOMOS, 2013. *The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance.*

James Jervis. 1941. Alexander Berry, The Laird of Shoalhaven, in The Royal Australian Historical Society Journal and proceedings, vol. 27 part. 1. Accessed online 8/01/2021: http://nla.gov.au/nla.obj-602181525

NSW Heritage Office, 1996. *Heritage Terms and Abbreviations.*

NSW Office of Environment & Heritage (former), 2017. '"Illowra" – Federation timber Berry Estate residence and garden'. Accessed online 12/01/2021 at: http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?id=2390819

T. M. Perry, 'Berry, Alexander (1781–1873)', Australian Dictionary of Biography, National Centre of Biography, Australian National University. Accessed online 8/01/2021: http://adb.anu.edu.au/biography/berry-alexander-1773/text1987, published first in hardcopy 1966.

The Berry Estate Land Sale. (1892, April 6). Northern Star (Lismore, NSW: 1876 - 1954), 2. Accessed online 8/01/2021: http://nla.gov.au/nla.news-article71738452

# Appendix F

## ISEPP Consultation

Transport for NSW

15/01/2021

Reference: A35834629
File No: SF2018/205962

Micaiah Tipton
Shoalhaven City Council
PO Box 42
Nowra NSW 2541

Dear Micaiah

**Consultation regarding proposed works within the Illowra Property at 125 Brinawarr Street, Bomaderry**

Transport for NSW is proposing to undertake works for the Nowra Bridge project.

Under the State Environmental Planning Policy (Infrastructure) 2007, Transport for NSW is required to consult with Shoalhaven City Council under clause 14 due to the potential impacts on local heritage, for impacts on the Illowra Property situated at 125 Brinawarr Street, Bomaderry.

It has been determined that in addition to minor or moderate impacts outlined within our previous correspondence and consultation undertaken in May and June of 2018, that this proposal may have additional minor or moderate impacts upon the identified local heritage item of Illowra.

The additional impacts are a result of the need to relocation a portion of the internal driveway, which requires the demolition of a circa 1990 built minor structure used a storage shed for the tennis court, and additional vegetation impacts associated with this works and construction impacts of retaining walls for the Princes Highway upgrade. Also attached is a copy of the Draft Addendum REF prepared for these works and the Statement of Heritage Impacts (SoHI) outlining the minor or moderate impacts to the Illowra Property.

It would be appreciated if you could provide any comments about this proposal by Friday 5 February 2021.

Transport for NSW would be pleased to provide further information if required and offer Council staff an inspection of the site and impacts. In this regard I may be contacted on 0407 271 454 or by email at ryan.whiddon@transport.nsw.gov.au

Yours faithfully

Ryan Whiddon
Project/Contract Manager – Nowra Bridge project

**Transport for NSW**
Level 6, 90 Crown Street, Wollongong NSW 2500
**W** transport.nsw.gov.au | ABN 18 804 239 602

**Tash Pace**

---

**From:** Micaiah Tipton <Micaiah.Tipton@shoalhaven.nsw.gov.au>
**Sent:** Tuesday, 19 January 2021 11:51 AM
**To:** Ryan Whiddon
**Subject:** RE: Illowra Property

Hi Ryan,

Please see below for comments from Council. These were supplied by Gordon Clarke – Section Manager Strategic Planning

---

On review I note that the extent of impact is noted in the 'Addendum Statement of Heritage Impact' as being

**Impacts to *Illowra* comprised minor encroachment of construction works (approximately 3 metres) into the item's heritage curtilage. These works were assessed as a minor physical impact and moderate visual impact to the heritage significance of item.**

Whilst it is not ideal that there will be further impact on this listed property I note that there has already been a considerable impact on this edge of the property arising from the bridge project.

When looking at the 'statement of significance' related to this LEP listed heritage item, the significance primarily relates to the residence and the garden (mentions *fine old trees and established garden*).

The currently proposed works will not impact on the dwelling itself, which is a positive and the garden has already been substantially impacted by the bridge works.

**Conclusion** - There is generally no objection to the proposed works provided the recommendations and mitigation measures listed in the 'Addendum Statement of Heritage Impact' are closely followed and complied with, this is particularly important in terms of the ensuring that the garden is suitably reinstated and the proposed works do not impact negatively on 'Illowra'.

---

Let me know if you need anything further,

**Micaiah Tipton** *RPEng (CMI), BE CMI*
**Manager Design Services**
Shoalhaven City Council

02 4429 3313 | 0429 516 231
Bridge Rd (PO Box 42) Nowra NSW 2541
micaiah.tipton@shoalhaven.nsw.gov.au

RESPECT | INTEGRITY | ADAPTABILITY | COLLABORATION

---

**From:** Ryan Whiddon <Ryan.WHIDDON@transport.nsw.gov.au>
**Sent:** Friday, 15 January 2021 4:44 PM