Appendix C: Updated Statement of Heritage Impacts

Sydney Harbour Bridge Cycleway Northern Access Proposal

Statement of Heritage Impact

Report to Arcadis / Transport for NSW

March 2023

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Project name:	Sydney Harbour Bridge Cycleway Northern Access Proposal
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EXECUTIVE SUMMARY

The Sydney Harbour Bridge cycleway route is a critical link in the metropolitan Sydney regional bike network connecting the proposed North Shore cycleway on the Pacific Highway with the existing Kent Street cycleway in the Sydney Central Business District (CBD). The current step access to the heavily used Sydney Harbour Bridge cycleway is not easily accessible and prevents many customer groups from using the facility, and its usage has decreased over time despite a significant growth in bike purchases and uptake in the recent years.

Transport for NSW proposes to upgrade the existing cycleway connection between the Sydney Harbour Bridge northern cycleway and the bike network at Milsons Point. Artefact Heritage has been engaged by Arcadis on behalf of Transport for NSW to prepare a Statement of Heritage Impact for the Review of Environmental Factors and for submission as part of an application for Section 60 (S60) approval under the *Heritage Act 1977* (Heritage Act).

This Statement of Heritage Impact assesses the potential heritage impacts of updates to the proposal as undertaken in the detailed design February 2023. This report also includes an assessment of early works which would be undertaken to investigate the study area. A Statement of Heritage Impact was prepared by Artefact Heritage 27 October 2022 which assessed the concept design and was issued to Heritage NSW as part of S60 application in March 2023. This report provides a consistency assessment against the original Statement of Heritage Impact and assesses whether there are any changes to the potential impact levels as a result of the proposed works. This report has considered and is consistent with the heritage management strategies outlined in the Sydney Harbour Bridge Conservation Management Plan[1].

The proposal would occur within the following statutory listed heritage curtilages:

Listing	Number	Name	Location
National Heritage List (NHL)	105888	Sydney Harbour Bridge	Bradfield Highway and North Shore Railway, Milsons Point/Dawes Point, NSW 2000
State Heritage Register (SHR)	00781	Sydney Harbour Bridge, approaches and viaducts (road and rail)	Bradfield Highway and North Shore Railway, Milsons Point/Dawes Point, NSW 2000
SHR	01194	Milsons Point Railway Station Group	North Shore railway, Milsons Point, NSW 2061
Roads and Traffic Authority (now TfNSW) Section 170	4301067	Sydney Harbour Bridge, approaches and viaducts	Bradfield Highway and North Shore Railway, Milsons Point/Dawes Point, NSW 2000
Transport Asset Holding Entity (TAHE) Section 170	4801059	Sydney Harbour Bridge (Rail Property Only)	Arthur and Argyle Streets, Sydney, NSW 2000
TAHE Section 170	4801026	Milsons Point Railway Station	Alfred Street, Milsons Point, NSW 2061

[1] GML Heritage. *Sydney Harbour Bridge Conservation Management Plan*. Prepared by GML and Transport for NSW, 2021.

Listing	Number	Name	Location
North Sydney Local Environmental Plan 2013 (North Sydney LEP)	I0538	Bradfield Park (including northern section)	Alfred Street South, Milsons Point
North Sydney LEP	I0539	Milsons Point Railway Station Group	North Shore railway, Milsons Point, NSW 2061
North Sydney LEP	I0530	Sydney Harbour Bridge approach viaducts, arches and bays under Warringah Freeway	Bradfield Highway and North Shore railway, Milsons Point/Dawes Point, NSW 2000

Detailed Design Process

After a preliminary design evaluation community consultation process that strongly favoured a linear cycle ramp over a spiral configuration, Transport for NSW engaged three design companies to create design solutions for a new elevated linear bike ramp. The competition design process involved three leading urban design and architectural firms (Aspect Studios, REALMstudios, and Civille), each providing a design solution. Following an extensive optioneering process, the Aspect Studios design, comprising a linear scheme that most closely aligned with the TZG Heritage Framework and progressive review and feedback provide by the TfNSW Design Integrity Panel and the Heritage Council of NSW.

The potential visual impact of options were also assessed in the Landscape Character and Visual Assessment (LCVIA) prepared as part of the REF process. This helped to determine the best design solution which minimised physical and visual impacts.

Aspect Studios engaged leading heritage firm Design 5 Architects (lead by Alan Croker) to provide iterative specialist heritage advice first at the competition stage. Since the selection of the successful team, Design 5 has had a close and ongoing involvement in the design development. The detailed design February 2023 is a result of the refinement and development of the design by the design team, including Design 5 in collaboration with Aspect and TfNSW to minimise impacts on the Sydney Harbour Bridge fabric and the surrounding context.

Summary of Findings

Table 1 provides a summary of the findings of this SOHI.

Table 1: Summary of heritage impacts (direct and indirect) to the Sydney Harbour Bridge and surrounding heritage listings as assessed for the 70 per cent detailed design

Design feature	Listing(s) impacted	Direct and Indirect Impacts
Early investigation works including Geotech boreholes (4 no.), slot trenches (16 no.), tree root survey, core holes to parapet, concrete reinforcement and cycleway slab at bridge deck.	**NHL:** • 105888: Sydney Harbour Bridge **SHR:** • 00781: Sydney Harbour Bridge, approaches and viaducts (road and rail) **TfNSW Section 170 Register:** • 4301067: Sydney Harbour Bridge, approaches and viaducts **North Sydney LEP:** • I0530: Sydney Harbour Bridge approach viaducts, arches and bays under Warringah Freeway	**Negligible direct impact** **Negligible indirect impact**
Removal of part of a parapet near the Burton Street stairs along the viaduct. The connection between the newly built ramp and the existing cycleway on the Sydney Harbour Bridge. Raised median strips in the middle of the upper connection platform. Paving finishes and line marking between on the existing cycleway and new cycleway.	**NHL:** • 105888: Sydney Harbour Bridge **SHR:** • 00781: Sydney Harbour Bridge, approaches and viaducts (road and rail) **TfNSW Section 170 Register:** • 4301067: Sydney Harbour Bridge, approaches and viaducts **North Sydney LEP:** • I0530: Sydney Harbour Bridge approach viaducts, arches and bays under Warringah Freeway	**Minor to Moderate adverse direct impact** **Minor adverse indirect impact**
Creation of a landing point for the ramp in Bradfield Park.	**North Sydney LEP:** • I0538: Bradfield Park (including northern section)	**Moderate adverse direct impact** **Moderate adverse indirect impact**
Partial obstruction of the Burton Street entrance to Milsons Point Station and the Burton Street archway.	**SHR:** • 01194: Milsons Point Railway Station Group **TAHE Section 170 Register:** • 4801026: Milsons Point Railway Station **North Sydney LEP 2013:** I0539: Milsons Point Railway Station Group	**Moderate adverse indirect impact**

Design feature	Listing(s) impacted	Direct and Indirect Impacts
Introduction of a new structure into the setting of Bradfield Park, Milsons Point Station and the Bradfield Highway approaches of the Sydney Harbour Bridge.	**NHL:** • 105888: Sydney Harbour Bridge **SHR:** • 00781: Sydney Harbour Bridge, approaches and viaducts (road and rail) • 01194: Milsons Point Railway Station Group **TfNSW Section 170 Register:** • 4301067: Sydney Harbour Bridge, approaches and viaducts **TAHE Section 170 Register:** • 4801026: Milsons Point Railway Station **North Sydney LEP:** • I0538: Bradfield Park (including northern section) • I0539: Milsons Point Railway Station Group • I0530: Sydney Harbour Bridge approach viaducts, arches and bays under Warringah Freeway	**Moderate adverse direct impact** **Moderate adverse indirect impact**
A change to the layout of Bradfield Park, including the removal of some landscaping elements, vegetation, and introduction of new pedestrian and cycle pathways.	**North Sydney LEP 2013:** • I0538: Bradfield Park (including northern section)	**Minor adverse direct impact** **Minor adverse indirect impact**
Alfred Street south cycleway and pedestrian pathway adjustments. Bus stop adjustments along Alfred Street. On-street parking adjustments. Associated landscaping.	**NHL:** • 105888: Sydney Harbour Bridge **SHR:** • 00781: Sydney Harbour Bridge, approaches and viaducts (road and rail) **North Sydney LEP:** • I0538: Bradfield Park (including northern section)	**Minor adverse to neutral direct impact** **Minor adverse to neutral indirect impact**
New pedestrian crossings and round about adjustments on both Middlemiss and Lavender Streets. Associated landscaping.	**NHL:** • 105888: Sydney Harbour Bridge **SHR:** • 00781: Sydney Harbour Bridge, approaches and viaducts (road and rail)	**Minor adverse to neutral direct impact** **Minor adverse to neutral indirect impact**

Design feature	Listing(s) impacted	Direct and Indirect Impacts
Ancillary sites during construction.	**NHL:** • 105888: Sydney Harbour Bridge **SHR:** • 00781: Sydney Harbour Bridge, approaches and viaducts (road and rail) **TfNSW Section 170 Register:** • 4301067: Sydney Harbour Bridge, approaches and viaducts **North Sydney LEP:** • I0538: Bradfield Park (including northern section) • I0530: Sydney Harbour Bridge approach viaducts, arches and bays under Warringah Freeway	**Negligible to neutral direct impact** **Negligible to neutral indirect impact**
Excavation in Bradfield Park Central and North, and on each side of Burton Street for the columns footings and associated works.	**NHL:** • 105888: Sydney Harbour Bridge **SHR:** • 00781: Sydney Harbour Bridge, approaches and viaducts (road and rail) **TAHE Section 170 Register:** • 4301067: Sydney Harbour Bridge, approaches and viaducts **North Sydney LEP:** • I0538: Bradfield Park (including northern section) • I0530: Sydney Harbour Bridge approach viaducts, arches and bays under Warringah Freeway	**Negligible to Neutral potential direct (vibration and settlement)**

Approval pathway

Impacts to the SHR within the study area would be managed via the Section 60 process of the Heritage Act. All excavation works within the SHR curtilage of the SHB would be subject to a Section 60 approval as well.

Areas outside the SHR curtilage have the potential to contain locally significant archaeological 'relics' associated with residential occupation of the study area from the early to late 19th century (historical phases 1 and 2). It is therefore recommended that a Section 140 approval is obtained from HNSW prior to works commencing.

Refinements from the concept design to the detailed design February 2023 have largely improved heritage outcomes and have resulted in a reduction of both direct (physical) and indirect (visual) impacts to the NHL listed Sydney Harbour Bridge.

Therefore it is considered that the proposal would not result in a significant impact to the National Heritage values of the Sydney Harbour Bridge (see 8.6), and therefore is not recommended referral under the EPBC Act

Recommendations

The following recommendations and mitigations are provided to ensure no unnecessary impacts occur prior to and during the construction of the proposal, and that the operation of the proposal also avoids impact.

Approvals and management measures

The following measures should be implemented prior to finalisation of the detailed design:

- The design must continue to progress in accordance with the conservation policies and management measures outlined in the *Sydney Harbour Bridge Conservation Management Plan* prepared by GML (2021) and *the Supplementary Detailed Heritage Framework* (draft) prepared by TZG (2021).
- A Heritage Interpretation Strategy (HIS) for the proposal must be prepared. Heritage interpretation opportunities must be considered during progression of detailed design for the proposal, in accordance with the recommendations in the *Sydney Harbour Bridge Conservation Management Plan* prepared by GML (2021) and the *Supplementary Detailed Heritage Framework* (draft) prepared by TZG (2021), as well as any other future heritage interpretation documentation prepared for the proposal. Appropriate heritage interpretation must be incorporated into the design for the proposal in accordance with the NSW Heritage Office's *NSW Heritage Manual* (1996), *Interpreting Heritage Places and Items Guidelines* (2005b), and *Heritage Interpretation Policy* (2005a). The *Sydney Harbour Bridge Interpretation Plan* 2007 must also be referred to during the preparation of the HIS. Opportunities for interpretive displays in appropriate locations should be explored as part of the HIS.
- The following archival recordings of the Sydney Harbour Bridge should be undertaken prior to the commencement of construction
    - Photographic Archival Recording of the project footprint area and surrounding areas.
    - A 3D scanning of the Bridge of the project footprint area
    - A point-cloud survey of the Bridge of the project footprint area
- Preparation of a vibration management plan to guide vibration levels and provide advice on vibration monitoring during works.

Construction

The following must be considered and implemented in the construction of the proposal:

- The Design Integrity Panel (DIP), incorporating heritage, design and Connecting with Country expertise, should have continued involvement throughout the construction of the proposal. Heritage NSW should be invited to attend meetings as observers.
- A Construction Environmental Management Plan (CEMP) must be prepared for the proposal prior to construction works commencing. This plan must outline all relevant environmental

and heritage constraints, mitigations and control measures to ensure unapproved impacts are avoided.

- A Heritage Interpretation Plan must be prepared to guide the interpretation of the Bridge, Bradfield Park and the changes undertaken. The Plan must provide guidance for the interpretation of the removed section of the parapet.
- No changes to the overall design intent, overall design footprint or constructability of the proposal can occur in this phase of the proposal without consultation with the proposal heritage specialist.
- Early investigation works core holes into the parapet are to be stopped 100mm short of the opposite face, so as not to break through the face of the parapet and minimise damage to the fabric for later interpretative use in the park.
- All bore holes and slot trenches in the park should be monitored by an Archaeologist and an Arborist
- Site rehabilitation measures related to construction sites will be incorporated within an Urban Design and Landscape Plan or similar documents. The objective of the rehabilitation will be to minimise long-term impacts on the visual amenity of the items by recreating a sympathetic environment. A landscape scheme would be prepared for the North Sydney LEP listed Bradfield Park to capture the new plantings, retained plantings and overall landscaping within and around the item's curtilage. The scheme will consider appropriate plantings, including those proposed as part of the Connecting with Country plan for the project.
- A heritage induction briefing should be prepared for the proposal to be delivered to all staff working on the proposal. The briefing should be prepared by a qualified heritage specialist, and ideally delivered by the proposal heritage specialist. It should contain key information about heritage significance, areas to avoid and key do's and dont's within the heritage areas.
- Construction vibration monitoring is recommended throughout the construction phase of the proposal to ensure no indirect impacts occur to heritage items and the public domain as a result of the works. This should be guided by the vibration management plan. Vibration monitors should be applied to significant fabric (beeswax), and regular visual monitoring of lesser significant elements should be undertaken in conjunction with the monitors.
- Operating plant (swinging, reversing, moving etc.) must adhere to standard setbacks and clearances from heritage structures and items which are not identified to be impacted.
- Temporary hoarding and signage should be placed around heritage buildings and structures to be avoided during works, and should consider interpretative signage or artwork on the hoarding to lighten the visual impacts during construction.
- Protection of significant fabric should be put in place to ensure that no inadvertent damage occurs to fabric, including protection from concrete splatter.
- Repair of parapet and bridge deck should be undertaken after completion of early investigation works. Surfaces and fabric should be made good to match existing. Protect surrounding fabric during repair works to insure non inadvertent damage occurs to fabric, including concrete splatter.
- The removed section of parapet should be carefully stored on site or in a facility off-site until such time when its installation within the garden as part of the interpretation of the site is required.

Operation

There are no specific operational heritage recommendations for this proposal.

Historical archaeology

The management of potential archaeological impacts and excavation methodology should be guided by the Archaeological Research Design prepared by Artefact Heritage, March 2023.

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1.0 INTRODUCTION

1.1 Proposal background

The NSW Government is committed to cycling as a key mode of city-serving, sustainable infrastructure. Active transport infrastructure provides positive community health, amenity and environmental outcomes. Active transport involves walking, cycling and other physical modes of travel. The NSW Government is looking to address continued access and safety constraints, and find ways to encourage more people to cycle, to develop active, healthy and carbon neutral ways to move across the metropolis.

The Sydney Harbour Bridge cycleway route is a critical link in the metropolitan Sydney regional bike network connecting the proposed North Shore cycleway on the Pacific Highway with the existing Kent Street cycleway in the Sydney Central Business District (CBD). Over the last decade, a rolling average of just under 2,000 cyclist trips have been completed each weekday on the Sydney Harbour Bridge cycleway making it one of the busiest links in the Metro Sydney Bike Network. However, the current step access to the heavily used Sydney Harbour Bridge cycleway is not easily accessible and prevents many customer groups from using the facility, and its usage has decreased over time despite a significant growth in bike purchases and uptake in the recent years. The step access and safety barriers create a bottleneck that would prevent the cycleway from meeting projected demand.

The proposal is required to not only improve safety and accessibility for cyclists and pedestrians, but also to support the future growth in the number of cyclists travelling between the Lower North Shore, North Sydney CBD and Sydney's CBD. The proposal would provide a linear ramp for cyclists to access the Sydney Harbour Bridge cycleway more easily; and a safer, separated connection on Alfred Street South from Burton Street to the existing bike network on Middlemiss Street. The proposal is part of a suite of projects that aim to make it easier for people to access and use the Sydney Harbour Bridge. Other proposals include upgrades of the Sydney Harbour Bridge's southern cycleway access and the recently completed pedestrian access lift on the northern and southern sides of the Sydney Harbour Bridge pedestrian pathway.

Following extensive consultation and design development, Transport for NSW is upgrading the existing cycleway connection between the Sydney Harbour Bridge northern cycleway and the bike network at Milsons Point. Artefact Heritage was engaged by Arcadis on behalf of Transport for NSW to prepare a Statement of Heritage Impact (SOHI) for the concept design for submission as part of the Review of Environmental Factors (REF) planning process. Following the REF exhibition and finalisation in late 2022 a Section 60 approval is required under the Heritage Act. The previous SOHI has now been updated (this report) to assess design refinements as part of detailed design, and will be submitted to Heritage NSW in support of the s60 application.

1.2 Report background

This Statement of Heritage Impacts (SOHI) is based on the detailed design February 2023 and has been prepared to support the Review of Environmental Factors (REF) and to support an application under Section 60 of the *Heritage Act 1977* (Heritage Act). The SoHI is an update to the SoHI prepared by Artefact Heritage in October 2022. Descriptions of the proposal are current as of March 2023 and includes the scope of early works investigations. Outcomes of further detailed design to be subject to updated heritage impact assessment.

This report provides details of the heritage significance of the listed heritage items, assesses potential impacts to the significance of the heritage items from the proposal, and assesses potential impacts to non-Aboriginal archaeological remains. This report has considered and is consistent with the heritage

management strategies outlined in the Sydney Harbour Bridge Conservation Management Plan (GML 2021).

1.3 The proposal and study area

Transport for NSW (Transport) proposes to upgrade the existing cycleway connection between the Sydney Harbour Bridge Cycleway and the bike network in Milsons Point. The cycleway connection would interface with a new cycle path along Alfred Street South (the proposal).

The proposal is located on Cammeraygal land and is in Milsons Point, within the North Sydney Local Government Area (LGA). The proposal is bounded by Middlemiss Street to the north, the Sydney Harbour Bridge to the east, Fitzroy Street to the south and Alfred Street South to the west.

The proposal would consist of a three-metre-wide elevated linear bike ramp that extends 200 metres from Bradfield Park North, near Burton Street, interfacing with the Sydney Harbour Bridge Cycleway south of the existing stair access. The ramp would connect to a new cycle path which would extend along the east side of Alfred Street South, between Middlemiss Street and Burton Street, and include a new street crossing on Alfred Street South. The two-way cycle path would be 2.5 metres wide and connect to the existing bike network in Milsons Point.

Figure 1: Overview of the proposed elevated bike ramp (Courtesy: Aspect, 2022)

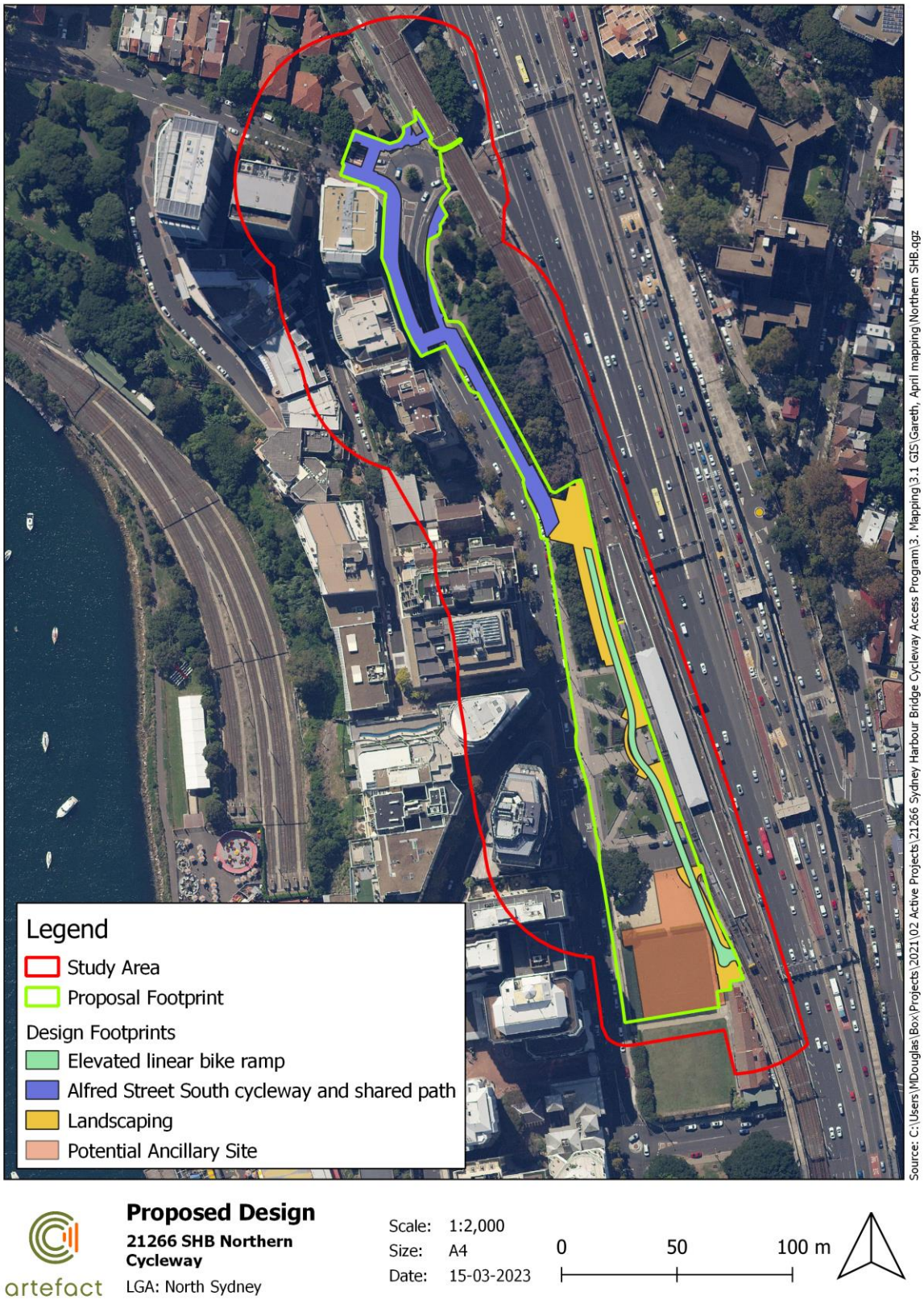

Figure 2: Overview of the proposal footprint and the study area

Key features of the proposal would include:

- A design-led approach to the integration of new cycling infrastructure with its existing significant open space and heritage setting
- A new elevated linear bike ramp, with deck about three metres wide and about 200 metres in length between the Sydney Harbour Bridge Cycleway and Bradfield Park North including:
    - Steel ramp structure with deck incorporating Designing with Country motifs, and balustrade with integrated lighting
    - Precast columns carefully sited within Bradfield Park North and Central
    - Provision of a bike riders rest area next to the Sydney Harbour Bridge Cycleway connection
    - A gathering space, lighting and cycle path within Bradfield Park North connecting the elevated linear bike ramp and the proposed Alfred Street South cycle path
- Alfred Street South pedestrian and cycle path upgrade including:
    - New 2.5-metre-wide two-way cycle path on Alfred Street South from the ramp landing, linking to the existing bike network in Middlemiss Street. The cycle path would be located on the east side of Alfred Street South between the ramp landing and the new street crossing at 110 Alfred Street South. On the west side of Alfred Street South the cycle path would be located between the new crossing and Lavender Street
    - Replacement of the existing pedestrian refuge crossing at the north end of Alfred Street South with a pedestrian and bike rider crossing located near 110 Alfred Street South and an upgrade to the pedestrian crossing at Lavender Street
    - Low speed shared path and verge widening on the north side of Lavender Street
    - Adjustments to the Lavender Street roundabout
    - New street tree planting, shrub planting and footpath paving
    - Relocation of the existing bus stop on Alfred Street South near Lavender Street about 60 metres to the south of its current location
    - Permanent removal of up to 15 parking spaces along Alfred Street South.

The proposal, would also include, but not be limited to:

- Kerb and pavement work, and line marking
- Drainage and utility adjustments
- Street furniture adjustments
- Changes to street parking, parking meter locations and regulatory signage
- Minor lighting upgrades to Bradfield Park North and in other locations where required to meet safe lighting standards.

Construction of the proposal would take around 18 months and, subject to planning approval, is expected to commence late 2023.

Key terms used in this SOHI are defined in the REF and include:

- Proposal footprint: includes the area of direct impact and a 10-metre buffer from the design, as well as the proposed temporary ancillary facility located the Bradfield Park Bowling Green at Alfred Street South.
- Study area: generally includes an area of 50 metres either side of the centre of the proposal footprint; and includes the maximum possible extent of a potential ancillary facility site (Refer to Figure 1).

The proposal footprint and study area are shown in Figure 2.

1.4 Methodology

This SOHI has been prepared as one concise report that combines an assessment of built heritage and archaeological impacts from the proposal. This report was prepared by Artefact following a site visit, a review of relevant documentation, and attendance at relevant meetings.

The methodology for this report is consistent with the proposal brief and the standard methodology for SOHI.

This report is informed by the following guiding documents:

- *Assessing Heritage Significance* (NSW Heritage Office, 2001)
- *Statements of Heritage Impact* (NSW Heritage Office and Department of Urban Affairs & Planning, 2002)
- *Design in Context: Guidelines for Infill Development in the Historic Environment* (NSW Heritage Office and Royal Australian Institute of Architects, 2005)
- *The Burra Charter* (Australia ICOMOS, 2013)
- *NSW Heritage Manual* (NSW Heritage Office & Department of Urban Affairs and Planning NSW Heritage Manual, 1996)
- *Commonwealth of Australia, Matters of National Environmental Significance: Significant Impact Guidelines 1.1* (Department of the Environment 2003).

The report includes the following key components:

- Searches of statutory and non-statutory heritage registers, including the NSW SHR, the NSW State Heritage Inventory (SHI), the North Sydney LEP, the Commonwealth Heritage List, the NHL, and the World Heritage List
- Preparation of concise historical information relevant to the proposal and the study area
- Statements of significance for items in the vicinity of the proposal
- Assessment of significance of relevant items
- Details of the design and the proposal

- Assessment of impacts to any built (historic) heritage places or items in the subject area (including conservation areas, built heritage, landscapes, etc.)
- Assessment of Impacts to any archaeology within the study area (including relics and works)
- Proposed mitigation and management measures (including measures to avoid significant impacts) generally consistent with the guidelines in the NSW Heritage Manual, alongside recommendations for approval of the proposal
- Analysis of works against the Sydney Harbour Bridge Conservation Management Plan (CMP) and other key guiding documents.

The following key reports were used to inform this SOHI:

- *Sydney Harbour Bridge Northern Cycleway Access Urban Design and Heritage Framework* (Cox Architecture, 2021)
- *Sydney Harbour Bridge Geotechnical Studies SOHI* (Artefact, 2018)
- *Scoping Design Report for Cycleway Options* (TZG, SMM and Aurecon, 2021)
- *Sydney Harbour Bridge Cycleway Access Project – North: Supplementary Detailed Heritage Framework* (TZG, 2021)
- *Sydney Harbour Bridge Cycleway Access Program Stage 1: Northern Access Final Business Case* (Transport for NSW, 2021)
- *Sydney Harbour Bridge Cycleway Northern Access Planning Pathway and Environmental Risk Assessment Memo* (Transport for NSW, 2019)
- *Sydney Harbour Bridge Conservation Management Plan* (GML Heritage, 2021).
- *Sydney Harbour Bridge Cycleway Design Report* (Aspect, 2023)

1.5 Limitations

The key objective of this SOHI is to understand the nature of the proposal and its design, and to assess the impact of the proposal (as defined in Section 1.2) on the heritage values of the study area, being the northern approach to the Sydney Harbour Bridge, Bradfield Park, and relevant heritage curtilages.

This report does not replace existing reports about the Sydney Harbour Bridge, including for example the extensive historical information and other information about the Sydney Harbour Bridge in the 2021 *Sydney Harbour Bridge Conservation Management Plan* prepared by GML or the draft *Sydney Harbour Bridge Cycleway Access Project – North: Supplementary Detailed Heritage Framework* prepared by Tonkin Zulaikha Greer in 2021. These and other documents are referred to in this report and should be viewed for additional contextual information. New information is only provided specifically on the impact of the proposal at the northern end of the Sydney Harbour Bridge and surrounds.

1.6 Authorship

This updated SoHI report was prepared by Sarah-Jane Zammit (Senior Associate) with input and review provided by Scott MacArthur (Principal), and technical review by Sandra Wallace (Managing Director) and Josh Symons (Technical Director), all from Artefact Heritage. Iain Stuart, nominated Excavation Director for the project reviewed the archaeological component of the SoHI.

2.0 STATUTORY CONTEXT

2.1 Summary

The Sydney Harbour Bridge is listed on the following statutory and non-statutory registers or lists:

- National Heritage List (since 2007)
- State Heritage Register (1999)
- *North Sydney Council Local Environmental Plan* (2013)
- Transport for NSW Section 170 Heritage and Conservation Register
- National Trust Register (1974)
- Register of the National Estate (1978).

2.2 Relevant legislation

2.2.1 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) provides a legislative framework for the protection and management of matters of national environmental significance, that is, flora, fauna, ecological communities and heritage places of national and international importance. Heritage items are protected through their inscription on the World Heritage List (WHL), Commonwealth Heritage List (CHL) or the National Heritage List (NHL).

Under Part 9 of the EPBC Act, approval under the EPBC Act is required for any action occurring within, or outside, a National or Commonwealth Heritage place that has, will have, or is likely to have a 'significant impact' on the heritage values of a World, National or Commonwealth heritage listed property (referred to as a 'controlled action' under the Act). A 'significant impact' is defined as:

> *an impact which is important, notable, or of consequence, having regard to its context or intensity. Whether or not an action is likely to have a significant impact depends upon the sensitivity, value, and quality of the environment which is impacted, and upon the intensity, duration, magnitude and geographic extent of the impacts*.

The EPBC Act stipulates that a person who has proposed an action that will, or is likely to, have a significant impact on a site that is listed on the WHL, CHL or NHL must refer the action to the Minister for Environment and Water (hereafter Minister). The Minister will then determine if the action requires approval under the EPBC Act. If approval is required, an environmental assessment would need to be prepared. The Minister would approve or decline the action based on this assessment.

2.2.1.1 National Heritage List

The NHL was established under the EPBC Act, which provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities, and heritage places. Under the EPBC Act, nationally significant heritage items are protected through listing on the NHL or the CHL.

There is one item listed on the NHL located within the study area. This item is shown in Table 2.

Table 2: NHL items located within the study area.

NHL Number	Name	Location
105888	Sydney Harbour Bridge	Bradfield Highway and North Shore Railway, Milsons Point/Dawes Point, NSW 2000

The Sydney Harbour Bridge was included on the NHL in 2007. The listing includes the bridge, pylons, constructed approaches, and parts of Bradfield and Dawes Point Parks. The NHL curtilage is the same as the SHR curtilage, except that the northern extent of the NHL listing ends at Lavender Street, Milsons Point, while the SHR curtilage ends at Blues Street, North Sydney.

Proposed development (or 'actions') that will have, or are likely to have, a 'significant impact' on the world heritage values of a declared World Heritage property (such as the Sydney Opera House), or on the National Heritage values of a National Heritage Place (such as the Sydney Harbour Bridge), must be referred to the Minister.

A 'significant impact' is defined as an action that has an important, notable consequence, dependent upon the sensitivity, value and quality of the environment that is impacted, and upon the intensity, duration, magnitude and geographic extent of the impacts. The *Commonwealth of Australia, Matters of National Environmental Significance: Significant Impact Guidelines 1.1* (Department of the Environment, 2003) state that an action is likely to have a significant impact on the National Heritage values of a place is there is a real chance or possibility that it will cause:

- One or more of the National Heritage values to be lost
- One or more of the National Heritage values to be degraded or damaged
- One or more of the National Heritage values to be notable altered, modified, obscured or diminished.

Figure 3: Sydney Harbour Bridge National Heritage List curtilage (Source: Commonwealth Department of Agriculture, Water and the Environment)

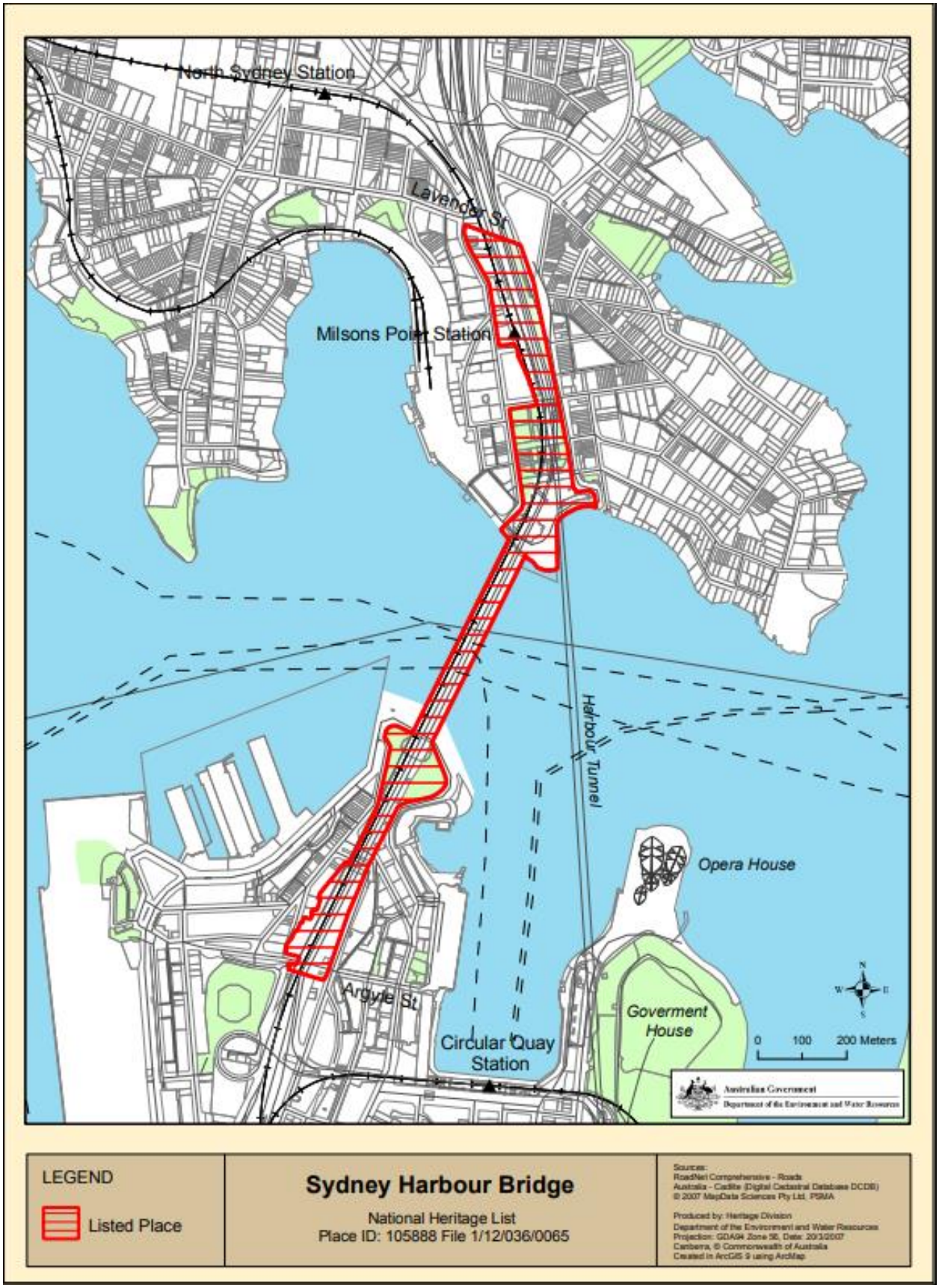

Figure 4: Sydney Harbour Bridge National Heritage List curtilage (Source: Commonwealth Department of Agriculture, Water and the Environment)

2.2.2 NSW Heritage Act 1977

The Heritage Act is the primary piece of state legislation affording protection to heritage items (natural and cultural) in NSW. Under the Heritage Act, 'items of environmental heritage' include places, buildings, works, relics, moveable objects, and precincts identified as significant based on historical, scientific, cultural, social, archaeological, architectural, natural or aesthetic values. State significant items can be listed on the NSW SHR and are given automatic protection under the Heritage Act against any activities that may damage an item or affect its heritage significance. The Heritage Act also protects 'relics', which can include archaeological material, features and deposits.

In some circumstances a Section 60 approval may not be required if works are undertaken in accordance with the Standard Exemptions for Works Requiring Heritage Council Approval (Heritage NSW, 2020) or in accordance with agency specific exemptions.

For this proposal, the standard exemptions are not applicable, and the proposal must be submitted to the NSW Heritage Council for approval under Section 60 of the Heritage Act.

There are two items listed on the SHR located within the study area. These items are shown in Table 3.

Table 3: SHR items located within the study area.

SHR Number	Name	Location
00781	Sydney Harbour Bridge, approaches and viaducts (road and rail)	Bradfield Highway and North Shore Railway, Milsons Point/Dawes Point, NSW 2000
01194	Milsons Point Railway Station Group	North Shore railway, Milsons Point, NSW 2061

Figure 5: **Sydney Harbour Bridge approaches and viaducts (Source: NSW Government, Heritage Management System)**

Figure 6: Milsons Point Railway Station Group (Source: NSW Government, Heritage Management System)

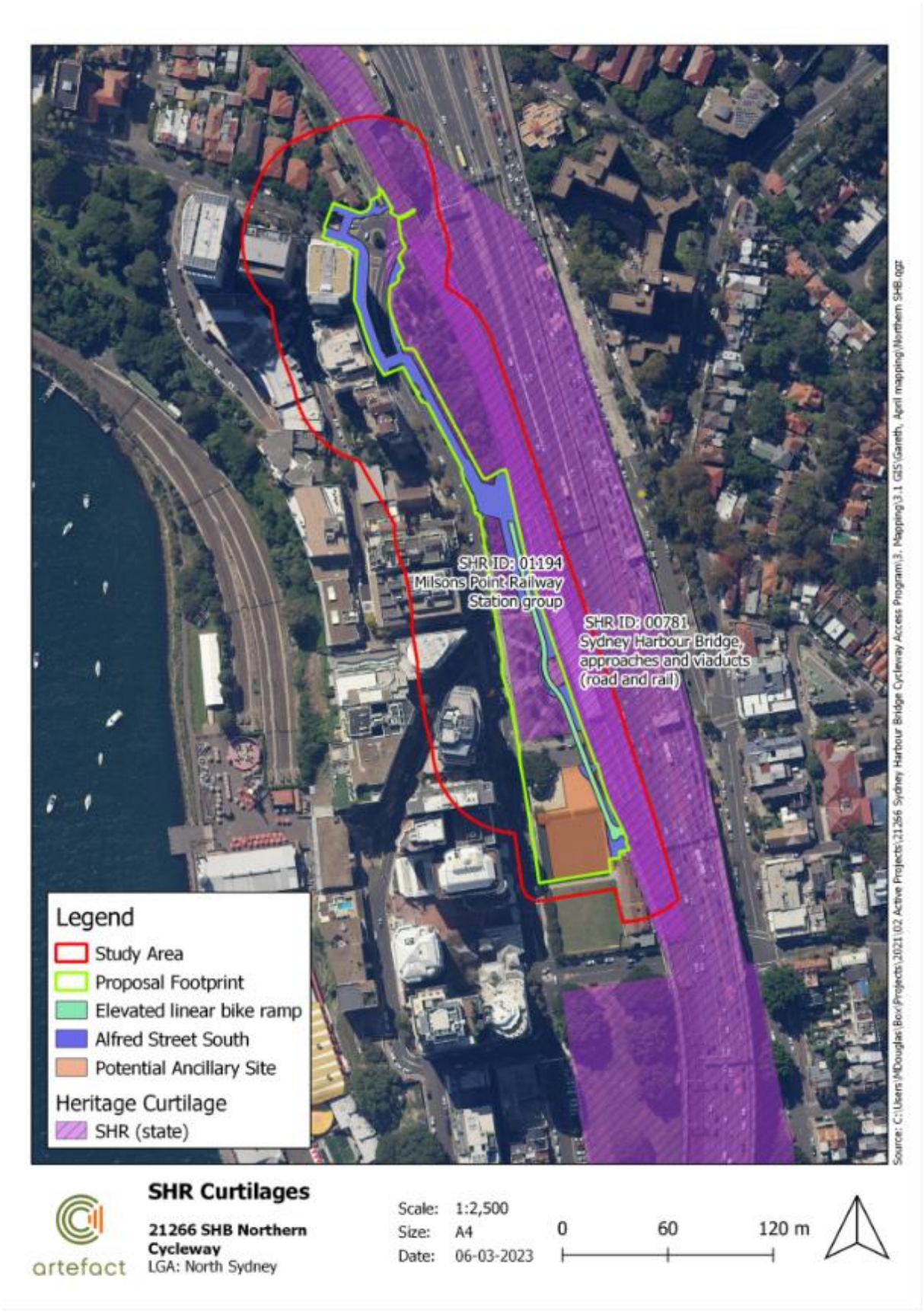

Figure 7: SHR curtilages (Artefact, 2022)

2.2.3 Conservation Management Plan

A Conservation Management Plan (CMP) for the Sydney Harbour Bridge was prepared in 2007 by Godden Mackay Logan for Transport for NSW. The report was revised in 2021 by GML Heritage and was endorsed by the Heritage Council of NSW in July 2021. The CMP is a comprehensive document in two volumes. Relevant policies in the CMP are included in section 8.8 of this SOHI.

The current Sydney Harbour Bridge CMP (volume 1) can be viewed at this link:

Sydney Harbour Bridge 2021 CMP

Volume 2 can be viewed at this link:

Sydney Harbour Bridge 2021 CMP Volume 2 Inventory Records

2.2.4 Transport Asset Holding Entity (TAHE) and Transport for NSW Section 170 Register

The Heritage Act requires all government agencies to identify and manage heritage assets under their ownership and control. Under Section 170 of the Heritage Act, government agencies must establish and keep a register which includes all items of environmental heritage listed on the SHR, environmental planning instruments or which may be subject to an interim heritage order that are owned, occupied or managed by that government body. Government agencies must also ensure that all items entered on its register are maintained with due diligence in accordance with *State Owned Heritage Management Principles* (Heritage Council, 2005) approved by the Minister on advice of the NSW Heritage Council. These principles serve to protect and conserve the heritage significance of identified sites, items and objects and are based on relevant NSW heritage legislation and statutory guidelines.

There are two items listed on S170 registers located within the study area. These items are shown in Table 4 and mentioned in this report for completeness. The fact that the items are listed on the S170 register does not create any additional external approval process other than what is already outlined in this report.

Table 4: s170 items located within the study area.

s170 register listing	Name	Location
Roads and Traffic Authority (now TfNSW) Section 170 Register No. 4301067	Sydney Harbour Bridge, approaches and viaducts	Bradfield Highway and North Shore Railway, Milsons Point/Dawes Point, NSW 2000
TAHE Section 170 Register No. 4801059	Sydney Harbour Bridge (Rail Property Only)	Arthur and Argyle Streets, Sydney, NSW 2000
TAHE Section 170 Register No. 4801026	Milsons Point Railway Station	Alfred Street, Milsons Point, NSW 2061

2.2.5 Environmental Planning and Assessment Act 1979

The *Environmental Planning & Assessment Act 1979* (EP&A Act) is administered by the Department of the Premier and Cabinet and provides planning controls and requirements for environmental assessment in the development approval process. The EP&A Act has three main parts of direct relevance to environmental cultural heritage. Namely, Part 3 which governs the preparation of

planning instruments, Part 4 which relates to development assessment process for local government (consent) and Part 5 which relates to activity approvals by governing (determining) authorities.

A REF is being prepared under Part 5, Division 5.1 of the EP&A Act to determine the potential environmental impacts of the proposal.

2.2.5.1 Local Environmental Plans (LEPs)

North Sydney Local Environmental Plan 2013

The North Sydney LEP is the applicable local planning instrument for the North Sydney LGA. The North Sydney LEP aims to make local environment provisions for land in North Sydney in accordance with relevant standard environmental planning instruments under Section 33A of the EP&A Act

The study area contains several locally listed heritage items. These items are listed in Table 5.

Table 5: LEP items located within the study area.

North Sydney LEP Number	Name	Location
I0538	Bradfield Park (including northern section)	Alfred Street South, Milsons Point
I0539	Milsons Point Railway Station Group	North Shore railway, Milsons Point, NSW 2061
I0530	Sydney Harbour Bridge approach viaducts, arches and bays under Warringah Freeway	Bradfield Highway and North Shore railway, Milsons Point/Dawes Point, NSW 2000

Table 6: Nearby heritage places (Milsons Point):

Suburb	Item	Address	Location	Listing	Place ID (Item No.)
Milsons Point					
Milsons Point	Alfred Street (entrance to Luna Park)	Alfred Street South	Intersection Alfred Street South, Dind Street and road reserve	Local	I0529
Milsons Point	Bradfield Park (including northern section)	Alfred Street South		Local	I0538
Milsons Point	Sydney Harbour Bridge north pylons	Bradfield Park, Alfred Street South		Local	I0541
Milsons Point	North Sydney Olympic Pool	4 Alfred Street South	Lot 100, DP 875048	Local	I0537
Milsons Point	House	22 Alfred Street South	SP 83350	Local	I0522
Milsons Point	House	24 Alfred Street South	SP 83350	Local	I0523
Milsons Point	House	26A Alfred Street South	Lot A, DP 437985	Local	I0525
Milsons Point	House	28 Alfred Street	Lot X, DP 403084	Local	I0526
Milsons Point	Camden House	48 and 56 Alfred Street South	SP 40513; Lot 102, DP 814884	Local	I0527
Milsons Point	Chinese Christian Church	100 Alfred Street South	Lot 14, DP 54205	Local	I0528
Milsons Point	Sydney Harbour Bridge approach viaducts, arches and bays under Warringah Freeway	Sydney Harbour Bridge and approach viaducts, including 2–44 Ennis Road and 32–76 Middlemiss Street		State	I0530
Milsons Point	Commercial building	2–2A Glen Street	Lot 1, DP 437535; Lot 3, DP 172924	Local	I0531
Milsons Point	Milsons Point Railway Station Group			State	I0539
Milsons Point	Seawall and wharf site		Lot 1, DP 849664	Local	I0540
Milsons Point	House	15 Northcliff Street	Lot 6, DP 223842	Local	I0532
Milsons Point	House	17 Northcliff Street	Lot 7, DP 223842	Local	I0533

Suburb	Item	Address	Location	Listing	Place ID (Item No.)
Milsons Point	House	19 Northcliff Street	Lot 8, DP 223842	Local	I0534
Milsons Point	House	21 Northcliff Street	Lot 9, DP 223842	Local	I0535
Milsons Point	Luna Park	1 Olympic Drive	Lots 2–4, DP 1066900; Lots 1247, 1250 and 1256–1258, DP 48514; Lots 10–12, DP 1113743	State	I0536

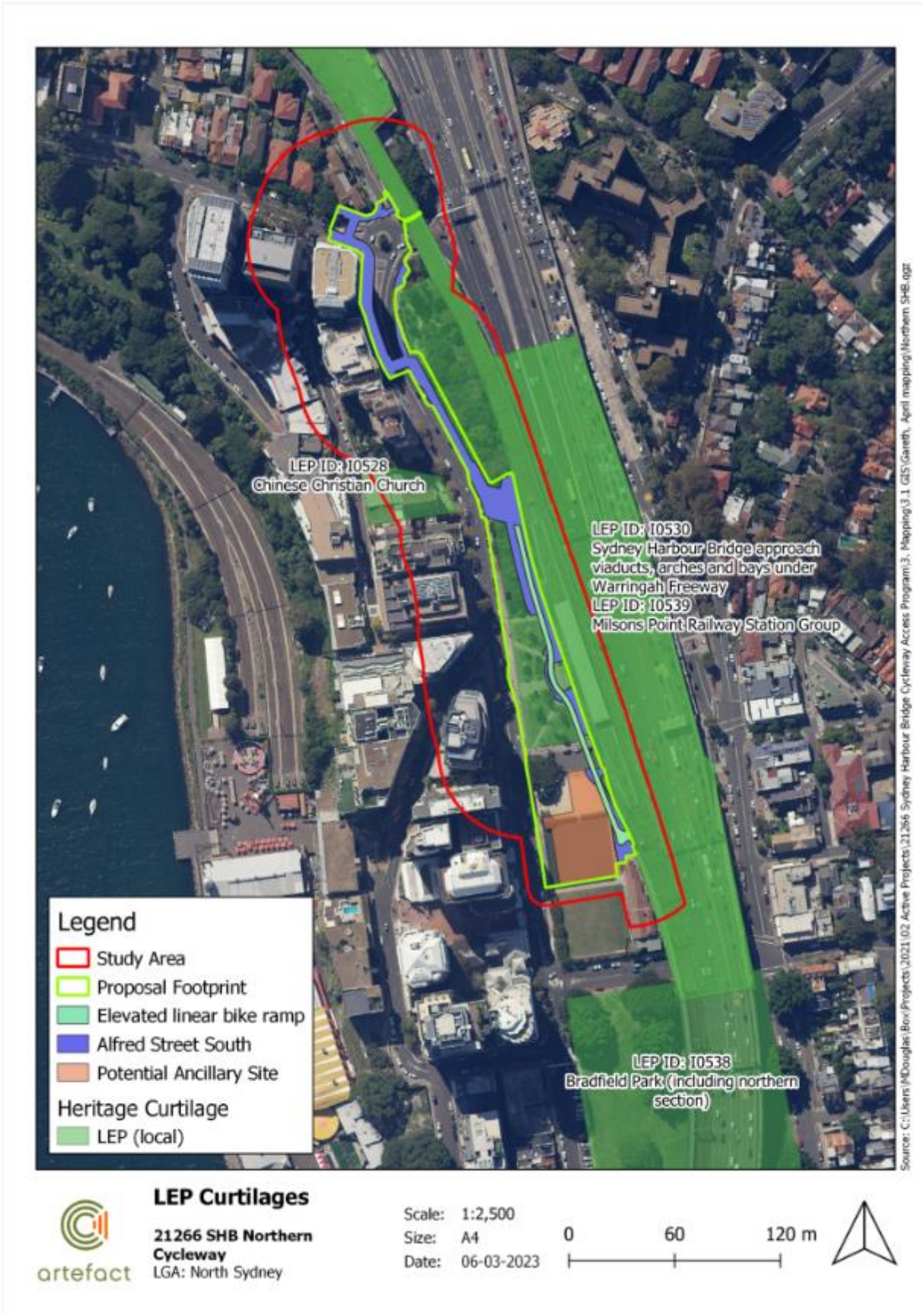

Figure 8: LEP curtilages (Artefact, 2022)

2.2.6 State Environmental Planning Policy (Transport and Infrastructure) 2021

State Environmental Planning Policy (Transport and Infrastructure) 2021 (the Transport and Infrastructure SEPP) aims to facilitate the effective delivery of transport and infrastructure across NSW.

The Transport and Infrastructure SEPP assists local government, the NSW Government and the communities they support, by simplifying the process for providing essential infrastructure in areas such as education, hospitals, roads and railways, emergency services, water supply and electricity delivery. The Transport and Infrastructure SEPP also guides consultation with Council depending on the level of heritage impact and the heritage listing.

The Transport and Infrastructure SEPP outlines the planning rules for these works and facilities, including:

- Where such development can be undertaken
- What type of infrastructure development can be approved by a public authority under Part 5 of the EP&A Act following an environmental assessment (REF) (known as 'development without consent')
- What type of development can be approved by the relevant local council, Minister for Planning or Department of Planning under Part 4 of the EP&A Act (known as 'development with consent')
- What type of development is exempt or complying development
- The relationship of other statutory planning instruments to the Transport and Infrastructure SEPP.

This SOHI will form part of a s60 application under Section 60 of the *Heritage Act 1977.*

2.2.7 State Environmental Planning Policy (Biodiversity and Conservation) 2021

The Sydney Harbour Bridge is included in the State Environmental Planning Policy (SEPP) (Biodiversity and Conservation) 2021 as Listing 67 – Sydney Harbour Bridge, including approaches and viaducts (road and rail).

The heritage provisions in relation to the Sydney Harbour Catchment are in Chapter 10.5 in the Biodiversity and Conservation SEPP. This outlines the protection of heritage items within the Sydney Harbour catchment area and what kinds of development can occur at or near a heritage item with or without consent from the relevant consent authority.

Division 3A also outlines the protections within the Sydney Opera House buffer zone, which includes the Sydney Harbour Bridge. These protections focus on the need for development to preserve views and vistas between the Sydney Opera House and other public places within that zone, to preserve the world heritage value of the Sydney Opera House, and to avoid any diminution of the visual prominence of the Sydney Opera House when viewed from other public places within that zone. This buffer zone is shown in Figure 9.

2.2.8 UNESCO World Heritage Convention

On 28 June 2007 the Sydney Opera House and buffer zone (including part of Sydney Harbour and the Sydney Harbour Bridge) was included on the UNESCO World Heritage List under the World Heritage Convention.

The Sydney Harbour Bridge Cycleway Northern Access Proposal is outside the buffer zone for the Opera House, therefore does not trigger referral in relation to this matter.

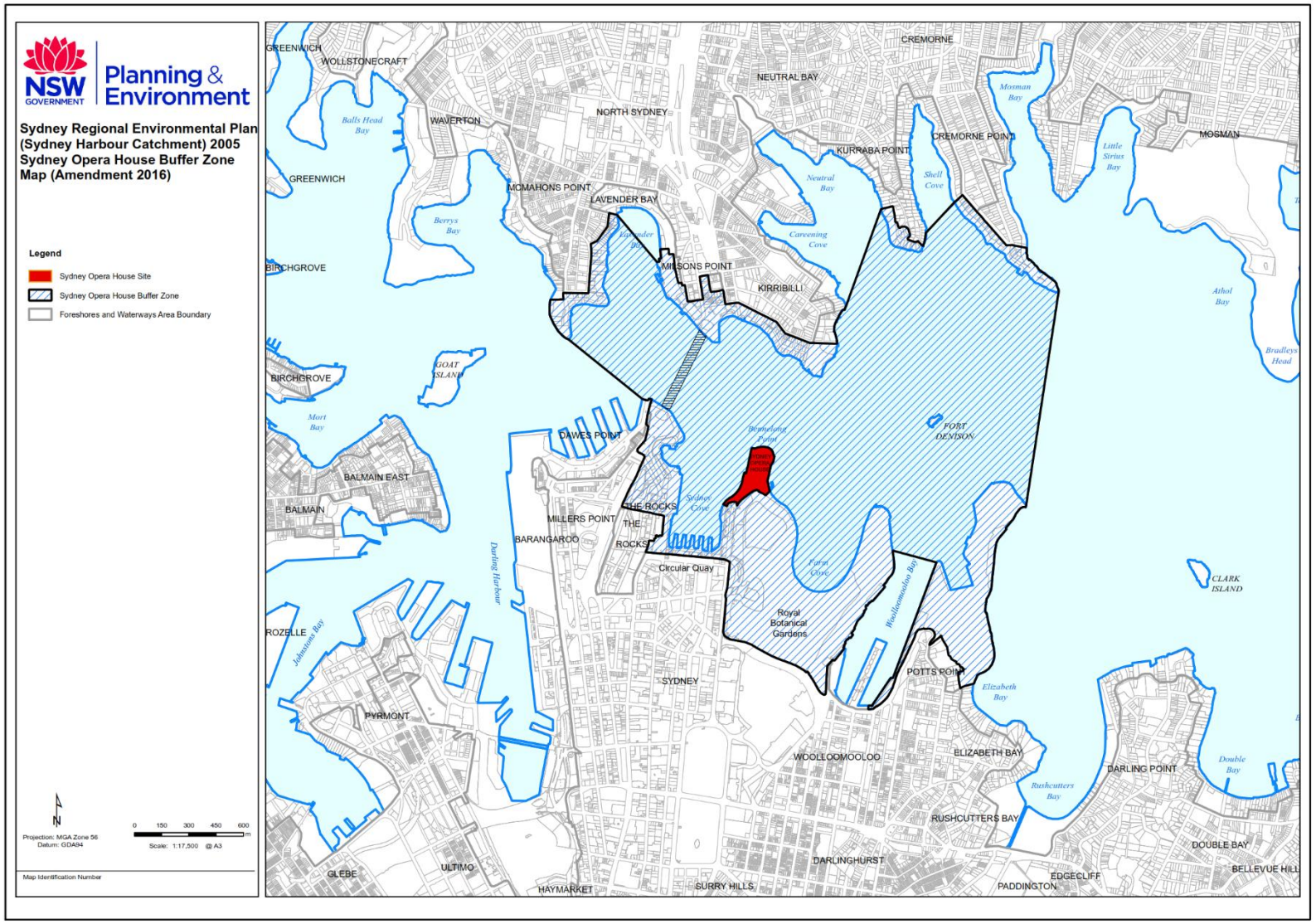

Figure 9: Buffer zone for Sydney Opera House world heritage listing (Source: SREP (Sydney Harbour Catchment), NSW Department of Planning & Environment

3.0 THE PROPOSAL

3.1 Preamble: Design refinement process leading to current elevated linear bike ramp proposal

The proposal, including the elevated linear bike ramp is shown in Section 3.2.

The proposal development process included investigations to improve connectivity, safety and access between the Sydney Harbour Bridge Cycleway and Milsons Point and has been ongoing since 1999, with about 30 options considered.

In late 2020, Transport began assessing feasible options to meet existing and future demands as an alternative to the existing step access to Sydney Harbour Bridge Cycleway, such as travelators and elevators, linear ramps and looped compact ramps. This process comprised a series of workshops informed by previously completed work, stakeholder feedback and further technical analysis with a strong commitment to design excellence.

As a result, 14 consolidated feasible options were shortlisted, leading to four ramp options which were deemed able to satisfy the minimum rideability requirements and met future capacity requirements. These four options were assessed against the proposal objectives and resulted in the selection of two shortlisted options (linear ramp and loop ramp).

The two shortlisted options were then refined to reflect past feedback received from Heritage NSW, Heritage Council, North Sydney Council, community groups and bicycle groups, aiming to minimise loss of open space, tree removal, impacts to the fabric of the Sydney Harbour Bridge values and fabric, while meeting customer's rideability objectives.

The refined linear and refined loop ramp options were put on public display in 2021 for three weeks to seek feedback and input from a wide range of community members and key stakeholder groups. Following community and stakeholder feedback, the linear ramp was considered the preferred option as it would manage bike rider and pedestrian conflict better by minimising cycle interactions on Burton Street and around Milsons Point Station. The linear ramp also resulted in a reduced footprint and a less bulky structure than the loop option.

The preferred option and details of the proposal's Design Excellence Strategy were presented to the Heritage Council Approvals Committee who also voiced support for a linear ramp and the design competition process. As part of the proposal's Design Excellence Strategy, a design competition process was held, and three linear options were developed by leading design teams.

This approach was developed to optimise the preferred option and ensure the highest standard of architectural, urban and landscape design for the proposal in a highly sensitive heritage setting.

The design excellence approach adopted for the proposal includes the following requirements:

- Sensitively respond to the heritage values articulated in the Statements of Significance fo the National Heritage Listing and the State Heritage Listing of the Sydney Harbour Bridge, and the State Heritage Listing of the Milsons Point Railway Station Group
- Embed Aboriginal design and cultural expression, revealing and celebrating the deep, rich history of Aboriginal people and stories relevant to this Country in all aspects of the proposal

- Be consistent with the Sydney Harbour Bridge Conservation Management Plan and other relevant heritage management documents (such as The Burra Charter, Design in Context, Better Design for Heritage etc.) applicable policies and proposal documents
- Assess what collateral benefits may be possible through integration and/or complementary forms
- Be capable of achieving design excellence in every aspect and be consistent with the Project Design Excellence Strategy
- Be innovative, creative, site-responsive, refined, elegant, slender and beautiful
- Minimise physical and visual impacts
- Embed measurable sustainability initiatives and benefits
- Minimise impacts on Milsons Point station forecourt and Bradfield Park public open spaces, trees and pedestrian movement, and 'touch lightly' on the landscape
- Integrate seamlessly with the public domain, proposed Alfred Street cycleway and desired landscape character including the Bradfield Park Masterplan
- Achieve the proposal objectives which are: to improve cycling mode share, reduce the number of safety incidents on the Sydney Harbour Bridge Cycleway, respect heritage and open space amenities and provide equity of access

The design selection process comprised three steps including community consultation, Design Jury assessment and tender assessment committee consideration.

Based on the Design Jury assessment and public feedback, a preferred design was selected by Transport for NSW tender assessment committee (Aspect Studios team design).

The design has since been further developed to fit into the heritage precinct as sensitively as possible, using sympathetic material and sensitive design, while minimising impacts to open space and tree loss. The ramp would incorporate ellipse columns and be aligned parallel to the bridge approach walls, so to not detract from the character and prominence of the Sydney Harbour Bridge. The ramp would also have an original and contemporary character, contrasting in form and detail with the heritage character of the bridge, it will be clearly identifiable as a new element and will not detract from the authenticity of the bridge character. While it would introduce a new built structure attached to the Sydney Harbour Bridge, the generally linear alignment, original and contemporary character would respect the character of the bridge features and Milsons Point Station.

A design statement was prepared by Aspect Studios and Design 5 in March 2023, in response to the specific feedback of Heritage Council Approvals committee. This statement is appended to this SOHI at Appendix A: Heritage Design Statement and provides evidence of the heritage-led design development of the cycleway.

As part of the design development, the detailed design refined the bike ramp's design to have minimal intrusion on views to the Sydney Harbour Bridge for park users, residents, commuters and visitors, and to ensure safety. It encompassed the refinement of the bike ramp in relation to its alignment to be generally matched to that of the Sydney Harbour Bridge viaduct, the balustrading along the length of the ramp, its geometry and landing with deference to the heritage of Milsons Point Station and Bradfield Park North setting. Key changes to the design are discussed in Table 7.

Table 7: Summary of design refinements for the concept design

Design refinements for the 30 per cent design:	
Design element	**Design refinement**
Bike ramp – viaduct offset	The bike ramp's alignment has been generally matched to that of the Sydney Harbour Bridge viaduct, such that infrastructure and movement are combined in a more simple, complementary and intuitive manner. This leaves the park open and uncluttered. The ramp's offset from the viaduct varies slightly along its length in response to varying design and site constraints across the proposal site. South of the Milsons Point station entry, the ramp generally adopts a three-metre offset from the viaduct in order to prevent the need for throw screens to the adjacent railway corridor. North of the station entry, this offset gradually tapers from three metres to 1.5 metres in order to reduce impacts and encroachment on Bradfield Park while maintaining required offsets for viaduct maintenance.
Bike ramp – balustrade	High quality balustrading along the length of the ramp has been incorporated in the concept design. The design of the balustrade would aim to minimise visual impact. The balustrade would incorporate lighting.
Bridge connection	The proposal includes the removal of approximately 8.4 metres of viaduct parapet to allow for the new cycleway ramp to connect to the existing Sydney Harbour Bridge Cycleway. The steel balustrade would now run all the way to the parapet. An 'island' would be provided in the middle of the connection (over the joint) to separate cyclists heading up and down the ramp and accessing the rest area. This dimension allows for safe passage of cyclists with due consideration for sight lines and turning movements, while reducing impacts to the heritage structure as much as practical.
Station entry arc	The bike ramp geometry adjusts with deference to the heritage of Milsons Point Station entry. The extent of the curve carefully traces the powerful park geometry on the ground plane. In doing so, the cycleway frames the access to Milsons Point Station and its forecourt, and subtly slows cyclists as they descend towards Bradfield Park North. The cycleway flattens out over the heritage awning to create an address which when viewed from Alfred Street South respects the established datums of the approach viaduct. This flat and curved section of ramp would facilitate both an easier journey for cyclists riding up the ramp in the southbound direction, as well as reducing speeds of cyclists travelling down the ramp in the northbound direction.
Bradfield Park North Landing	The proposal seeks to reduce impacts on the heritage park setting as much as practical, while providing a safe pedestrian and cyclist environment and embracing Country-led design opportunities. The proposal meets this objective by landing the cycleway close to the existing viaduct, set away from the eastern edge of Alfred Street South. A gathering space has been retained to provide space for pedestrians and park users to meet and congregate. Cyclists and Station Forecourt pedestrians are clearly separated wherever possible to reduce conflicts. The bike ramp landing in Bradfield Park North has been shortened by approximately 50 metres and would avoid impacts on all significant trees. This change would result in a very minor increase in travel time of approximately 20 seconds for the 20 per cent of cyclists traveling back south towards Burton Street (travelling at a comfortable cycling speed of 10 kilometres per hour).
Station Forecourt arc	A minor reconfiguration of the forecourt's pathways and garden beds next to the Sydney Harbour Bridge viaduct is proposed. The existing planting next to the viaduct would be removed, increasing the width of pavement to provide a footpath next to the base of the viaduct. This would return the alignment of the paths to their original location and also ensure the pathway is open to the sky, which would provide a pleasant pedestrian experience. The existing trees and plaza geometry would be retained. New pavement features, such as light and dark pavement zones and heritage stone inlays, would be incorporated with respect to the existing geometry to provide a seamless extension of existing elements.

Aspect Studios further engaged with leading heritage firm Design 5 Architects (lead by Alan Croker) to provide iterative specialist heritage advice. The 70 per cent detailed design is a result of the refinement and development of the design by Design 5 in collaboration with Aspect and Transport for NSW to minimise impacts on the Sydney Harbour Bridge fabric. Key changes to the design are discussed in Table 8.

Table 8: Summary of design refinements for the detailed design

Design refinements for the detailed design:	
Design element	**Design refinement**
-Bike ramp – Viaduct offset	The beginning of the abutment would adopt the same geometry of columns and would widen slightly more than the previous alignment to allow more accessibility for maintenance.
Bike ramp - Form and detail	The paving surface of the ramp would incorporate Aboriginal artwork with a paving pattern showing inter-connected and overlapping eels, and include the bronze centre line markings with various colour tones of granite.
Columns	Downpipes would be located within the middle of the columns which would allow for no break in the façade. Bronze trims would be adopted at the base of the columns in the plaza forecourt, with a pattern that talks to Country and tried treads would be required for maintenance to columns.
Bike ramp - Balustrade	The bump rail has been reduced and the hairpin balustrade has been extended to enclose the gap between the parapet and balustrade. The bump rail would be incorporated as a separate, independently element that appears to mirror the angle of the balustrade screen.
Connection to the Sydney Harbour Bridge	The tie in with the Sydney Harbour Bridge would be shifted around 3 metres north with a minor reduction in the ramp length. A 125 mm raised median, line marking, and different pavement finishes would be introduced in the middle of the upper connection platform of the ramp structure which would delineate cyclists to slow down or move to the side.
Removed 8.4 metre section of parapet	The 8.4 metre section of parapet that would be removed ~~would~~ is proposed to be relocated in line with the new cycle path at the end of the landing point and would be subject to heritage interpretation.
Ramp landing	The ramp landing is designed as a curve that would induce a turning movement to slow down cyclists
Relocation of bus stop	The in-lane bus stop has been removed from the design. The bus stop would remain in the current bus stop bay
Shared paths on Lavender Street	Due to space constraints on the northern side of Lavender Street, the separated walking and cycling facility would be reverted to a shared path on the northern side of the roundabout.
Lighting	LED lighting would be incorporated into the underside of the handrail and into the soffit. Three pole top lights would be installed at the land plaza standard with North Sydney Council requirements
Sandstone inlays	Sandstone inlays within Bradfield Park North would be updated in line with most recent surveys. The stone of the inlays at the ramp landing would be lifted and relayed at the correct grading levels of the ramp landing.

3.2 Early investigation works

The first phase of the proposed works at the Sydney Harbour Bridge include investigation works that are intended to assess the structural integrity of the bridge deck and parapet, as well as surveys of the landscape for tree roots and rock footings. The following would be included as part of the early works scope:

- 4 x Geotech boreholes, 120mm in diameter drilled up to an approximate depth of 10 metres
- Installation of standpipe within 1no borehole with gattic cover for groundwater testing
- 16 x slot trenching locations within Bradfield Park and landscape along Milsons Point Station entrance to identify known underground services and space-proof future installations. Slot trenches would be between 1 to 12 metres in length, 0.3-0.5 metres in width to a maximum depth of approximately 1.5 metres

- Tree root survey of mature trees in Bradfield Park North (involving targeted root potholing and investigations to nominated arborists specifications)
- 2 x horizontal core holes to investigate the parapet at the ramp connection point to the existing cycleway
- 3 x vertical core holes at the ramp connection point to investigate the concrete reinforcement of the cycleway at bridge deck level for the new connection

The works outlined as part of the Early investigation works package are consistent with the applications and methodologies for approved investigation works in the area in 2018 and 2023 for both Geotech boreholing and utilities investigations in Bradfield Park.

This SoHI has reviewed the following design plans which used the FJA Consulting Engineers plans prepared 15/7/2022 as a base:

Plan Number	Plan Title	Date and Issue	Prepared By
SHBCA-AURC-NWW-UT-DRG-0000001	Cover Sheet	17/03/2023	Downer and Aurecon
SHBCA-AURC-NWW-UT-DRG-0000002	Drawing Index	17/03/2023	Downer and Aurecon
SHBCA-AURC-NWW-UT-DRG-0000021	Utilities Layout Sheet 1 of 4	17/03/2023	Downer and Aurecon
SHBCA-AURC-NWW-UT-DRG-0000022	Utilities Layout Sheet 2 of 4	17/03/2023	Downer and Aurecon
SHBCA-AURC-NWW-UT-DRG-0000023	Utilities Layout Sheet 3 of 4	17/03/2023	Downer and Aurecon
SHBCA-AURC-NWW-UT-DRG-0000024	Utilities Layout Sheet 4 of 4	17/03/2023	Downer and Aurecon
SHBCA-AURC-NWW-UT-DRG-0000031	Utilities Conflict Register	17/03/2023	Downer and Aurecon

3.3 Detailed design, February 2023

This SoHI has reviewed the following design plans:

Table 9: Detailed design plans reviewed for this SOHI

Plan Number	Plan Title	Date and Issue	Prepared By
SHBMW 150520-ASPT-NWW-DU-DRG-000001	Cover Sheet	20/02/2023	Aspect Studios
SHBMW 150520-ASPT-NWW-DU-DRG-000002	Drawing Index	20/02/2023	Aspect Studios
SHBMW 150520-ASPT-NWW-DU-DRG-000003	Legend	20/02/2023	Aspect Studios
SHBMW 150520-ASPT-NWW-DU-DRG-000101	Existing Site Plan – Zone A	20/02/2023	Aspect Studios

Plan Number	Plan Title	Date and Issue	Prepared By
SHBMW 150520-ASPT-NWW-DU-DRG-000102	Existing Site Plan – Zone B	20/02/2023	Aspect Studios
SHBMW 150520-ASPT-NWW-DU-DRG-000103	Existing Site Plan – Zone C	20/02/2023	Aspect Studios
SHBMW 150520-ASPT-NWW-DU-DRG-000104	Existing Site Plan – Zone D	20/02/2023	Aspect Studios
SHBMW 150520-ASPT-NWW-DU-DRG-000201	Proposed Site Plan – Zone A	20/02/2023	Aspect Studios
SHBMW 150520-ASPT-NWW-DU-DRG-000202	Proposed Site Plan – Zone B	20/02/2023	Aspect Studios
SHBMW 150520-ASPT-NWW-DU-DRG-000203	Proposed Site Plan – Zone C	20/02/2023	Aspect Studios
SHBMW 150520-ASPT-NWW-DU-DRG-000204	Proposed Site Plan – Zone D	20/02/2023	Aspect Studios
SHBMW 150520-ASPT-NWW-DU-DRG-000301	General Arrangement Plan – Zone 1	20/02/2023	Aspect Studios
SHBMW 150520-ASPT-NWW-DU-DRG-000302	General Arrangement Plan – Zone 2	20/02/2023	Aspect Studios
SHBMW 150520-ASPT-NWW-DU-DRG-000303	General Arrangement Plan – Zone 3	20/02/2023	Aspect Studios
SHBMW 150520-ASPT-NWW-DU-DRG-000304	General Arrangement Plan – Zone 4	20/02/2023	Aspect Studios
SHBMW 150520-ASPT-NWW-DU-DRG-000305	General Arrangement Plan – Zone 5	20/02/2023	Aspect Studios
SHBMW 150520-ASPT-NWW-DU-DRG-000306	General Arrangement Plan – Zone 6	20/02/2023	Aspect Studios
SHBMW 150520-ASPT-NWW-DU-DRG-000307	General Arrangement Plan – Zone 7	20/02/2023	Aspect Studios
SHBMW 150520-ASPT-NWW-DU-DRG-000501	Alfred Street Sections	20/02/2023	Aspect Studios
SHBMW 150520-ASPT-NWW-DU-DRG-000502	Cycle Ramp Landing Sections	20/02/2023	Aspect Studios
SHBMW 150520-ASPT-NWW-DU-DRG-000503	Station Forecourt Section	20/02/2023	Aspect Studios
SHBMW 150520-ASPT-NWW-DU-DRG-000504	Alfred Street Detail Sections	20/02/2023	Aspect Studios
SHBMW 150520-ASPT-NWW-DU-DRG-000505	Alfred Street Detail Sections	20/02/2023	Aspect Studios
SHBMW 150520-ASPT-NWW-DU-DRG-000506	Alfred Street Detail Sections	20/02/2023	Aspect Studios
SHBMW 150520-ASPT-NWW-DU-DRG-000507	Alfred Street Detail Sections	20/02/2023	Aspect Studios

Plan Number	Plan Title	Date and Issue	Prepared By
SHBMW 150520-ASPT-NWW-DU-DRG-000508	Cycleway Ramp Detail Sections	20/02/2023	Aspect Studios
SHBMW 150520-ASPT-NWW-DU-DRG-000509	Cycleway Ramp Detail Sections	20/02/2023	Aspect Studios
SHBMW 150520-ASPT-NWW-DU-DRG-000510	Station Plaza Detail Sections	20/02/2023	Aspect Studios
SHBMW 150520-ASPT-NWW-DU-DRG-000601	Details – Hardworks	20/02/2023	Aspect Studios
SHBMW 150520-ASPT-NWW-DU-DRG-000620	Details – Custom Artwork	20/02/2023	Aspect Studios
SHBMW 150520-ASPT-NWW-DU-DRG-000621	Details Custom Furniture	20/02/2023	Aspect Studios
SHBMW 150520-ASPT-NWW-DU-DRG-000651	Details – Softworks	20/02/2023	Aspect Studios
SHBMW 150520-ASPT-NWW-DU-DRG-000701	Details – Fixtures	20/02/2023	Aspect Studios
SHBMW 150520-ASPT-NWW-DU-DRG-000751	Planting Plan – Zone 1	20/02/2023	Aspect Studios
SHBMW 150520-ASPT-NWW-DU-DRG-000752	Planting Plan – Zone 2	20/02/2023	Aspect Studios
SHBMW 150520-ASPT-NWW-DU-DRG-000753	Planting Plan – Zone 3	20/02/2023	Aspect Studios
SHBMW 150520-ASPT-NWW-DU-DRG-000754	Planting Plan – Zone 4	20/02/2023	Aspect Studios
SHBMW 150520-ASPT-NWW-DU-DRG-000755	Planting Plan – Zone 5	20/02/2023	Aspect Studios
SHBMW 150520-ASPT-NWW-DU-DRG-000756	Planting Plan – Zone 6	20/02/2023	Aspect Studios
SHBMW 150520-ASPT-NWW-DU-DRG-000757	Planting Plan – Zone 7	20/02/2023	Aspect Studios
SHBMW 150520-ASPT-NWW-DU-DRG-000760	Planting Schedule	20/02/2023	Aspect Studios
Final Version A	Sydney Harbour Bridge Cycleway Northern Access Project: Detailed Design Report	23/02/2023	Aspect Studios
SHBMW 150520-ASPT-NWW-FN-DRG-000100	Legend, Key plan and Drawing List	20/02/2023	Electrolight
SHBMW 150520-ASPT-NWW-FN-DRG-000101	Southern Connection Proposed Plan	20/02/2023	Electrolight
SHBMW 150520-ASPT-NWW-FN-DRG-000102	Central Ramp Proposed Plan	20/02/2023	Electrolight

Plan Number	Plan Title	Date and Issue	Prepared By
SHBMW 150520-ASPT-NWW-FN-DRG-000103	Northern Ramp Landing Proposed Plan	20/02/2023	Electrolight

The following is a montage of images and urban design plans which have been developed as part of the 70 per cent detailed design. This graphical information reveals the visual impact of the proposed elevated linear bike ramp from above and from street level.

These montages represent the detailed design, as current in February 2023.

Figure 10: Aerial axonometric of the proposed cycleway ramp (Source: Aspect, 2023)

Figure 11: View to the cartouche from the edge of the forecourt (Source: Aspect, 2023)

Figure 12: View from west side of Alfred Street of the proposed elevated linear bike ramp (Source: Aspect, 2023)

Figure 13: View of the proposed gathering space and ramped landing adjacent Alfred Street (Source: Aspect, 2023)

Figure 14: View north along Alfred Street towards the proposed pedestrian and cycleway crossing (Source: Aspect, 2023)

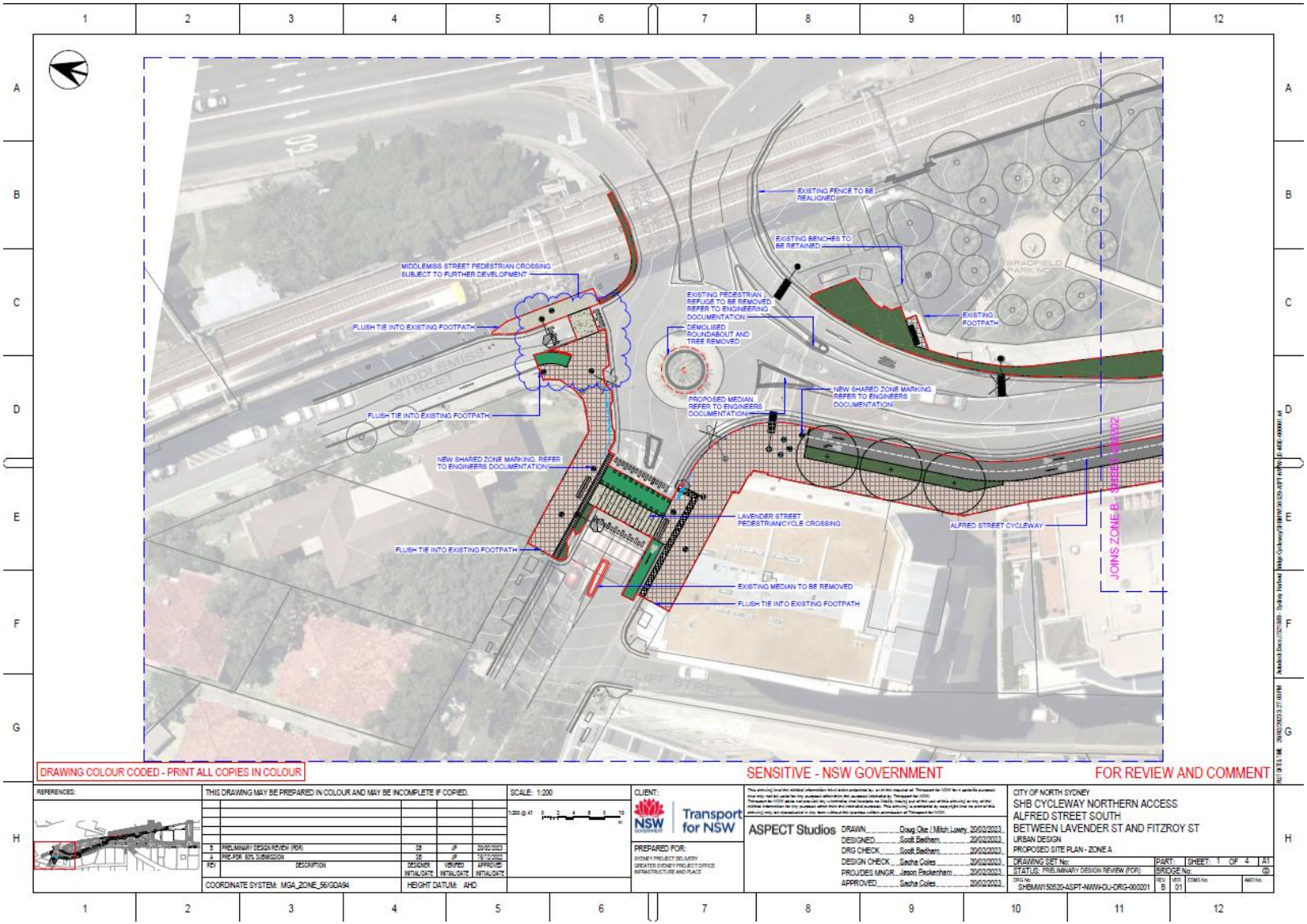

Figure 15: Proposed Site Plan – Zone A (Source: Aspect, 2023)

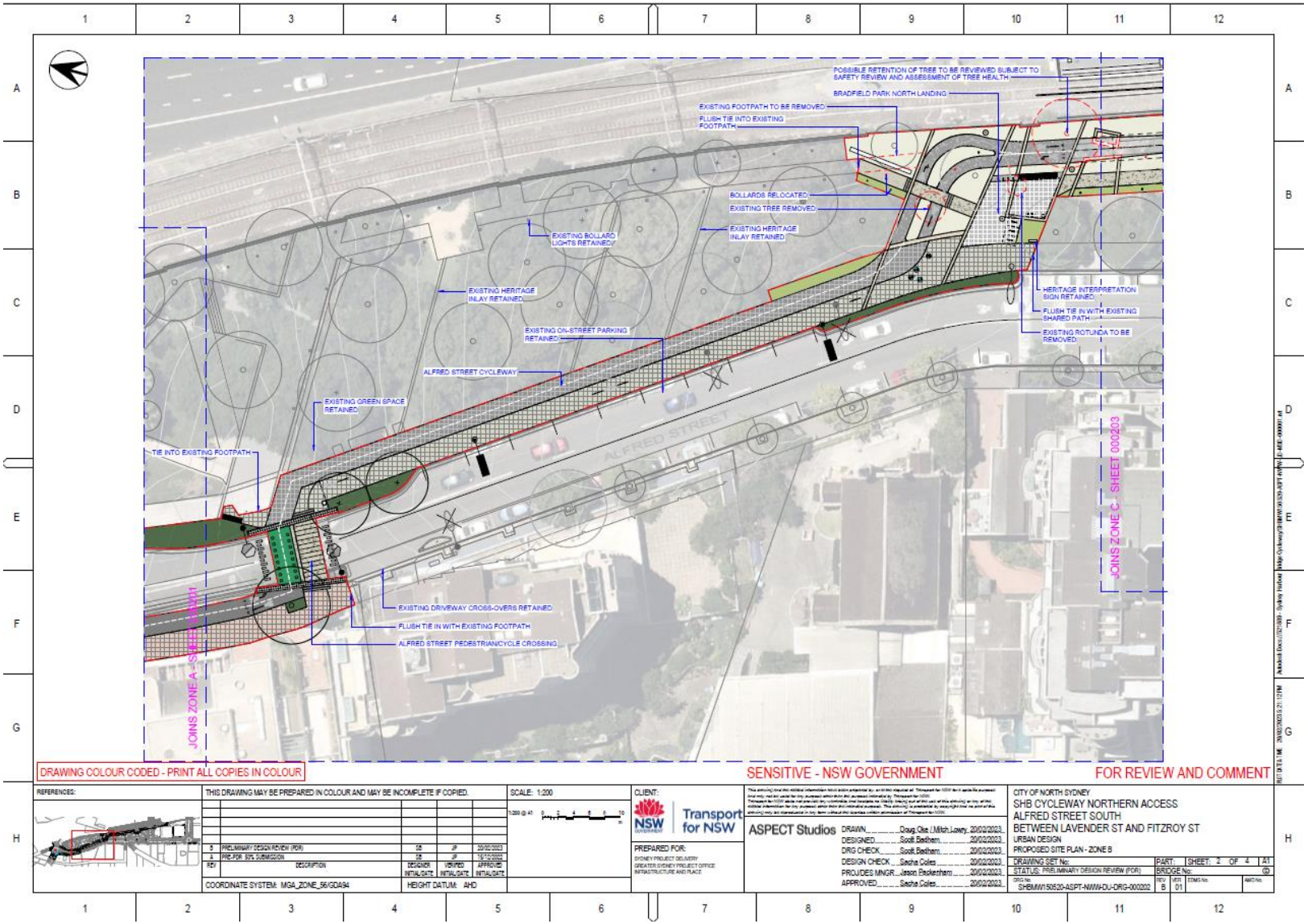

Figure 16: Proposed Site Plan – Zone B (Source: Aspect, 2023)

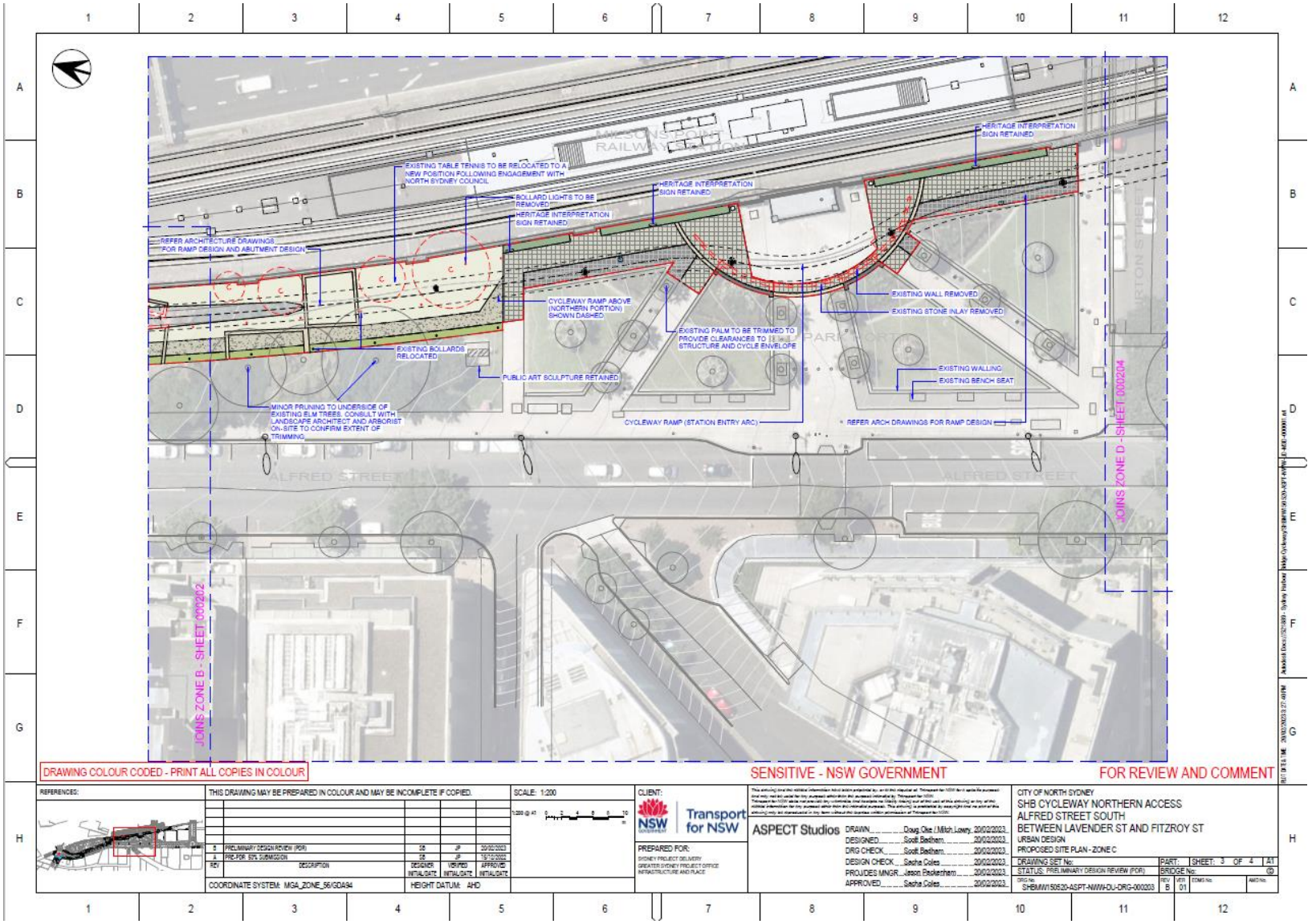

Figure 17: Proposed Site Plan – Zone C (Source: Aspect, 2023)

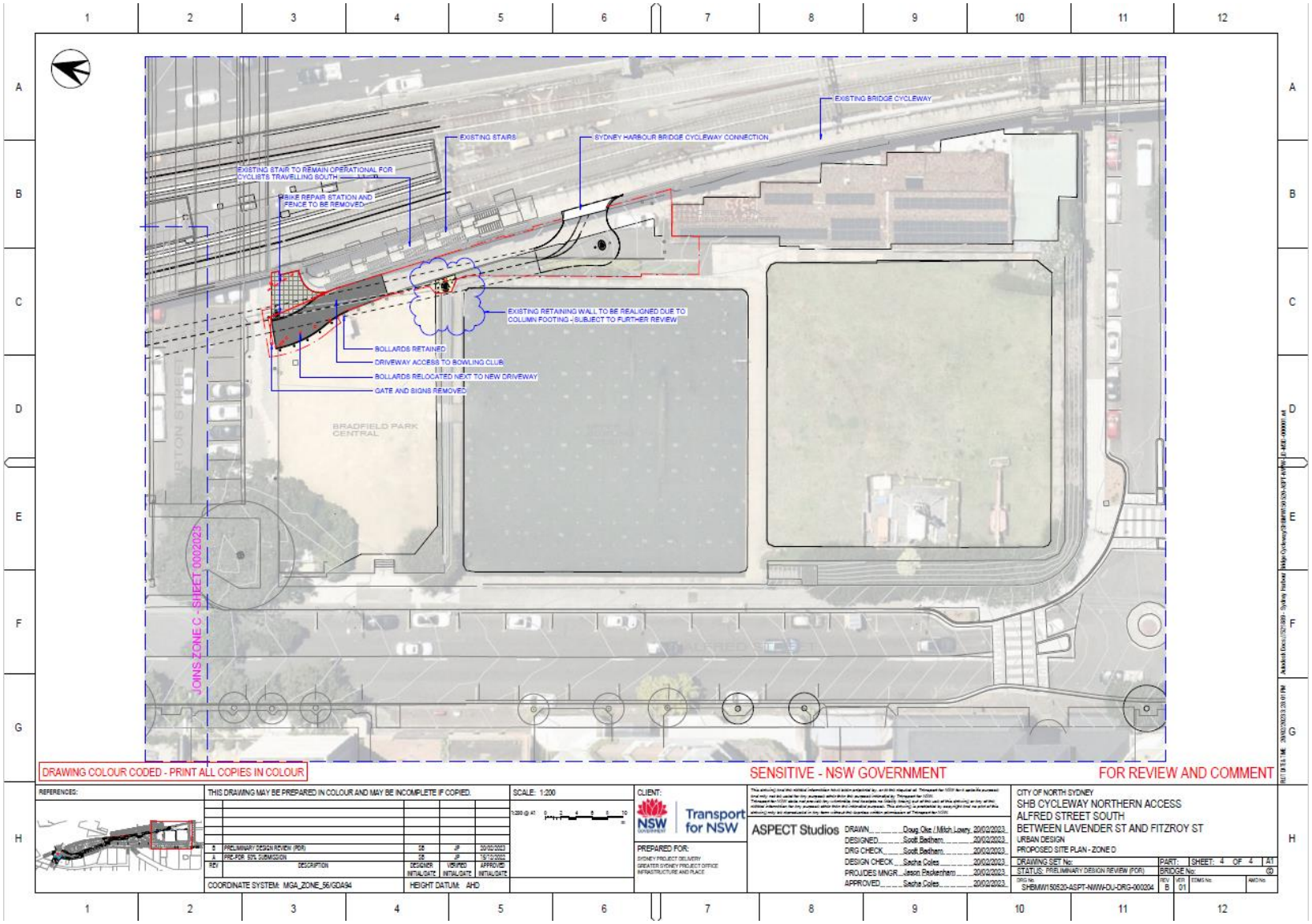

Figure 18: Proposed Site Plan – Zone D (Source: Aspect, 2023)

The detailed design includes the following central elements and approaches, which are consistent with the approved concept design:

- "Designing with Country" including recognising the Sydney Harbour Bridge as a crossing between Gadigal and Cammeraygal Country
- Respecting the heritage values of the Sydney Harbour Bridge including for example, recognising in the design the sweep of the bridge approach and the arch of the span
- Opening (retaining) most of Bradfield Park for public use
- Balancing (minimising) the visual impacts of the new structure by placing it to the east (close to the bridge approach) and extending the cycleway to the north of the station plaza
- Privileging existing users (pedestrians) and minimising conflicts
- Shortening the ramp as much as possible to reduce open space and heritage impacts but still ensuring the ramp gradient is accessible to a range of cycle users
- Use of enduring materials and a design that is "beautiful" and "light"
- Recognising Bradfield Park as a "key open space" with heritage status, including keeping the park open and uncluttered, and retaining the legibility of key focal points in the park (e.g. the Milsons Point Railway Station entrance and the key plantings)

3.4 Elevated linear bike ramp works

A new elevated linear bike ramp, with deck about three metres wide and about 200 metres in length between the Sydney Harbour Bridge Cycleway and Bradfield Park North including:

- Steel ramp structure with deck incorporating Designing with Country motifs, and balustrade with integrated lighting
- Precast columns carefully sited within Bradfield Park North and Central
- Provision of a bike riders rest area next to the Sydney Harbour Bridge Cycleway connection
- A gathering space , lighting and cycle path within Bradfield Park North connecting the elevated linear bike ramp and the proposed Alfred Street South cycle path

3.5 Alfred Street south cycle path and associated works

The Alfred Street South pedestrian and cycle path upgrade would include:

- New 2.5-metre-wide two-way cycle path on Alfred Street South from the ramp landing, linking to the existing bike network in Middlemiss Street. The cycle path would be located on the east side of Alfred Street South between the ramp landing and the new street crossing at 110 Alfred Street South. On the west side of Alfred Street South the cycle path would be located between the new crossing and Lavender Street
- Replacement of the existing pedestrian refuge crossing at the north end of Alfred Street South with a pedestrian and bike rider crossing located near 110 Alfred Street South and an upgrade to the pedestrian crossing at Lavender Street
- Low speed shared path and verge widening on the north side of Lavender Street

- Adjustments to the Lavender Street roundabout
- New street tree planting, shrub planting and footpath paving
- Relocation of the existing bus stop on Alfred Street South near Lavender Street, about 60 metres to the south of its current location
- Permanent removal of up to 15 parking spaces along Alfred Street South.

The proposal, would also include, but not be limited to:

- Kerb and pavement work, and line marking
- Drainage and utility adjustments
- Street furniture adjustments
- Changes to street parking, parking meter locations and regulatory signage
- Minor lighting upgrades to Bradfield Park North and in other locations where required to meet safe lighting standards.

4.0 HISTORICAL BACKGROUND

4.1 Development of Milsons Point and Kirribilli

The pre-contact history is addressed in a companion report for the proposal. The post-contact history of what is now Bradfield Park dates to 1800, when the area comprised part of a land grant to Robert Ryan (HLA Envirosciences, 2003). Little to no evidence exists of subdividing or farming taking place in present-day Kirribilli until 1806, when prominent merchant Robert Campbell purchased the grant (Sydney Morning Herald, 1950). In 1822, the whole area was leased to James Milson, the first European to permanently settle in the Kirribilli area and after whom Milsons Point is now named. Milson kept cattle and grew various crops on the land and the property remained undisturbed until the late 1820s, with no records of subdivision, lease or development in existence.

Following the death of Robert Ryan in 1846, George Campbell took over the ownership of the site. Subdivision and sale of the land during the 1850s resulted in the development of Milsons Point Wharf and Lane Cove Road (Alfred Street) in 1861. Development in the area increased after the establishment of the North Shore Steam Ferry Company that year and facilitated the consolidation of the road network and services in the area. Urban development continued in the area in the decades that followed, with working class terrace housing taking effect in the Milsons Point area until construction of the Sydney Harbour Bridge northern approaches in 1924 (HLA Envirosciences, 2003).

4.2 Sydney Harbour Bridge

As early as 1815, Francis Greenway had suggested to Governor Macquarie that a bridge be constructed across the harbour, and throughout the nineteenth century various proposals were made for such a bridge. Tenders were eventually called for the design of a bridge in 1923, with specifications set out by J.J.C Bradfield, who had been appointed as Chief Engineer, Sydney Harbour Bridge, City Transit and Metropolitan Railway Construction. Bradfield recommended the arch design of the English firm Dorman Long & Co Ltd, which was accepted by the Government in March 1924 (GML, 2007).

During the early 1920s, hundreds of buildings on either side of the harbour were resumed and demolished to construct the bridge and approaches (Figure 19 to Figure 23). A total of 438 houses were demolished and the reclamation works that followed resulted in a more usable foreshore. In 1924, construction of the northern approaches commenced, with the tipping of soil from the North Sydney railway site and tunnels to form a ramp up to the start of the bridge. Concrete walls were constructed along Broughton Street, Alfred Street, Bradfield Highway and Pacific Highway, and reinforced concrete arched bridges were completed at Fitzroy Street, Burton Street, Lavender Street and Arthur Streets between 1928 and 1929 (HLA Envirosciences, 2003). Construction of the bridge continued until 1932.

The construction of the approaches of the Sydney Harbour Bridge also included the construction of the railway infrastructure. From 1929 to 1932, Milsons Point Railway Station Group was constructed at the northern approach. The station was originally called Kirribilli Station, however, prior to its completion and opening it was renamed Milsons Point. Construction of the Sydney Harbour Bridge finished in January 1932, and in February the bridge was test loaded. At the time of its completion, the Sydney Harbour Bridge was the largest structure in Sydney. It was officially opened on 19 March 1932 by Premier Jack Lang, followed by a parade over the bridge (GML, 2007).

Figure 19: Photograph of dwellings on Burton Street, Milsons Point prior to resumption for the construction of the Sydney Harbour Bridge, circa early 1920s. (Source: State Library NSW)

Figure 20: Side view of dwelling at 129 Alfred Street, 1926, resumed for Sydney Harbour Bridge (Source: North Sydney Council)

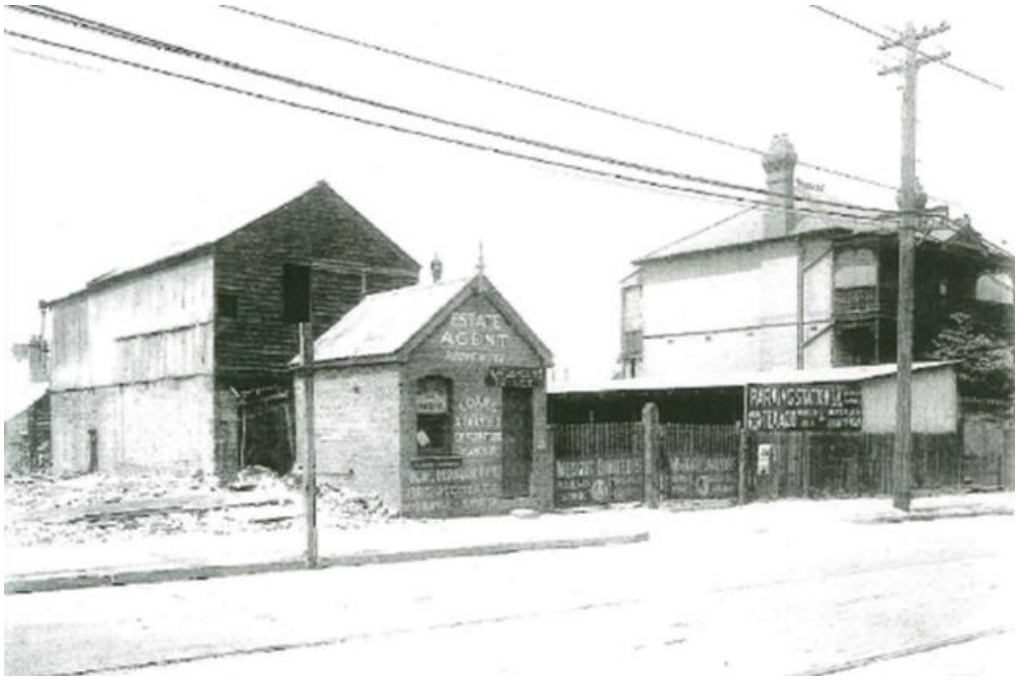

Figure 21: Structures at 121 Alfred Street, 1926, resumed for the Sydney Harbour Bridge (Source: North Sydney Council)

Figure 22: Historical photograph of construction of Sydney Harbour Bridge showing building extant within study area at the time (prior to demolition), 1930s. (Source: North Sydney Council)

Figure 23: Construction of Sydney Harbour Bridge showing several buildings extant within the study area prior to demolition, circa 1920s (Source: North Sydney Council).

4.3 Establishment of Bradfield Park

In 1932, following completion of the Sydney Harbour Bridge, the northern approach area was named after Dr J.J. Bradfield, chief engineer for the bridge construction. In 1934, a comprehensive plan for the layout of the park was adopted. Despite large scale rehabilitation plans, early work on the park was restricted to general clearing, and initial plantings (HLA Envirosciences, 2003). In 1934, the planned rockery garden at the northern portion of the park was completed.

In 1935, North Sydney Council purchased approximately 14 acres of land beneath the newly completed Sydney Harbour Bridge (HLA Envirosciences, 2003). During World War Two, Bradfield Park was temporarily used by the Royal Australian Air Force for use as a mobilisation and demobilisation depot. At this time, several huts were established on the site and were later removed. After World War Two, Bradfield Park became a reception centre for migrants from Europe. In 1980, a report on Bradfield Park by George Wellings Smith & Co described the northern section as giving a sense of 'almost depressive enclosure' due to the high-rise buildings and traffic noise, and as being 'primarily a lawn type with comparatively few trees' some benches and tables at the northern end (HLA Envirosciences, 2003).

In 2003, Bradfield Park North was significantly upgraded with substantial landscaping works. During the works, archaeological excavations uncovered footings and remains of houses and other structures that existed on the site prior to the construction of the Sydney Harbour Bridge. Upgrade works involved installation of new paving and lighting, stormwater, drainage, and irrigation works, plantings, and provision of park furniture. The grassed entrance to Milsons Point Station was reconfigured as a paved plaza area, featuring stone-clad seating walls, and raised lawn areas with feature plantings (Artefact Heritage, Roads and Maritime, 2015).

Figure 24: Bradfield Park towards Alfred Street following construction of the Sydney Harbour Bridge, 1937 (Source: North Sydney Council).

4.4 Development of the study area

Prior to the construction of the Sydney Harbour Bridge northern approaches, the study area was originally part of a land grant provided to multiple landowners before being granted to Robert Campbell, followed by James Milson.

Development in the area increased after the establishment of the North Shore Steam Ferry Company in 1861. This facilitated the construction of a formalised road network and services, including the establishment of Alfred Street in 1861. By 1868 there were several dwellings located within the study area along with several cottages and residences along the eastern side of Alfred Street. The road network within the study area comprised Alfred Street and Milson Street to the east, intersected by Willoughby Street to the north, and Burton Street and Fitzroy Street to the south.

By 1891, cottages, terraces, and freestanding residences can be seen in a block plan of the area, revealing significant development along the eastern side of Alfred Street (State Records NSW, 1904). These structures were largely associated with the working-class community of Milsons Point, comprising a mix of commercial and residential dwellings (Sands Directory, 1886). Archival images from the c1890s reveal that many structures within the study area were built on stone foundations due to the topography of the land along Alfred Street towards the harbour below. A tramline was also in use along Alfred Street by the 1890s.

There appears to have been limited or no further development within the study area between the turn of the century and the commencement of construction for the bridge and approaches. The study area was resumed by the government, the workers terraces and cottages demolished, and the immediate area excavated for the construction of the retaining wall of the Sydney Harbour Bridge northern approaches. In 1934, the rockery garden was completed at the northern section of Bradfield Park. In 1935, North Sydney Council purchased approximately 14 acres of land beneath the newly completed Sydney Harbour Bridge (HLA Enviroscienses, 2003). In 2003, Bradfield Park North was significantly upgraded with substantial landscaping works.

4.5 Milsons Point Railway Station

Milsons Point Railway station originally opened at Lavender Bay in 1893. The original location provided direct access to ferries and the one-time terminus of the North Shore railway line. This was an earlier station serving the Hornsby to Milsons Point line (Figure 25). Prior to the construction of the Sydney Harbour Bridge there was no rail line crossing the harbour linking northern and southern Sydney. Milsons Point Railway Station had two temporary locations during construction of the Harbour Bridge before opening at its current location in 1932. One of the original locations is now one of the Sydney Harbour Bridge's northern pylons (Dictionary of Sydney).

First work on the bridge commenced in 1924 with construction of the bridge approaches and the approach spans. Construction of the approach spans was undertaken concurrently with erection of the steelwork for the actual bridge structure. The building of the approaches on the north side included the construction of North Sydney Station, Milsons Point Station and a number of underbridges to carry the railway. The approaches were designed and built by the Sydney Harbour Bridge Branch of the Public Works Department and the Metropolitan Railway Construction Branch of the NSW Government Railways. The northern approaches were built using spoil from the excavation of the North Sydney station site to build a ramp up to the main bridge level. Retaining walls of concrete, built by Monier Concrete, were built along Broughton and Alfred Streets and Bradfield and Pacific Highways.

Concrete had been extensively used for foundations and walls since the 1890s. By 1910 reinforced concrete was in use, but not for superstructures directly supporting railway tracks. The Bellevue Street underbridge at Glebe was the first to use it for this purpose, in 1919.

The Milsons Point station was constructed between 1929 and 1932 as part of the northern approaches. It was initially called Kirribilli Station but was changed to Milsons Point before its opening. By June 1931 the station platform had been completed and a portion of the platform awnings had also been erected. The railway decking had advanced as far as Milsons Point, tracks had begun to be laid and the transoms delivered for installation. By January 1932 the platforms had been covered with asphalt, the brickwork of the shops in the arcade below the station was completed as was the tiling, the laying of magnesite flooring in the station office, terrazzo flooring in the lavatories, the erection of the metal awnings at the Alfred Street and Broughton Street entrances, terracotta facing to the station and installation of gates and barriers. Trackwork was completed and ballast laid along the tracks at the same time.

On 19 March 1932 the Milsons Point station was officially opened as part of the larger bridge opening celebrations to roadway, railway and pedestrian traffic by the then premier of NSW, JT Lang. (State Heritage Inventory)

Milsons Point Railway Station was added to the New South Wales State Heritage Register on 2 April 1999.

Figure 25: Original Milsons Point Railway Station (used for north shore train services only), date unknown (Source: State Library of New South Wales [Home and Away - 35108])

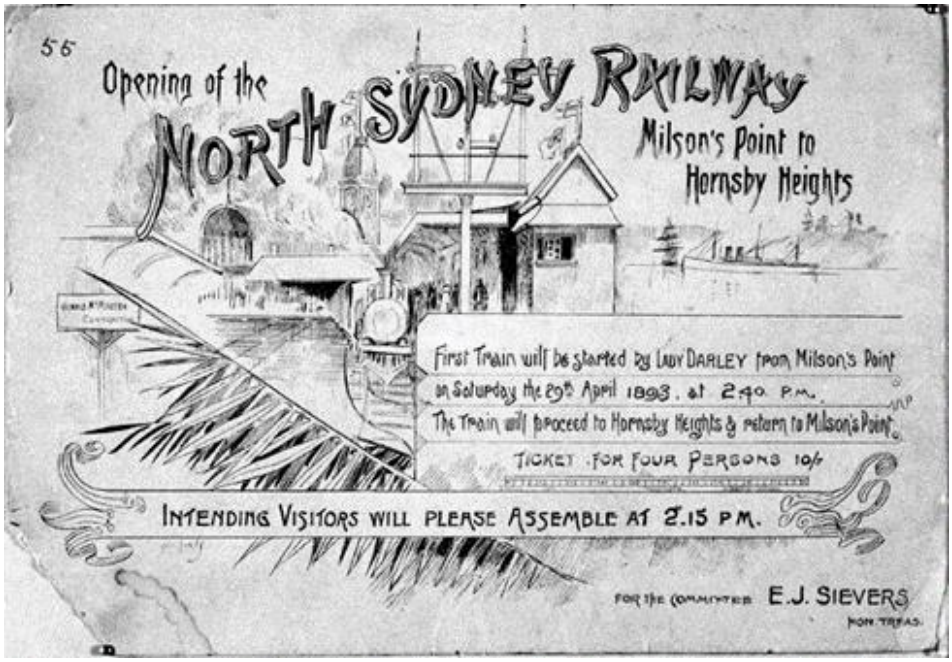

Figure 26: "Opening of the North Sydney Railway", 1893. This was for the first station at what is now Milsons Point Railway Station, for services only on Sydney's North Shore (Source: National Archives of Australia [C4076:HN126])

Figure 27: Aerial view south over Milsons Point showing Sydney Harbour Bridge, 1963. (Source: National Library of Australia)

5.0 SITE DESCRIPTION

5.1 Introduction

The southern section of study area comprises a combination of parking spaces, a formal plaza, and bowling club to the west of the Sydney Harbour Bridge northern approaches and Milsons Point Station, within Bradfield Park Central and Bradfield Park South. The northern section of the study area (Bradfield Park North) contains an open park space featuring a large group of old Western Australian Peppermint Trees or Willow-Myrtle trees (*Agonis flexuosa*), park furniture, formal paved areas, and interpretative signage. The interpretive elements reveal the location of houses and other structures removed prior to the construction of the Sydney Harbour Bridge. The central area of the park, near the entrance to the railway station, includes a diagonal sandstone kerb edged with a concrete gutter: a remnant of the kerbing that edged Willoughby Street prior to construction of the Sydney Harbour Bridge. The central portion of the study area also features a grassed area near the entrance to a paved plaza in front of the Milsons Point Railway Station entrance.

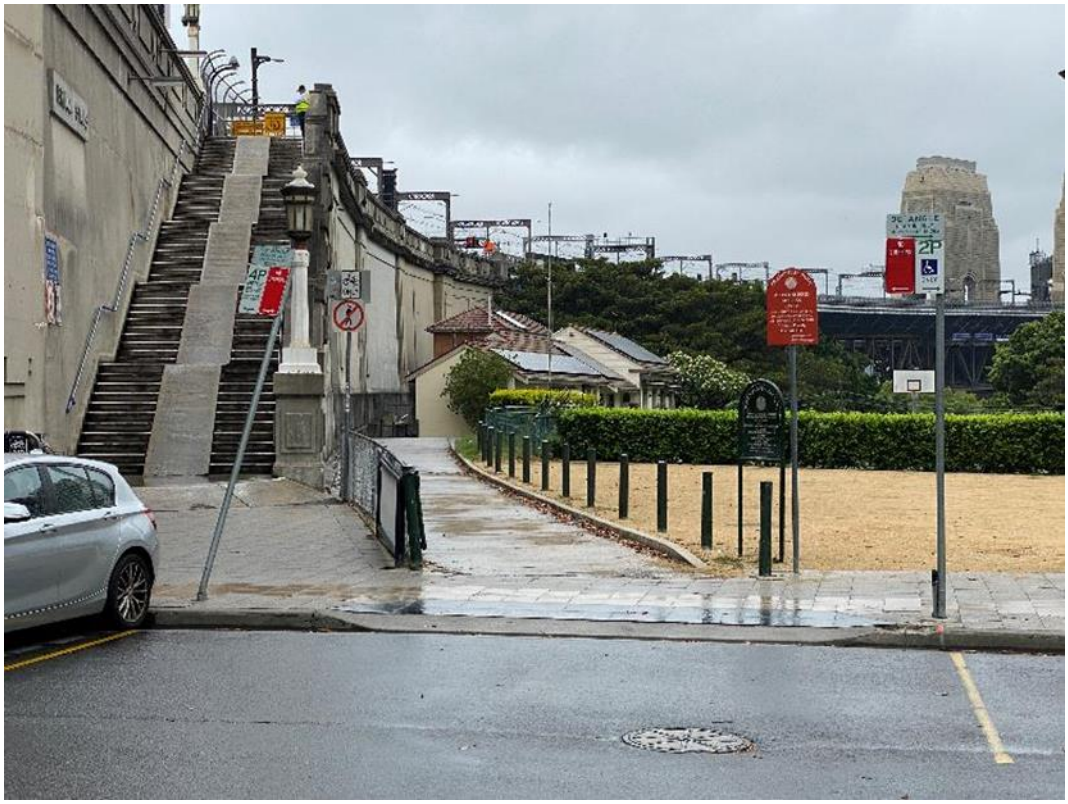

Figure 28: Location of current cycle route including stairs used by cyclists (Artefact, 2021)

5.2 Visual site inspection

An inspection of the study area was conducted by Scott MacArthur (Principal) on 18 January 2022. During the site inspection, observations were made about the overall intactness of the study area.

The study area was traversed on foot and photographs were taken of local features, identified views and structures (shown in Figure 29 to Figure 55).

Figure 29: Bradfield Park: View looking south towards the entrance to Milsons Point Railway Station and Bradfield Park Central (Artefact, 2021)

Figure 30: Bradfield Park Central: paved area near entrance to Milsons Point Railway Station (Artefact, 2021)

Figure 31: Bradfield Park Central: paved area near entrance to Milsons Point Railway Station (Artefact, 2021)

Figure 32: Bradfield Park Central: entrance to Milsons Point Railway Station from Alfred Street South (Artefact, 2021)

Figure 33: Bradfield Park Central: cycleway stairs in background (Artefact, 2021)

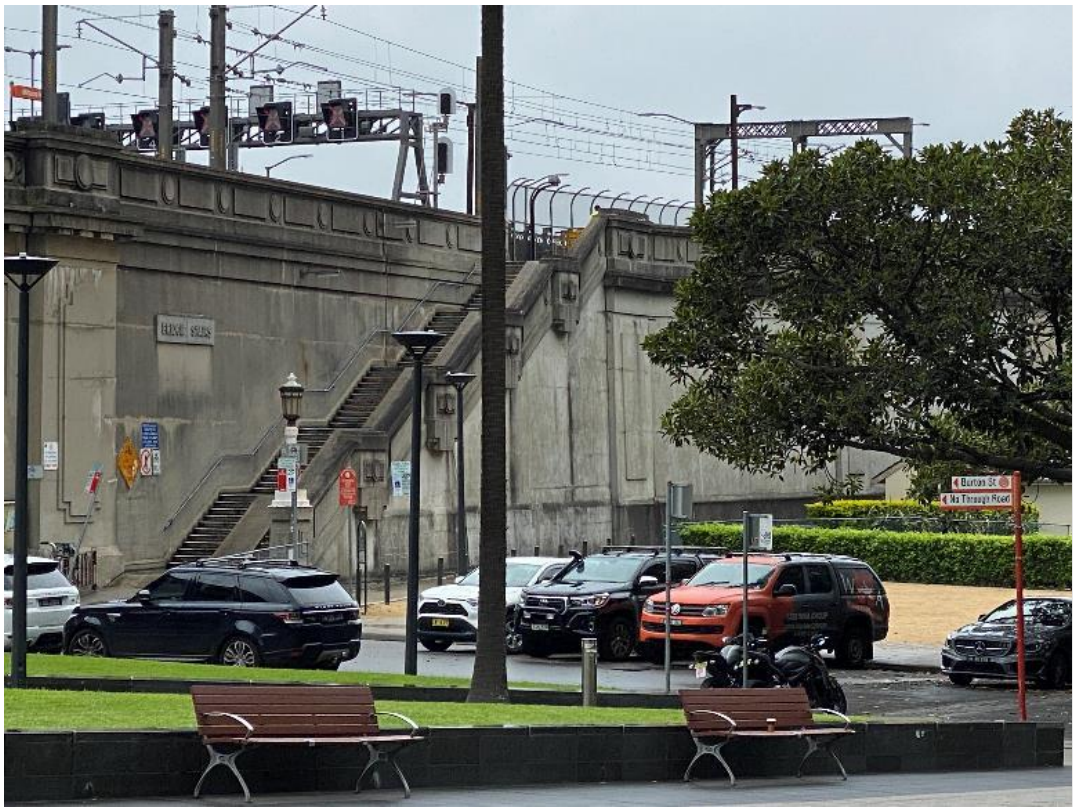

Figure 34: Northern approach for cyclists to the Sydney Harbour Bridge (Artefact, 2021)

Figure 35: Bradfield Park South: location for temporary ancillary works during construction of proposal (Artefact, 2021)

Figure 36: Bradfield Park Central: recreational area to be used for temporary ancillary works during construction of the proposal (Artefact, 2021)

Figure 37: Burton Street (Artefact, 2021)

Figure 38: Bradfield Park Central: entrance to Milsons Point Railway Station (Artefact, 2021)

Figure 39: Bradfield Park from Alfred Street South: location of the proposed elevated linear ramp (Artefact, 2021)

Figure 40: Bradfield Park North: commemorative sculpture and drinking fountain (Artefact, 2021)

Figure 41: Bradfield Park North: area of mostly open space located below the route of the proposed elevated linear ramp (Artefact, 2021)

Figure 42: Bradfield Park North looking north: grassed area located near the route of the proposed Alfred Street South cycle path (Artefact, 2021)

Figure 43: Bradfield Park North looking south: grassed area located near the route of the proposed elevated linear ramp (Artefact, 2021)

Figure 44: Bradfield Park North: view towards Alfred Street South (Artefact, 2021)

Figure 45: Bradfield Park North: park bench seating below concrete wall. Note: the abrupt interface between the austere and hard appearance of the bridge approach structure and the park setting of Bradfield Park North (Artefact, 2021)

Figure 46: Bradfield Park North: ground level interpretation of the location of former streets, lanes and houses demolished for the construction of the Sydney Harbour Bridge (Artefact, 2021)

Figure 47: Bradfield Park North: the covered seating structure has nil aesthetic value and is arguably intrusive (Artefact, 2021)

Figure 48: Bradfield Park North: view from Alfred Street South looking south. Note: The static interpretation panel is one of several interpretative devices (Artefact, 2021)

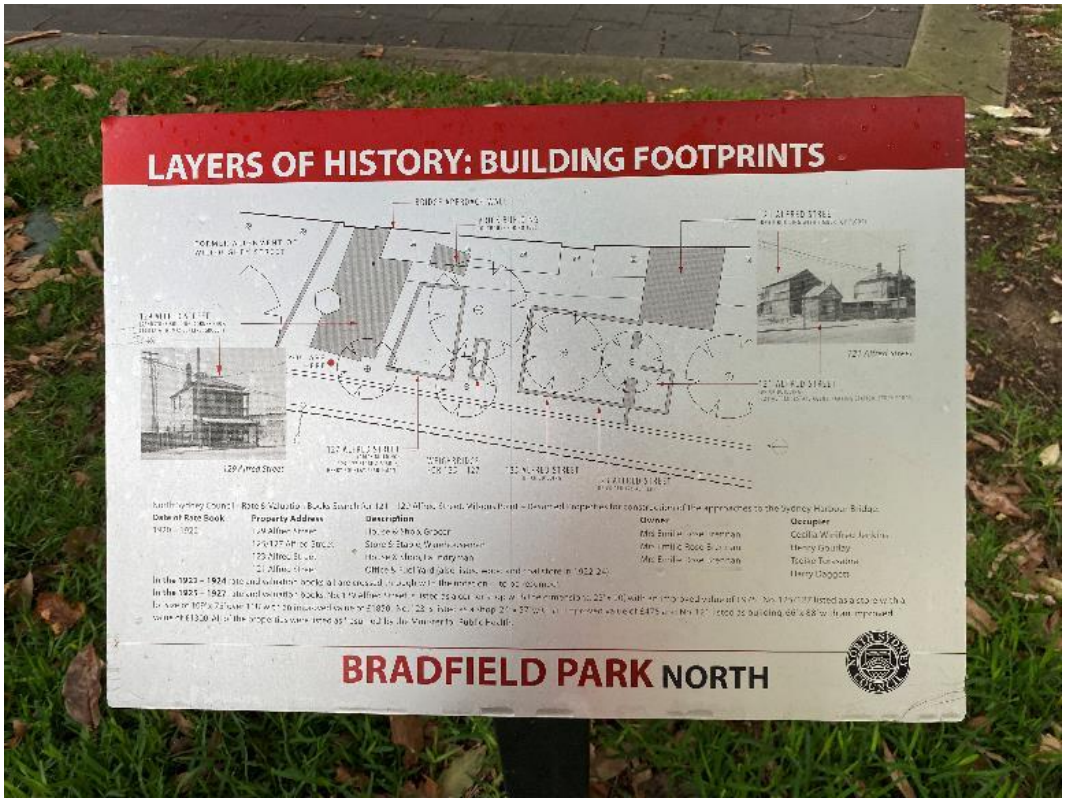

Figure 49: Bradfield Park North: Detail view of static interpretation panel. This proposed cycleway is part of a history of change at this location (Artefact, 2021)

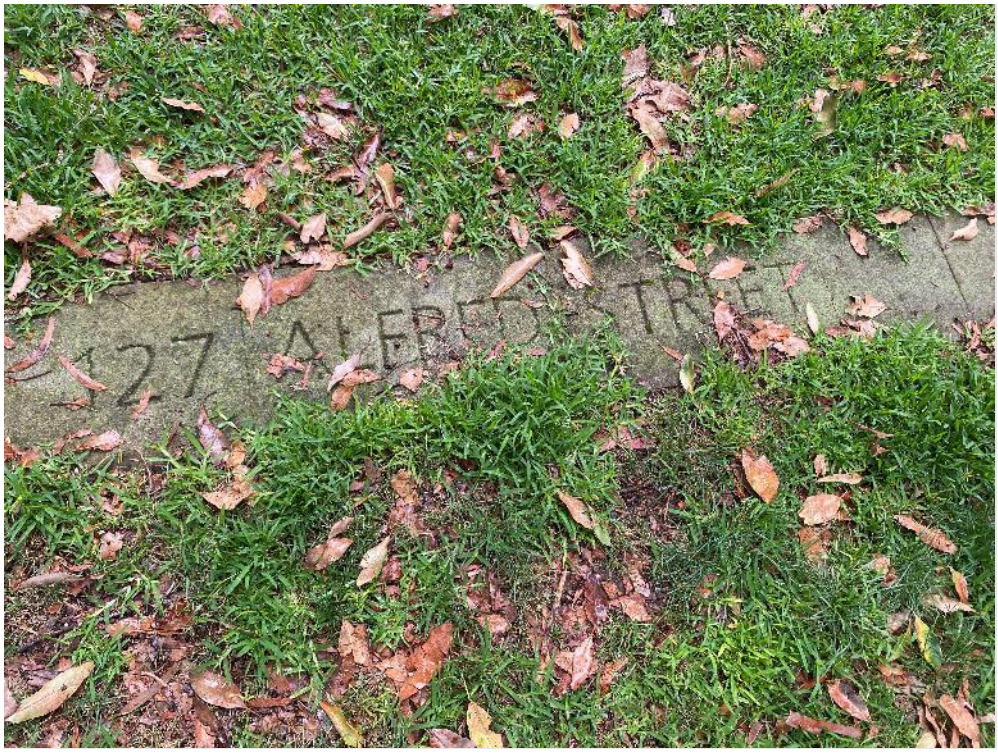

Figure 50: Bradfield Park North: interpretation. The existing interpretation reveals the location and footprint of houses demolished for the construction of the Sydney Harbour Bridge (Artefact, 2021)

Figure 51: Bradfield Park North: interpretation. The existing interpretation reveals the location and footprint of houses demolished for the construction of the Sydney Harbour Bridge (Artefact, 2021)

Figure 52: Bradfield Park: landscaping and public amenity (Artefact, 2021)

Figure 53: Bradfield Park North: public art (Artefact, 2021)

Figure 54: Bradfield Park Central: Main pedestrian thoroughfare between Alfred Street South and Milsons Point Railway Station (Artefact, 2021)

Figure 55: Bradfield Park is part of the North Sydney Council Public Art Trail (Artefact, 2021)

5.3 Visual setting and key views

The information in this section demonstrates the visual impact of the cycleway at important views, including towards Milsons Point Railway Station and the Sydney Harbour Bridge. The visual setting and key views are depicted in Figure 56 and Figure 57.

Figure 56: Sydney Harbour Bridge Cycleway Northern Access Project: visual setting and key views (NSW Government)

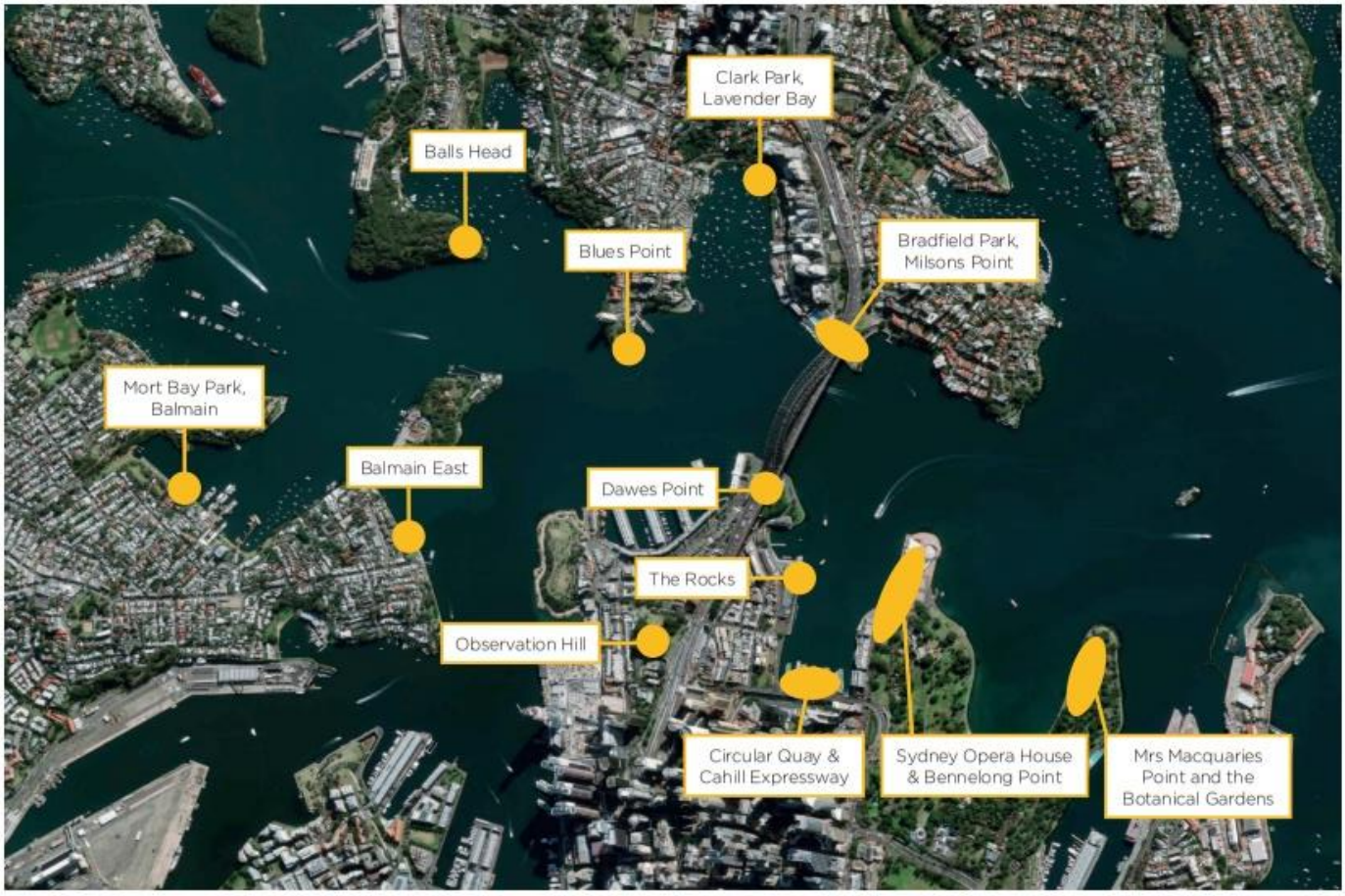

Figure 57: Sydney Harbour Bridge Cycleway Northern Access Project: key locations offering views of the Sydney Harbour Bridge (NSW Government)

6.0 ASSESSMENT OF HERITAGE SIGNIFICANCE

6.1 Methodology

Determining the significance of heritage items or a potential archaeological resource is undertaken by utilising a system of assessment centred on the *Burra Charter* (Australia ICOMOS 2013). The principles of the charter are relevant to the assessment, conservation and management of sites and relics. The assessment of heritage significance is outlined through legislation in the *Heritage Act* and implemented through the *NSW Heritage Manual*, the *Archaeological Assessment Guidelines*[2] and the document *Assessing Significance for Historical Archaeological Sites and 'Relics'*.[3]

If an item meets one of the seven heritage criteria and retains the integrity of its key attributes, it can be considered to have heritage significance (see Table 10). The significance of an item or potential archaeological site can then be assessed as being of local or State significance. If a potential archaeological resource does not reach the local or state significance threshold, then it is not classified as a relic under the *Heritage Act*.

'State heritage significance', in relation to a place, building, work, relic, moveable object or precinct, means significance to the State in relation to the historical, scientific, cultural, social, archaeological, architectural, natural or aesthetic value of the item.

'Local heritage significance', in relation to a place, building, work, relic, moveable object or precinct, means significance to an area in relation to the historical, scientific, cultural, social, archaeological, architectural, natural or aesthetic value of the item.[4]

Table 10: NSW heritage assessment criteria

Criteria	Description
A – Historical Significance	An item is important in the course or pattern of the local area's cultural or natural history.
B – Associative Significance	An item has strong or special associations with the life or works of a person, or group of persons, of importance in the local area's cultural or natural history.
C – Aesthetic or Technical Significance	An item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in the local area.
D – Social Significance	An item has strong or special association with a particular community or cultural group in the local area for social, cultural or spiritual reasons.
E – Research Potential	An item has potential to yield information that will contribute to an understanding of the local area's cultural or natural history.
F – Rarity	An item possesses uncommon, rare or endangered aspects of the local area's cultural or natural history.
G - Representativeness	An item is important in demonstrating the principal characteristics of a class of NSW's cultural or natural places of cultural or natural environments (or the cultural or natural history of the local area).

[2] NSW Heritage Office 1996, 25-27.
[3] NSW Heritage Branch 2009.
[4] This section is an extract based on the Heritage Office Assessing Significance for Historical Archaeological Sites and Relics 2009:6.

6.2 Sydney Harbour Bridge, Milsons Point Railway Station & Bradfield Park

6.2.1 Preamble

The Sydney Harbour Bridge is a monumental landmark in the centre of the city of Sydney, and one of the world's most globally recognised bridges. It is an important visual element in the Sydney cityscape viewed from many key points around the harbour. The steel arched form, Art Deco inspired granite pylons and composite approach spans create an iconic and dramatic composition that consistently evokes a positive response from observers. The Sydney Harbour Bridge is listed on multiple heritage registers and has heritage value at a local, state, and national level. Milsons Point Railway Station and Bradfield Park have separate listings at the state and local levels and are also captured by the SHR curtilage for the Sydney Harbour Bridge.

6.2.2 World heritage considerations

The Sydney Harbour Bridge is not listed on the World Heritage List, but the bridge is within the visual catchment (buffer zone) of the World Heritage listed Sydney Opera House.

6.2.3 National heritage significance

The NHL listing of the Sydney Harbour Bridge includes the following statement of significance:

The building of the Sydney Harbour Bridge was a major event in Australia's history, representing a pivotal step in the development of modern Sydney and one of Australia's most important cities. The bridge is significant as a symbol of the aspirations of the nation, a focus for the optimistic forecast of a better future following the Great Depression. With the construction of the Sydney Harbour Bridge, Australia was felt to have truly joined the modern age, and the bridge was significant in fostering a sense of collective national pride in the achievement.

The Sydney Harbour Bridge was an important economic and industrial feat in Australia's history and is part of the nationally important story of the development of transport in Australia. The bridge is significant as the costliest engineering achievement in the history of modern Australia, and this was extraordinary feat given that it occurred at the severest point of the Great Depression in Australia.

The bridge is also significant for its aesthetic values. Since its opening in 1932, the Sydney Harbour Bridge has become a famous and enduring national icon, and remains Australia's most identifiable symbol. In its harbour setting, it has been the subject for many of Australia's foremost artists, and has inspired a rich and diverse range of images in a variety of mediums – paintings, etchings, drawings, linocuts, photographs, film, poems, posters, stained glass - from its construction phase through to the present.

The Sydney Harbour Bridge is also significant as one of the world's greatest arch bridges. Although not the longest arch span in the world, its mass and load capacity are greater than other major arch bridges, and no other bridge in Australia compares with the Sydney Harbour Bridge in its technical significance. In comparing Sydney Harbour Bridge with overseas arch bridges, Engineers Australia has drawn attention to its complexity in combining length of span with width and load carrying capacity. The construction of Sydney Harbour Bridge combined

available technology with natural advantages provided by the site. The designers took advantage of the sandstone base on which Sydney was built, which enabled them to tie back the support cables during construction of the arch, and to experiment with massive structures. Although designed more than 80 years ago, the bridge has still not reached its loading capacity.

The bridge is also significant for its important association with the work of John Job Crew Bradfield, principal design engineer for the New South Wales Public Works Department, who ranks as one of Australia's greatest civil, structural and transport engineers (DEE, 2007),

6.2.4 State heritage significance: Sydney Harbour Bridge

The SHR listing for the Sydney Harbour Bridge and approaches includes the following summary statement of significance:

The bridge is one of the most remarkable feats of bridge construction. At the time of construction and until recently it was the longest single span steel arch bridge in the world and is still in a general sense the largest. The bridge, its pylons and its approaches are all important elements in townscape of areas both near and distant from it. The curved northern approach gives a grand sweeping entrance to the bridge with continually changing views of the bridge and harbour. The bridge has been an important factor in the pattern of growth of metropolitan Sydney, particularly in residential development in post World War II years. In the 1960s and 1970s the Central Business District had extended to the northern side of the bridge at North Sydney which has been due in part to the easy access provided by the bridge and also to the increasing traffic problems associated with the bridge (Walker and Kerr 1974).

6.2.5 State heritage significance: Milsons Point Railway Station

Milsons Point Railway Station consists of a platform office and shelter, along with platform faces, subway entrances, concourse, walls and abutments and the Burton Street Underbridge, and is located approximately 25 metres west of the study area. The station was constructed between 1929 and 1932 as part of the northern approaches to the Sydney Harbour Bridge. It was originally called Kirribilli Station but was changed to Milsons Point prior to its opening.

Milsons Point Railway Station is listed as a State significant heritage item due to its historical, associative, aesthetic, social and research potential heritage values. The SHI database contains the following statement of significance for the item:

Milsons Point station has state historical significance as an essential component of the northern approaches to the Sydney Harbour Bridge. The form and detail of the subway and tunnels in particular are significant as part of the overall design and specifications for the bridge as set down by Chief Engineer JJC Bradfield. The Milsons Point station retains a number of original features and decorative elements from its original construction phase including the platform building and entrance way awning from the Alfred Street side.

6.2.6 Local heritage significance

Bradfield Park (including northern section) is listed as an item of local significance on the North Sydney LEP for its rarity and representativeness. The SHI listing of Bradfield Park includes the following statement of significance:

> *Important local park with extensive views of Sydney harbour and the city skyline. Important locale for the historic icon of the Bow of the H.M.A.S. Sydney, a significant ship in Australian history. Associated with the harbour bridge construction and named for J.J.C. Bradfield. Formerly central township of Milsons Point and historically a most significant area for the North Shore.*

7.0 ARCHAEOLOGICAL CONTEXT

7.1 Introduction

This section discusses the proposal footprint potential to contain historical archaeological resources. The potential for the survival of archaeological remains is significantly affected by activities which may have caused ground disturbance. This assessment is therefore based on consideration of current ground conditions, and analysis of the historical development of the proposal footprint .

'Archaeological potential' refers to the likelihood that an area contains physical remains associated with an earlier phase of occupation, activity or development of that area. This is distinct from 'archaeological significance' and 'archaeological research potential'. These designations refer to the cultural value of potential archaeological remains and are the primary basis of the recommended management actions included in this document.

7.2 Historical phases for the site and potential

There are four identifiable phases of development for the proposal footprint , which may be present in the archaeological record:

- Phase 1: Early land grants (1800 – 1861)
- Phase 2: Residential and commercial development (1861 – 1920s)
- Phase 3: Resumption and major construction (Sydney Harbour Bridge) (1920s – 1932).
- Phase 4: Minor Changes to Bradfield Park Area (SHB) (1940s – 2016).

7.2.1 Phase 1: Early land grants (1800 – 1861)

Phase 1 relates to the earliest European developments in the area, and the early period of settlement at Milsons Point. The proposal footprint was originally part of a land grant of 120 acres to Robert Ryan. The ownership of the land passed through multiple landowners before being acquired by Robert Campbell. The land to the north beyond the line of Willoughby Street was granted to John Milson by Governor Bourke on the 10th August 1824. Milson also leased part of the 120 acres from Campbell. Milson's residence was located outside the study.

The northern portion of the study area likely to have been used for grazing prior to subdivision, as indicates by a plan of the area dating to 1840-49 (Figure 59) showing a barn, yards and calf pens (outside the study area). A new road appears to have been formed within the proposal footprint leading from Lane Cove and St Leonards to a new steam punt wharf. The central portion of land within the proposal footprint is labelled as having been a quarry.

Archaeological remains from this period are likely to consist of ephemeral evidence of land clearing and pastoral activities, such as tree boles, burnt stumps, furrows and irrigation channels, post holes from fence lines, and charcoal patches and isolated artefact scatters from informal camps. There is potential for evidence of earlier road alignments. However, any road during this phase would have likely been an informal dirt or gravel track, which are poorly visible within the archaeological record.

Subdivision of this land is likely to have occurred from the mid 1850s (Figure 58). A plan dating to c.1840 (see Figure 60) illustrates the following within the proposal footprint:

- Informal roads and paths

- Lane Cove Road in a state of disrepair, perhaps in the process of being formalised. Substantial holes and a 'swans groove' (i.e. narrow water channel) are labelled
- A tank in the northern portion of the cycleway footprint
- Quarry workings
- Residence on land owned by Samuel Truman (west of cycleway footprint)
- Residence on land belong to Samuel Howard and Francis Howson
- A 'small structure' on land owned by an individual called 'Landers' (see Figure 60)

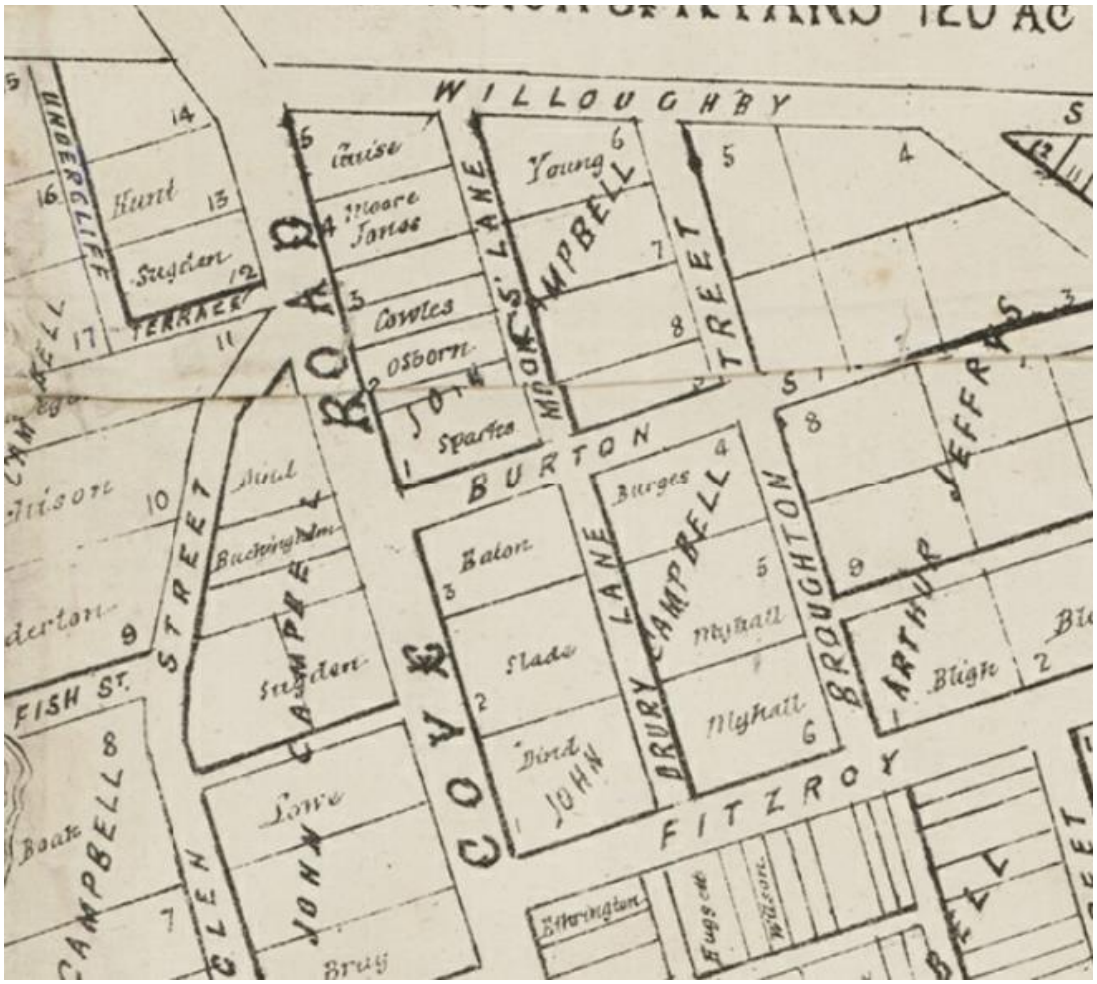

Figure 58: Detail from 1859 subdivision plan of the North Shore c. 1859 showing land ownership within the study area. Source: SLNSW M3 811.14/1859/1

7.2.2 Phase 2: Residential and commercial development (1861 – 1920s)

Development in the area increased after the establishment of the North Shore Steam Ferry Company in 1861. This facilitated the construction of a formalised road network and services, including the establishment of Alfred Street (originally called Lane Cove Road) in 1861. During this time the land to the north on Milsons grant underwent a difference process of development to the land south of Willoughby Street which was held under different ownership.

A plan of Milsons Point in 1868 shows that by this time there were several dwellings located within the proposal footprint with several cottages and residences along the eastern side of Alfred Street. The road network within the proposal footprint is seen to comprise Alfred Street and Milson Street to the

east, both running along a north-east axis, intersected by Willoughby Street to the north, Burton Street and Fitzroy Street to the south.

By 1891, a Water Board plan of the area indicates the east side of Alfred Street had been considerably developed, featuring cottages, terraces and freestanding residences. Sources from this period indicate that these structures within the proposal footprint were largely associated with the working-class community of Milsons Point, and comprised a combination of commercial and residential dwellings (Sands Directory 1886). Historical photographs illustrate that numerous structures within the proposal footprint were raised on stone foundations due to the sloped topography leading south along Alfred Street towards the harbour. A tramline is seen to have been established along Alfred Street.

Archaeological remains from this phase are likely to consist of stone or brick footings, yard surfaces, evidence of lot boundaries, and occupation-related deposits. Archaeological remains of properties established prior to the provision of reticulated water and municipal garbage collection in the late nineteenth century could possibly include cesspits, privies, wells or cisterns. Due to the presence of municipally provided waste management towards the end of the nineteenth century, deposits containing artefacts would be less likely in archaeological remains dating from this time onwards. Potential archaeological remains from Phase 2 could also include the remains of roads demolished to make way for the Sydney Harbour Bridge including the section of Willoughby Street between Alfred Street and Broughton Street, and Milson Street which was located between Alfred Street and Broughton Street. Remains associated with these roads could include evidence of the road surfaces, kerbing, drainage and associated deposits.

A plan dating to 1868 illustrates the following within the proposal footprint :

- Structures on allotments on the eastern side of Lane Cove Road owned by John Guise, Samuel Truman and William Eaton. All allotments are granted, not all are shown as containing structures.

A Water Board plan dated c.1891 indicates that the proposal footprint has undergone substantial alteration in the previous 20 years. Many of the former buildings have been subdivided and some lots contain semi-detached dwellings with narrow backyards. The proposal footprint included the following:

- The cycleway passes through the rear yards of several properties, including the footprint of what are likely to be privies, external kitchens and outbuildings.
- Burton and Willoughby Streets are still present, although many of the informal paths and roadways present on earlier plans are no longer depicted.

7.2.3 Phase 3: Resumption and major construction (Sydney Harbour Bridge) (1920s – 1932)

There appears to have been no further developments within the proposal footprint until construction started for the Sydney Harbour Bridge. At this time the proposal footprint was resumed by the government, the workers terraces and cottages were demolished, and the immediate area was excavated for the construction of the retaining wall of the Sydney Harbour Bridge northern approaches. Historical photographs and drawings indicate there was a natural slope towards the southern end of the proposal footprint , and that many of the buildings within the proposal footprint were elevated on stone foundations and in some cases constructed on levelled sites.

Since the construction of the Sydney Harbour Bridge approaches, the main notable developments within the proposal footprint involve the upgrade of landscaping in Bradfield Park.

Archaeological remains in the area would primarily consist of the backfill deposits associated with the Sydney Harbour Bridge. The installation of the services and landscaping works at Bradfield Park may have resulted in localised impacts to accumulated archaeological deposits and artefacts.

7.2.4 Phase 4: Minor Changes to Bradfield Park Area (SHB) (1940s – 2016)

After the Bridge opened in 1932 the facilities such as sheds connected to the construction of the Bridge were removed. This presented North Sydney Council with an opportunity to address the needs of the local community for recreational facilities on the now-vacant land. In 1935, following much public discussion and pressure exerted by various influential public figures including Alderman Primrose, an area of nearly 14 acres from the Harbour Bridge residues at Milsons Point was vested in the North Sydney Council for the purpose of parks and recreation. Council named the park Bradfield Park after J J C Bradfield, Chief Engineer of the Harbour Bridge construction. This causes some confusion with the similarly named Bradfield Park in Lane Cove.

A comprehensive plan for the layout of the proposed park was developed by Council's engineers and adopted in 1934. Some of the features constructed under the Plan including pathways and various tree plantings still apparent today.

In 1950 a group of North Sydney bowlers belonging to the Gallipoli Legion Memorial Bowling Club in Loftus Street, Sydney, received permission from North Sydney Council to clear the central area of Bradfield Park and establish bowling greens and a clubhouse. In 1994, Kirribilli Ex-Service Club amalgamated with Gallipoli Legion Memorial Bowling Club and the 20-year lease, commenced in 1981, was transferred to the Kirribilli Ex-Service Community and Bowling Club Limited. The Club did not seek a new lease when the lease expired in 2001.

The construction of the Sydney Harbour Tunnel 1988 – 1992 resulted in the lower section of Bradfield Park being partitioned off and used as a construction depot.

Improvements and upgrading work carried out in the Park have been in accordance with the Bradfield Park and Kirribilli Foreshore Master Plan. The upgrading of Bradfield Park North and enhancement of the adjacent Burton Street Tunnel was undertaken in 2003. Bradfield Plaza was created in 2006, and a new children's playground was completed in 2007. Also in 2007, the interpretive 'Bradfield Park Heritage Walk' was created based on the results of archaeological monitoring of the landscaping work in 2003.[5]

The majority of elements associated with this phase remain extant. The proposal footprint therefore has nil to low potential to contain archaeological remains associated with Phase 4.

[5] The preceding paragraphs are edited from the history of Bradfield Park in North Sydney Council. Bradfield Park Plan of Management. North Sydney Council (North Sydney: 2014), p8-9.

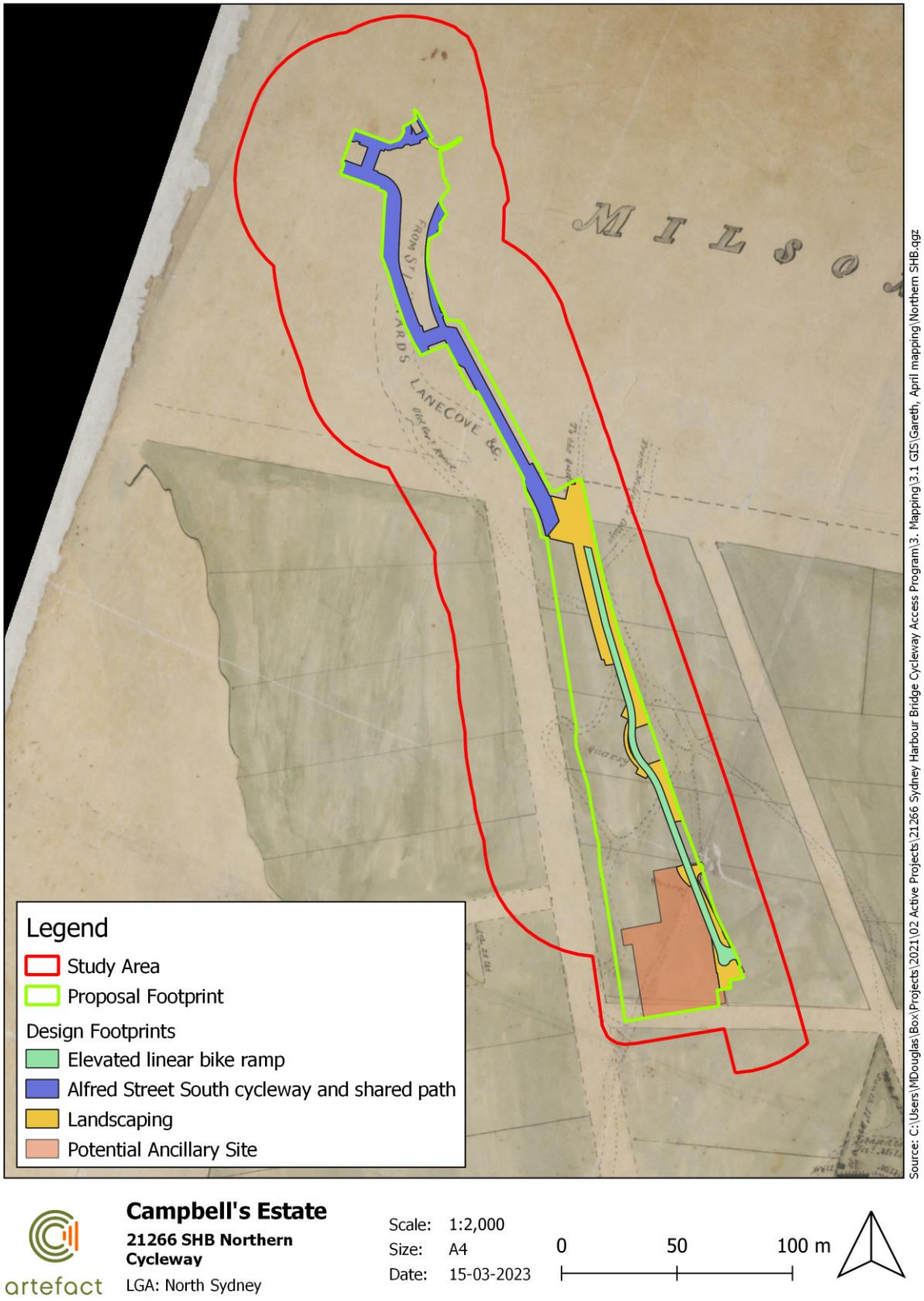

Figure 59:Detail from plan of Robert Campbells Estate, c. 1840. Source: NLA Map F 903

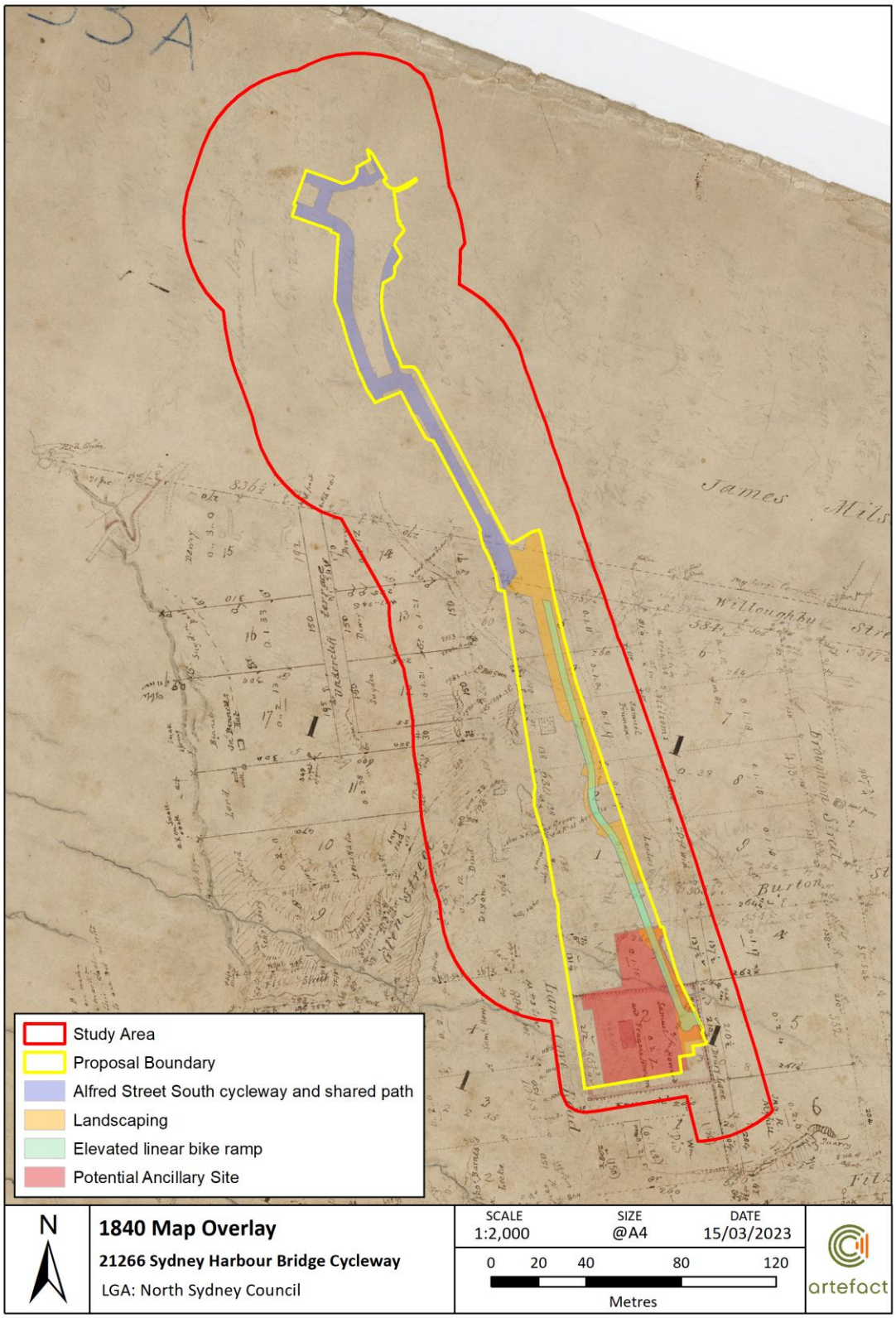

Figure 60: Detail from cadastral manuscript map of allotments and land grants in Milson's Point and Kirribilli, Sydney prepared by John Armstrong, c. 1840. Source: SLNSW Maps/0219

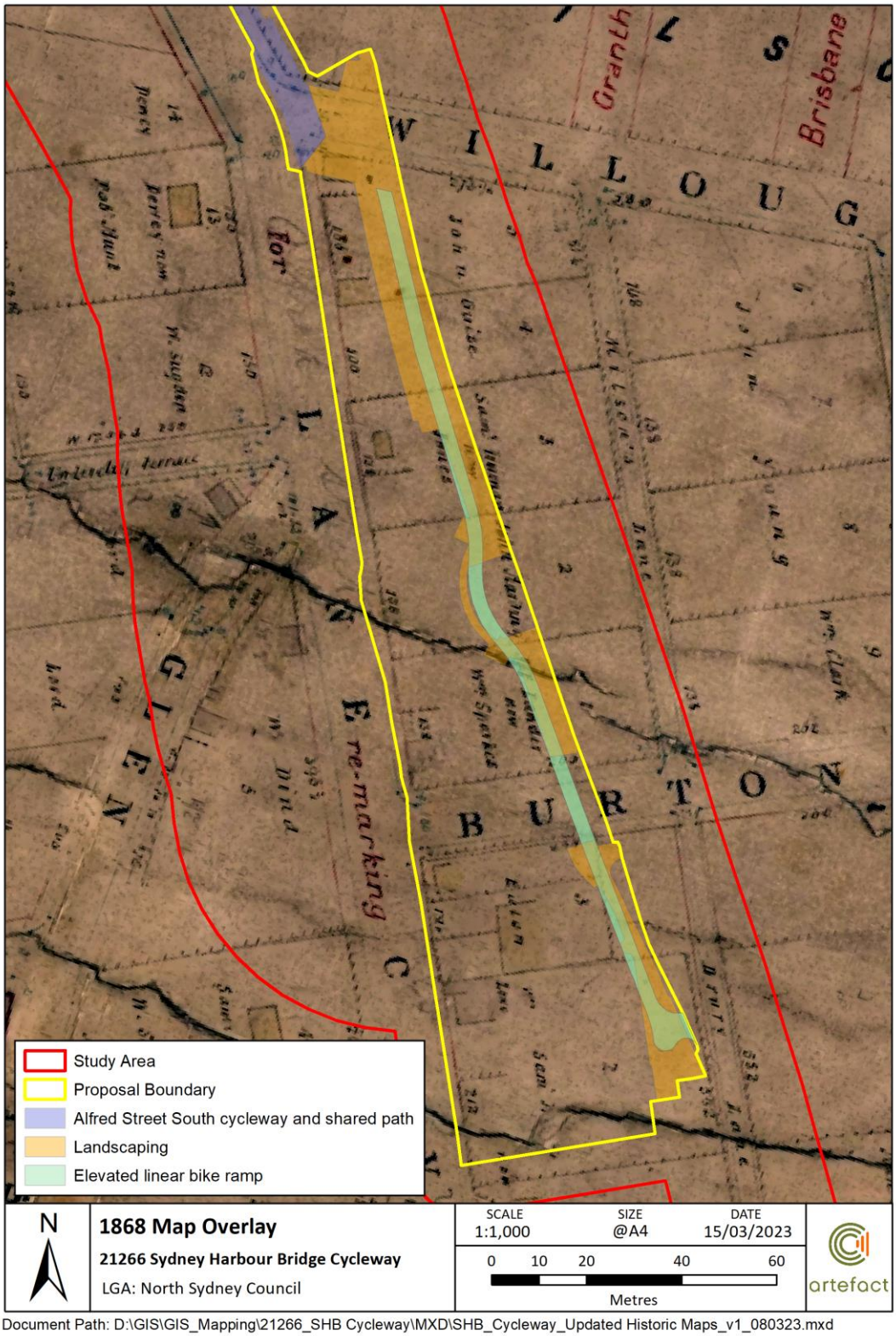

Figure 61: Detail from Plan of Streets in the East St. Leonards from 1868 showing extent of development. within proposal footprint. Source: NSW Land and Property Information, Historical Lands Records Viewer

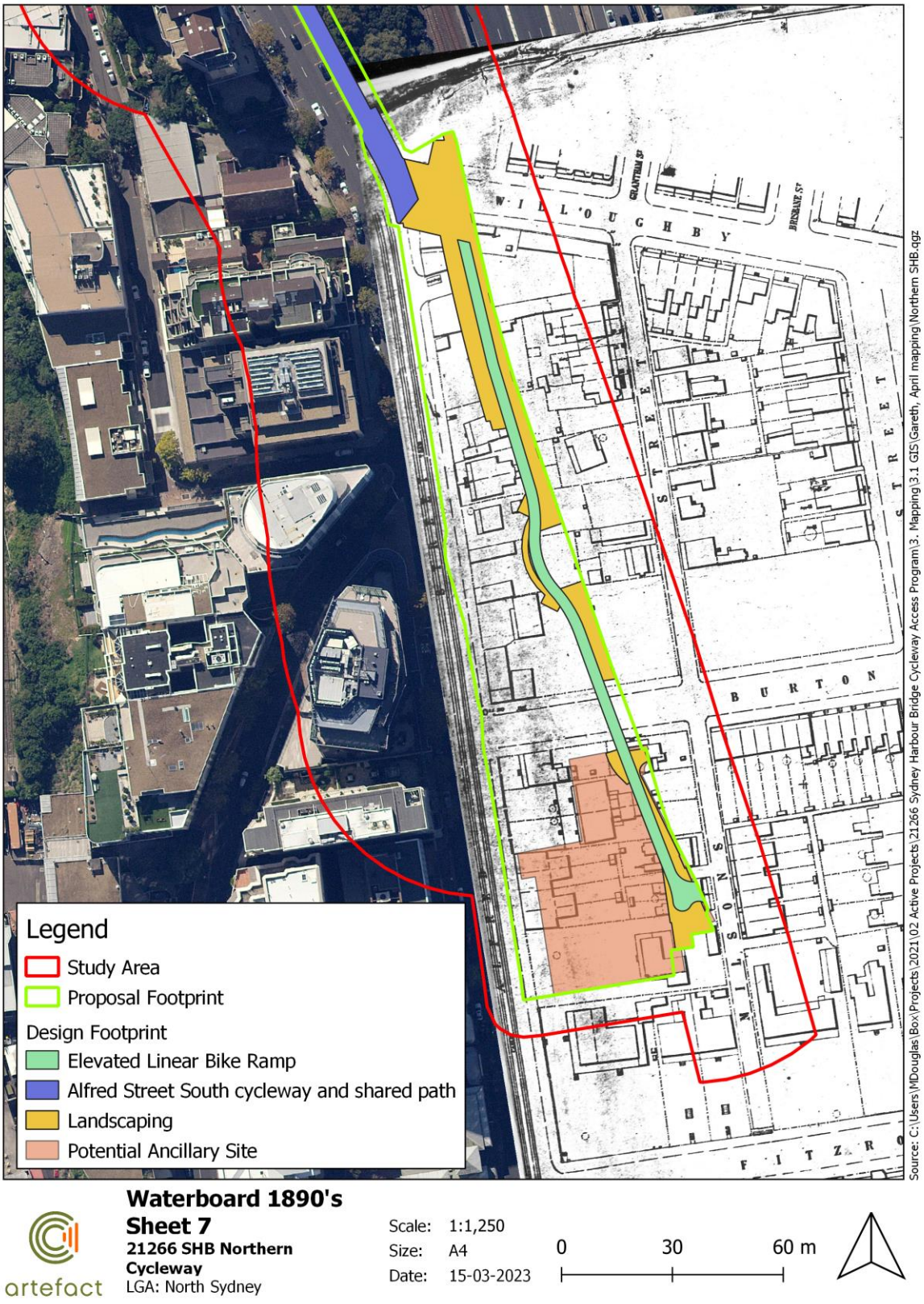

Figure 62: Detail from the Water Board block plan; North Sydney Sheet No 7, c. 1891. Source: Stanton Library

7.3 Guiding investigations and documents

In 2001 landscaping work was proposed in Bradfield Park and following preliminary reporting by HLA-Envirosciences (Di Fazio 2001) landscaping proceeded until archaeological remains were encountered which triggered and archaeological response. Dr Iain Stuart from HLA-Envirosciences was the Excavation Director. The reports generated by these works are discussed below.[6]

7.3.1 Di Fazio, 2001: Bradfield Park North, Milsons Point Archaeological Assessment

An archaeological assessment was completed by Di Fazio from HLA-Envirosciences in 2001 as part of an Assessment of Heritage Impact for the proposed landscaping upgrades to Bradfield Park North. The assessment concluded that due to the evidence of demolition and subsequent use of the site for construction works, which involved heavy disturbance combined with levelling and dumping of soil from outside the site, archaeological material was likely to have been removed or damaged. The assessment identified that some structural remains of the residential buildings, such as basements and foundations, may remain intact.

7.3.2 HLA Envirosciences 2003: Statement of Heritage Impact – Sandstone Walls: Bradfield Park North, Milsons Point

During landscaping works carried out in Bradfield Park in 2003, the remains of sandstone walls were identified and recorded by HLA Envirosciences. The SOHI was prepared to allow works to proceed within the curtilage of the Sydney Harbour Bridge. The sandstone walls were determined to date to the late 1800s and were an intact part of the original boundaries surrounding the residence located at 115-117 Alfred Street. The SoHI found the remains met the following criteria:

> Criterion (a)The archaeological remains are demonstrative of an earlier phase of urban development within Milsons Point and the wider North Sydney precinct. The walls are physical evidence that a number of 19th century residences existed on the site which were resumed and demolished as part of the Sydney Harbour Bridge construction.
>
> Criterion (e)The archaeological remains have some potential to yield information about the previous residential and commercial occupation of Milsons Point prior to the construction of the Sydney Harbour Bridge transport link.

The SoHI identified the sandstone walls as having “moderate” heritage significance at a local level in the context of the overall established significance of Bradfield Park. The following conclusions were made:

- The sandstone walls date to the late 1800s, an early period of occupation in Milsons Point.
- The walls are an intact part of the original boundaries surrounding the residence located at 115-117 Alfred Street.
- The walls are surviving elements of North Sydney’s history.
- The walls are part of the original layout associated with the early structures of Alfred Street, Milsons Point and are indicative of an initial phase of use of Bradfield Park.

The following statement of significance was provided for the sandstone walls: *The surviving stone walls are significant through their ability to demonstrate that the construction of the bridge had both a*

[6] Dr Iain Stuart pers com 2023

positive and negative impact on the North Shore community. The walls demonstrate that the Bridge resulted in the destruction of established houses and other buildings at Milsons Point.

7.3.3 HLA Envirosciences 2003: Section 65a Research Design Cesspit or Well, Bradfield Park North, Milsons Point

During landscaping works carried out in Bradfield Park, the remains of a cesspit or well were exposed in July 2003. Following uncovering of these remains, a Section 65a was provided as an amendment to the original Section 60 approval for the project, with a research design accompanying the application prepared by HLA Envirosciences. The cesspit or well was located approximately 60 metres to the north of the Milsons Point Station entrance, positioned between the two previously identified sandstone walls. The cesspit or well was assessed as being associated with the existing established significance of Bradfield Park, being reflective of the occupation and use of Bradfield Park, and as having local significance under Criterion E.[7]

The features were investigated to a total depth of 50cm. Glass bottles and other artefacts were identified in the removed fill (Figure 63). The remainder of the cesspit/well deposit was retained in situ.

Figure 63: Surface of the cesspit or well, with bottles removed from uppermost fill layer

7.3.4 AHMS 2006, Archaeological Excavation, Bradfield Park Plaza, Bradfield Park South at Milsons Point, NSW

In 2005 construction works approximately 80m to the south of the current study area exposed archaeological remains. These were investigated and assessed by AHMS, who identified brick footings and overlying full deposits associated with late 19th century domestic structures. These were interpreted as being the remains of two of the terrace houses shown lining Lewington Lane on the

[7] HLA Envirosciences 2003 Section 65a Research Design: 'Cesspit or Well, Bradfield Park North, Milsons Point' pp5-6.

1891 “Sydney Water Block Plan.”[8] (see Figure 64). Following the completion of archaeological recording, works proceeded. It is unclear if the remains have been retained in situ.

Figure 64: View west across the excavated area, the buildings identified during the excavation are indicated by a blue (the building that was fully cleaned and recorded) and a red arrow (the partially cleaned and recorded building). These footings are made from white dry pressed bricks and bonded by cement mortar. Source: AHMS 2006

7.3.5 Conclusions

Previous archaeological investigations within the proposal footprint have been undertaken in response to planned landscaping within Bradfield Park. This work has been limited to discrete areas being impacted. No overarching salvage excavation has been undertaken, and RL’s on exposed archaeological remains were unable to be identified during preparation of this report. These investigations demonstrate that archaeological deposits and structural remains are likely to exist within the uppermost c. 1m within Bradfield Park. Archaeological remains uncovered by HLA Envirosciences have been retained in situ (uppermost 50cm of the well/cesspit has been removed).

7.4 Assessment of archaeological potential

Based on historic plans and aerials, and after analysis of potential archaeological features within the landscape, it is evident that the proposal footprint originally contained numerous structures associated with the residential development of North Sydney prior to the changes in street layout that occurred in preparation for and during construction of the Sydney Harbour Bridge.

The results of previous archaeological investigations in the proposal footprint, primarily those undertaken by HLA Enviroscience in Bradfield Park North, demonstrates that the proposal footprint has high potential to contain substantially intact archaeological resources associated with Phase 2.. The integrity of exposed remains suggests that archaeological resources associate with Phase 1 are also likely to be retained within Bradfield Park. A subdivision plan from c1859 (Figure 58) indicates

[8] AHMS, letter report prepared for Hamish McLachlan ‘Re. Archaeological Excavation, Bradfield Park Plaza, Bradfield Park South at Milsons Point, NSW.’ 9 January 2006

that residential subdivision and development was relatively advanced by the mid-19th century. The plan does not include details showing the location of cesspits, wells or outbuildings that would almost certainly have been associated with the main structures depicted. As the study area passes through the former rear yards of this early subdivision, the project has moderate potential to encounter archaeological evidence associated with structures/features of this type associated with Phase 1.

Table 11provides a summary of the potential for identifying intact, legible archaeological remains related to former structures and historical land use described in the previous section.

Table 11: Historical phasing for the proposal footprint

Phase	Potential archaeological remains	Potential
Phase 1 (1800 – 1861)	Evidence of low impact pastoral activities, early road construction and quarry activity i.e. tree boles, burnt stumps, furrows and irrigation channels, post holes from fence lines, evidence of early road construction, backfilled depressions associated with quarrying activity. Evidence of early residential development including: • Cesspits, wells • Undocumented outbuildings, external kitchens. Evidence of early utilities: • Tank illustrated on the 1840s plan • Swan groove/evidence of water management in Lane Cove Road	**Moderate**
Phase 2 (1861 – 1920s)	Evidence of the residential and commercial development of the proposal footprint including: • Brick and/or stone footings • Postholes associated with fence lines, house stumps • Brick pads showing the location of posts • Areas of beaten earth, remnant tile, stone or brick paved flooring, evidence of timber flooring in the form of remnant joists and/or bearer impressions • Brick chimney bases and hearths • Paved areas showing the location of former verandahs • Wells, cisterns, privies and/or cesspits associated with artefact bearing backfill and accumulated deposits • Rubbish pits • Artefact bearing garden soils • Early road surfaces, drainage and kerbing associated with Burton and Willoughby Streets. Remains of residences along Alfred Street may also be present and are known to have been excavated in the north of the park (HLA 2003).	**High**
Phase 3 (1920s – 1932)	Backfill deposits from the SHB construction.	**High** (nil for relics (outside SHR curtilage))
Phase 4 (1940s – 2016)	Minor development works on Bradfield Park	**Nil – low** (extant)

7.5 Assessment of archaeological significance

Heritage or 'cultural' significance is defined in the Burra Charter' as: 'Aesthetic, historic, scientific, social or spiritual value for past, present and future generations'.[9]

Delineating the cultural significance of a place or an item assists in identifying what aspects of the place contribute to that significance. An understanding of the significance of the place is crucial to its management in providing guidance for future work and to ensure the significance is retained.

The Heritage Office (now Heritage NSW) developed a set of seven criteria detailed in the NSW Heritage Manual to provide the basis for an assessment of heritage significance of an item or place.[10]

If an item meets one of the seven heritage criteria, and retains the integrity of its key attributes, it can be considered to have heritage significance. The significance of an item or potential archaeological site can then be assessed as being of local or state significance. If a potential archaeological resource does not reach the local or state significance threshold, then it is not classified as a relic under the Heritage Act.

'*State heritage significance'*, in relation to a place, building, work, relic, moveable object or precinct, means significance to the State in relation to the historical, scientific, cultural, social, archaeological, architectural, natural or aesthetic value of the item.

'*Local heritage significance'*, in relation to a place, building, work, relic, moveable object or precinct, means significance to an area in relation to the historical, scientific, cultural, social, archaeological, architectural, natural or aesthetic value of the item.

The specific nature of archaeological resources necessitates that they be assessed independently from aboveground and other heritage elements because of the challenges associated with the often-unknown nature and extent of buried archaeological remains. A significance assessment is usually formulated based on anticipated attributes. Consideration of archaeological research potential is required when undertaking a significance assessment of a historical archaeological site. To facilitate assessment of archaeological significance, the former Heritage Office arranged the seven heritage criteria into four groups and provide further directions and guidelines in Assessing Significance for Historical Archaeological Sites and 'Relics'.[11] The following assessment has been prepared using the 2009 guidelines.

7.5.1 Assessment against the NSW heritage assessment guidelines

The assessment of the significance of the potential archaeological resource contained within the proposal footprint against the NSW heritage assessment criteria is outlined below.

Table 7: Consideration against NSW heritage assessment criteria

Criterion	Discussion
A) an item is important in the course, or pattern, of NSW's cultural or natural history (or the local area)	Phase 1 dates to the earliest European settlement of the North Shore. As historical research suggests that there was little development on the Campbell and Milson grant and that it was primarily used for agricultural pursuits, it is unlikely that this phase would have produced any substantial archaeological remains. Archaeological remains associated with land

[9] Australia ICOMOS 2013, 'Australia ICOMOS Charter for Places of Cultural Significance (The Burra Charter).
[10] Heritage NSW 2001, NSW Heritage Manual 'Assessing Heritage Significance' p.9
[11] Heritage NSW 2009, Assessing Significance for Historical Archaeological Sites and Relics.

Criterion	Discussion
	clearance, quarrying and grazing activities would be ephemeral in nature. The potential for archaeological evidence from this phase is nil-low. Any intact remains would be locally significant for their ability to contribute to our knowledge of the early development and occupation of Sydney's North Shore. Archaeological remains from Phase 2 are primarily associated with the residential development of the proposal footprint during the mid to late nineteenth century. Substantial remains from this phase may have research potential associated with the development of the North Shore during this period, analysis of which may provide insight into the preferences and ways of life of the working-class community of Milsons Point at this time. Archaeological remains may also provide information on the material expressions of the relative isolation of the north shore prior to construction of the bridge, and differences compared to the CBD. The relatively short occupation of the site between the 1860s and the 1920s could offer a 'snapshot' of life prior to the easy access to the city and the acceleration of development. If intact archaeological remains are located, they would be locally significant. Phase 3 is associated the SHB construction. Whilst this was a momentous event in the course of Sydney's history, archaeological remains of this phase would primarily consist of backfill deposits and would not hold any notable historical importance. As such, potential archaeological remains within the proposal footprint would meet the threshold for listing under this criterion at a local level.
B) an item has strong or special association with the life or works of a person, or group of persons, of importance in NSW's cultural or natural history (or the local area)	The proposal footprint was part of the grant provided to Robert Campbell and then to James Milson, both well-known local figures. However, the ephemeral nature of the remains from Phase 1 means it would be difficult to directly associate them with the lives of Campbell or Milson. Archaeological remains associated with Phase 2 would be unlikely to hold strong or special association with any individuals or groups of historical importance. Phase 3 is associated with the SHB construction. Whilst this was a momentous event in the course of Sydney's history, archaeological remains of this phase would primarily consist of backfill deposits. These deposits do not hold any research potential and would not be of any significance. As such, potential archaeological remains within the proposal footprint would not meet the threshold for listing under this criterion at a local or State level.
C) an item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW (or the local area)	Research indicates that potential archaeological remains within the proposal footprint would not possess any notable aesthetic or technical significance. As such, potential archaeological remains within the proposal footprint would not meet the threshold for listing under this criterion at a local or State level.

Criterion	Discussion
D) an item has strong or special association with a particular community or cultural group in NSW for social, cultural or spiritual reasons (or the local area)	Archaeological remains associated with Phase 1, Phase 2 and Phase 3 may be of interest to members of the local Milsons Point and broader Sydney community. However, it is unlikely that this association would be considered as particularly strong or special. As such, potential archaeological remains within the proposal footprint would not meet the threshold for listing under this criterion at a local of State level**.**
E) an item has potential to yield information that will contribute to an understanding of NSW's cultural or natural history (or the local area)	Phase 1 dates to the earliest European settlement of the North Shore. As historical research suggests that there was little development on the Campbell and Milson grant and that it was primarily used for agricultural pursuits, it is unlikely that this phase would have produced any substantial archaeological remains. Archaeological remains associated with land clearance, quarrying and grazing activities would be ephemeral in nature. The potential for archaeological evidence from this phase is nil-low. Any intact remains would be locally significant for their ability to contribute to our knowledge of the early development and occupation of Sydney's North Shore. Archaeological remains from Phase 2 are primarily associated with the residential development of the proposal footprint during the mid to late nineteenth century. Substantial remains from this phase may have research potential associated with the development of the North Shore during this period, analysis of which may provide insight into the preferences and ways of life of the working-class community of Milsons Points at this time. Archaeological remains may also provide information on the material expressions of the relative isolation of the north shore prior to construction of the bridge, and difference with the CBD. The relatively short occupation of the site between the 1860s and the 1920s could offer a 'snapshot' of life prior to the easy access to the city and the acceleration of development. If intact archaeological remains are located, they would be locally significant. Phase 3 is associated the SHB construction. Archaeological remains of this phase would primarily consist of backfill deposits. These deposits do not hold any research potential and would not be of any significance. As such, potential Phase 3 archaeological remains within the proposal footprint would meet the threshold for listing under this criterion at a local level.
F) an item possesses uncommon, rare or endangered aspects of NSW's cultural or natural history (or the local area)	Archaeological remains from Phase 1 and Phase 2 are associated with the early development of European settlement of Sydney's North Shore. Whilst historically significant, these remains would not be uncommon or particularly rare as similar sites exists within Milsons Point. As such, potential archaeological remains within the proposal footprint would not meet the threshold for listing under this criterion at a local or State level.

Criterion	Discussion
G) an item is important in demonstrating the principal characteristics of a class of NSW's cultural or natural places or cultural or natural environments (or the local area)	Research indicates that potential archaeological remains within the proposal footprint would not possess any notable representative significance. As such, potential archaeological remains within the proposal footprint would not meet the threshold for listing under this criterion at a local or State level.

Consideration of archaeological research potential is also required when undertaking a significance assessment of an historical archaeological site. In *Assessing the Research Significance of Historic Sites* (1984), Bickford and Sullivan developed three questions to gauge significance:[1]

The following responses answer the questions posed by Bickford and Sullivan regarding the proposal footprint overall.

- Can the site contribute knowledge that no other site can?
    - The potential archaeological resource may contribute to our knowledge of the early development and occupation of North Sydney
- Can the site contribute knowledge that no other resource can?
    - Similar sites have been subject to considerable archaeological analysis in recent years. However, in terms of a comparison between the historical archaeology of the Southern Bridge abutments in The Rocks vs. the archaeology preserved in Bradfield Park there is the potential for the proposal footprint to contribute information that no other resource can do.
- Is this knowledge relevant to general questions about human history or other substantive questions relating to Australian history, or does it contribute to other major research questions?
    - This archaeological resource is likely to contribute insight or data that would provide insight into Australian history, and respond to research questions relevant to the local area.

7.6 Statement of archaeological significance

The proposal footprint has the potential to contain an archaeological resource associated with early agricultural land use and the residential development of the suburb of Milsons Point. Intact archaeological remains may provide information regarding domestic life, agricultural development, living conditions and the growth of the local economy from the late nineteenth century to the early twentieth century.

Archaeological remains are likely to consist of footings associated with former structures. As previously identified by HLA, the proposal footprint also has potential to contain archaeological relics

[1] Bickford, A. & S. Sullivan, 1984. Assessing the Research Significance of Historic Sites. In: Sullivan S. & S. Bowdler (eds.) *Site Surveys and Significance Assessment in Australian Archaeology* (Proceedings of the 1981 Springwood Conference on Australian Prehistory), Department of Prehistory, Research School of Pacific Studies, The Australian National University, Canberra, p. 23–24.

in the form of backfilled artefact-bearing deposits within decommissioned wells and former garden soils.

If any intact remains of this type are located, they may reach the threshold for local significance under criteria A and E.

A summary of the potential archaeological resource is summarised below and in Figure 65.

Table 12: Archaeological potential summary for the proposal footprint

Phase	Potential	Significance
Phase 1 (1788 – 1860s)	Moderate	Local
Phase 2 (1860s – 1920s)	High	Local
Phase 3 (1920s – 1930s)	High	Unlikely to reach the threshold of local significance
Phase 4 (1940s – 2016)	Nil/low	None (extant)

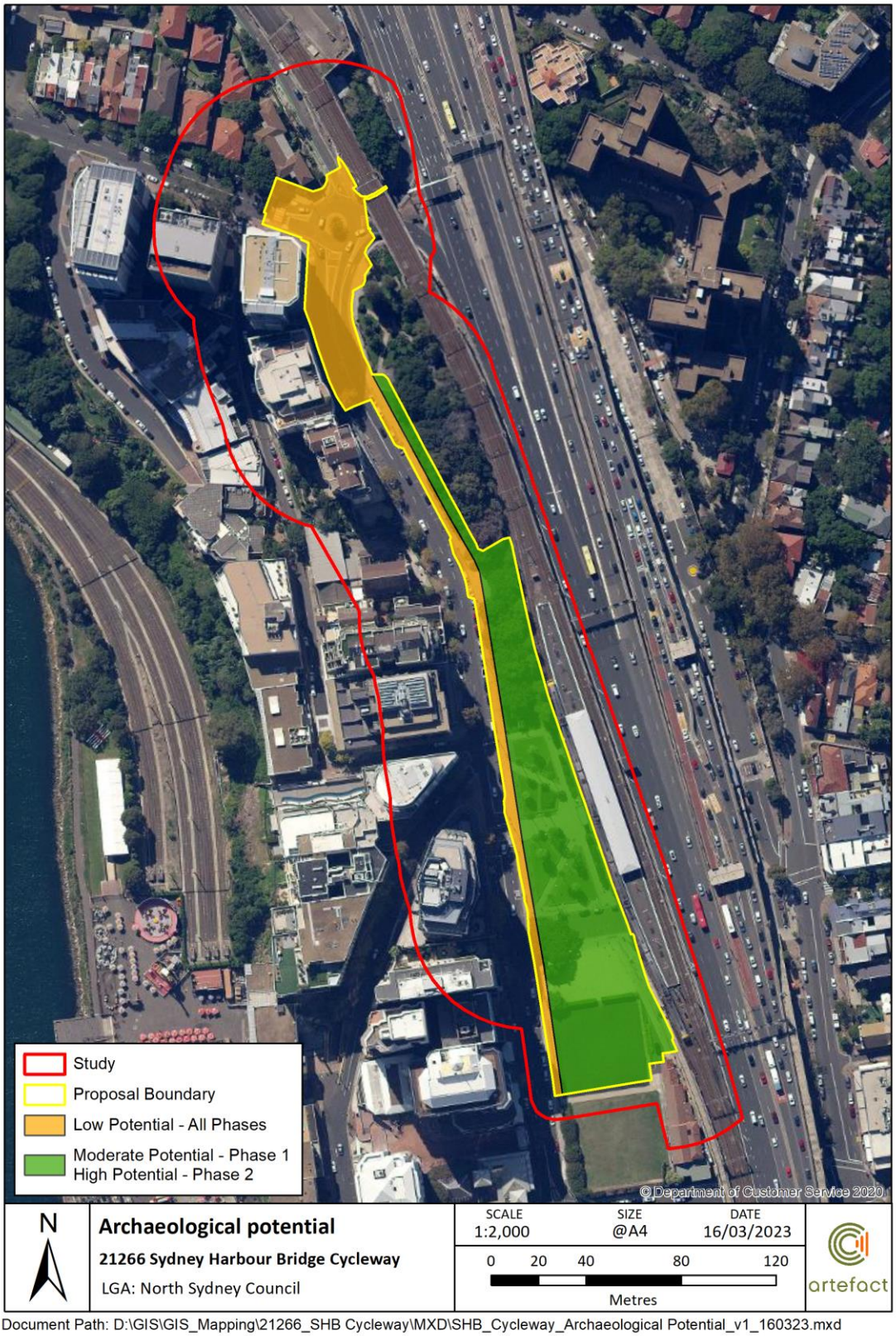

Figure 65: Overview of archaeological potential

8.0 HERITAGE IMPACT ASSESSMENT

8.1 Overview

This section assesses the heritage impact of the proposed works at the study area on heritage values within the study area. Justifications are also provided for the proposed works.

Within this approach, the objective of a heritage impact assessment is to evaluate and explain how the proposed works will affect the heritage value of the study area and/or place. A heritage impact assessment should also address how the heritage value of the site/place can be conserved or maintained, or preferably enhanced by the proposed works.

In order to consistently identify the impact of the proposed works, the terminology contained in the following table has been references throughout this document. The terminology and definitions are based on those contained in guidelines produced by the International Council on Monuments and Sites (ICOMOS)[12] and the Heritage Council of NSW[13]and are shown in Table 13.

Table 13: Terminology for assessing the magnitude of heritage impact.

Grading	Definition
Major adverse	Actions that would have a severe, long-term and possibly irreversible impact on a heritage item. Actions in this category would include partial or complete demolition of a heritage item or addition of new structures in its vicinity that destroy the visual setting of the item. These actions cannot be fully mitigated.
Moderate adverse	Actions that would have an adverse impact on a heritage item. Actions in this category would include removal of an important part of a heritage item's setting or temporary removal of significant elements or fabric. The impact of these actions could be reduced through appropriate mitigation measures.
Minor adverse	Actions that would have a minor adverse impact on a heritage item. This may be the result of the action affecting only a small part of the place or a distant/small part of the setting of a heritage place. The action may also be temporary and/or reversible.
Negligible	Actions that are so minor that the heritage impact is considered negligible.
Neutral	Actions that would have no heritage impact.
Minor positive	Actions that would bring a minor benefit to a heritage item, such as an improvement in the item's visual setting.
Moderate positive	Actions that would bring a moderate benefit to a heritage item, such as removal of intrusive elements or fabric or a substantial improvement to the item's visual setting.
Major positive	Actions that would bring a major benefit to a heritage item, such as reconstruction of significant fabric, removal of substantial intrusive elements/fabric or reinstatement of an item's visual setting or curtilage.

[12] Including the document Guidance on Heritage Impact Assessments for Cultural World Heritage Properties, ICOMOS, January 2011.
[13] https://www.environment.nsw.gov.au/resources/heritagebranch/heritage/material-threshold-policy.pdf

Table 14: Terminology for heritage impact types

Impact	Definition
Direct	Impacts resulting from works located within the curtilage boundaries of the heritage item.
Potential direct	Impacts resulting from increased noise, vibrations and construction works located outside the curtilage boundaries of the heritage item.
Indirect	Impact to views, vistas and setting of the heritage item resulting from proposed works outside the curtilage boundaries of the heritage item.
Archaeological	Impacts to potential archaeological remains located within the curtilage boundaries of the heritage item.

8.2 Early Investigation Works

8.2.1 Direct heritage impacts

The proposed early investigation works are divided into works to the bridge structure and works within the landscape.

8.2.1.1 Works to the bridge structure

The proposed early investigation works would involve multiple (4 no.) core holes into the significant fabric of the Sydney Harbour Bridge. Core holes would be bored horizontally in the concrete parapet (in the location of the proposed removal) and vertically down through the existing cycleway slab at the bridge deck level. These core holes would be undertaken to investigate the structural integrity of the fabric and inform the methodology for the removal of the proposed removal of the parapet and the ability for the parapet and road deck to accommodate a new connection for the cycleway.

Whilst the investigations would have minor adverse localised direct impacts to fabric and structures of significance to the Sydney Harbour Bridge, these impacts would be in areas which are already proposed to be removed as part of the cycleway works and therefore would not pose any greater impact than the removal itself.

Therefore, it is considered that overall, the proposed works would have **negligible** direct heritage impacts.

Direct impact: Negligible

8.2.1.2 Works to the landscape

The proposed early investigation works would require 4 no. Geotech boreholes, 16 no. slot trenches and tree root surveys.

The 4 no, boreholes are located within the SHR curtilage of the Sydney Harbour Bridge, but are outside the SHR curtilage for Milsons Point Railway Station. The 16 no. slot trenches are within the SHR curtilage of the Sydney Harbour Bridge.

The proposed geotechnical work would result in the removal of soft and hard landscaping to accommodate 120 millimetre diameter boreholes within the SHR curtilage of the Sydney Harbour Bridge. Each borehole would result in the removal of surface landscaping and subsurface materials to a maximum depth of 10 metres. The proposed slot trenches would also result in the removal of soft and hard landscaping within the SHR curtilage of the Sydney Harbour Bridge. The slot trenches measuring between 1-12 metres in length would result in the removal of surface landscaping and

subsurface materials to a maximum depth of 1.5 metres. A 5 metre buffer zone around each slot trench would be implemented to allow chasing services if required.

The proposed tree root survey would be non-invasive potholing to assess the location of tree roots prior to proposed future excavation for the cycleway. The tree root survey is required to identify all tree roots that may interfere with the proposed Cycleway construction. Slot trenches measuring approximately 0.3-0.5 metres at a depth between 0.4-1.5 metres would be performed around the perimeter of the proposed footpath and stormwater pit locations which are in close vicinity of retained trees (approximately 80 metres long in total). A 5 metre buffer zone around each slot trench and tree root survey location would be implemented. The non-invasive survey would use vacuum truck to create slot trenches – with a pressure that would not exceed 2000 Psi and performed under arborist supervision, in order to protect the tree root network.

Whilst the proposed investigation works would have a **localised temporary** impact on the ground and subsurface at the each site of the boreholes and slot trenches, the overall impact would be **negligible** to the overall significance of Bradfield Park and Sydney Harbour Bridge. The investigation works are located within areas and fabric of little significance, and all removed soft and hard landscaping would be reinstated, to match the existing upon completion of the works. The proposed tree potholing would have a **negligible** impact and would be a **positive** mitigation strategy to minimise impacts to significant tree root systems in the park.

Any direct physical impacts (including damage to the landscaped areas of the site) of mobile plant or temporary structures would be temporary in nature, made good upon completion of works and would therefore have a **negligible** direct impact on the overall landscape significance of Bradfield Park and the Sydney Harbour Bridge.

Direct impact: Negligible

8.2.2 Indirect heritage impacts

The proposed early investigation works are divided into works to the bridge structure and works within the landscape.

8.2.2.1 Works to the bridge structure

The proposed early investigation works would result in the removal of significant fabric of the Sydney Harbour Bridge. As however, the core holes would be fully reinstated and repaired to match the existing upon completion of the investigations, the indirect visual impacts of the proposal would be **negligible** on the overall significance of the Sydney Harbour Bridge.

The works would also be in an area which is proposed to be removed as part of the cycleway works and therefore would not pose any greater impact than the removal itself.

Therefore, it is considered that overall, the proposed works would have **negligible** indirect heritage impacts.

Indirect impact: Negligible

8.2.2.2 Works to the landscape

The proposed early investigation works would require 4 no. Geotech boreholes, 16 no. slot trenches and tree root surveys. The proposed works would result in the removal of landscaping within Bradfield Park. Each borehole will result in the removal of surface landscaping and subsurface materials to a maximum depth of 10 metres. The slot trenches measuring between 1-12 metres in length would result in the removal of surface landscaping and subsurface materials to a maximum depth of 1.5 metres. The proposed tree root survey would be non-destructive potholing to assess the location of

tree roots prior to proposed future excavation for the cycleway. Slot trenches measuring approximately 0.3-0.5 metres at a depth between 0.4-1.5 metres would be performed around the perimeter of the proposed footpath and stormwater pit locations which are in close vicinity of retained trees (approximately 80 metres long in total).

Due to the fact that the landscaping at each borehole site and slot trench site would be fully reinstated upon completion of the geotechnical investigations, the indirect visual impacts of the proposal would be **negligible** on the overall landscape significance of Bradfield Park.

Any indirect visual impacts of mobile plant or temporary structures (including construction hoardings) within Bradfield Park would be temporary in nature and will therefore be **negligible** on the overall significance of Bradfield Park.

Indirect impact: Negligible

8.3 Proposed Cycleway and Northern Access

8.3.1 Direct heritage impacts

Table 15 is a summary of the comparative direct (physical) impacts between the concept design and the detailed design, February 2023.

8.3.2 Potential direct heritage impacts

Table 16 is a summary of the comparative potential direct (physical – vibration and settlement) impacts between the concept design and the detailed design, February 2023.

8.3.3 Indirect heritage impacts

Table 17 is a summary of the comparative indirect (visual) impacts between the concept design and the detailed design, February 2023.

Table 15: Comparison of direct heritage impacts to the Sydney Harbour Bridge and surrounding heritage listings

Design feature	Listing(s) impacted	30% Concept Design Impact	70% Detailed Design Impact	Discussion
Removal of part of a parapet near the Burton Street stairs along the viaduct. The connection between the newly built ramp and the existing cycleway on the bridge. Raised median strips in the middle of the upper connection platform. Paving finishes and line marking between on the existing cycleway and new cycleway.	**NHL:** • 105888: Sydney Harbour Bridge **SHR:** • 00781: Sydney Harbour Bridge, approaches and viaducts (road and rail) **TAHE Section 170 Register:** • 4301067: Sydney Harbour Bridge, approaches and viaducts **North Sydney LEP:** • I0530: Sydney Harbour Bridge approach viaducts, arches and bays under Warringah Freeway	**Minor to Moderate adverse**	**Minor to Moderate adverse**	The proposed works potential impact remains consistent between concept design and detailed design, February 2023. The cutting of part of a parapet on the western cycleway would result in localised **moderate adverse** physical impact. This would see a removal of original fabric and replacement with contemporary material in the form of a linking ramp between the new structure and the existing. Whilst it is not ideal to remove original fabric, it would see a small section of the larger parapet removed whilst the remainder of the structure would be retained. Design refinement up to detailed design has also included aligning the cutting before the roundel decorative piece to ensure the symmetry of the parapet is retained and the cut is flush. The section of parapet being removed is also proposed to be reused within Bradfield Park North as an interpretation piece, which would have **minor positive** impact. The connection between the new ramp and the existing cycleway would be designed to be at the same level as the existing and would not be dominant in material, colour, form or scale. Keeping the landing level and clean would ensure the new design would merge with the existing heritage fabric in a sympathetic way. Raised median strips, line marking, and different pavement finishes are also proposed

Design feature	Listing(s) impacted	30% Concept Design Impact	70% Detailed Design Impact	Discussion
				on the upper platform of the ramp structure which would encourage cyclists to slow down or move to the side. Whilst these design elements are necessary for the safety of pedestrians and cyclists, they present a **minor adverse** physical impact to the existing viaduct structure, disturbing the flush concrete finish and introducing a physical and visual obstruction between the ramp connection and existing cycleway.
Creation of a landing point for the ramp in Bradfield Park.	**North Sydney LEP 2013:** • I0538: Bradfield Park (including northern section)	**Moderate adverse**	**Moderate adverse**	The proposed works potential impact remains consistent between concept design and detailed design, February 2023. The landing point for the ramp structure would result in **moderate adverse** physical and visual impacts to the setting of Bradfield Park North. The construction would see a direct physical impact to the park layout and a disturbance to the landscape features of Bradfield Park north. This change would see the existing wayfinding altered and the setting of the park as an open, public space partially obstructed. Whilst public amenity of the park would be altered due to the landing, it would also see a positive impact as general mobility of cyclists and pedestrians would be improved, relieving the congestion of Burton Street stairs and surrounds.
Introduction of a new structure into the setting of Bradfield Park, Milsons Point Station and the Bradfield Highway	**NHL:** • 105888: Sydney Harbour Bridge	**Minor to Moderate adverse**	**Moderate adverse**	The proposed works potential impact remains consistent with the upper threshold of impact assessed in the concept design compared to the detailed design, February 2023.

Design feature	Listing(s) impacted	30% Concept Design Impact	70% Detailed Design Impact	Discussion
approaches of the bridge.	**SHR:** • 00781: Sydney Harbour Bridge, approaches and viaducts (road and rail) • 01194: Milsons Point Railway Station Group **TAHE Section 170 Register:** • 4301067: Sydney Harbour Bridge, approaches and viaducts • 4801026: Milsons Point Railway Station **North Sydney LEP 2013:** • I0538: Bradfield Park (including northern section) • I0539: Milsons Point Railway Station Group • I0530: Sydney Harbour Bridge approach viaducts, arches and bays under Warringah Freeway			The ramp and associated structural elements would see a **moderate adverse** direct physical impact to the setting of Bradfield Park Central and North, the Northern Bowling Green, Milsons Point Station and the Bradfield Highway approaches on the Alfred Street South side. Generally, the interface of the ramp and the public domain is sympathetic to the heritage precinct and the landscape features of the open park setting. The materiality of the slim-line balustrades and piers, as well as the light colour palate, winding profile, setback from Alfred Steet, clearance from the viaducts, as well as the height of the structure, all blend well within the wider precinct. However, it is noted that the introduction of this structural element would result in a change to this open space and would partially obstruct the existing uncluttered feel to the precinct. Physical impacts would include the construction of the piers, abutment and the ramp landing, which would see potential disruption to the layout of the park space, the removal of original fabric within Bradfield Park Central and North, and the removal of some vegetation. The detailed design indicates that a larger abutment and footings are required to construct the proposed works, than first indicated in the concept design. As a result, this design change would have the potential to have a **moderate adverse** impact on archaeological remains within the park due to excavation requirements for footings. An ARD for the archaeological remains has been

Design feature	Listing(s) impacted	30% Concept Design Impact	70% Detailed Design Impact	Discussion
				prepared by Artefact to address the potential archaeology and their management should excavation have the potential to impact these artefacts.
A change to the layout of Bradfield Park, including the removal of some landscaping elements, vegetation, and introduction of new pedestrian and cycle pathways.	**North Sydney LEP:** • I0538: Bradfield Park (including northern section)	**Minor adverse**	**Minor adverse**	The proposed works potential impact remains consistent between concept design and detailed design, February 2023. The proposal would see a change to the layout of Bradfield Park Central and North, with the construction of the ramp structure and landing, as well as the introduction of new pedestrian and cycle pathways within and along the parks. **Minor adverse** physical impacts would result from this change however it is noted that the layout of the park would remain largely similar to the existing with small changes such as the removal of some landscaping elements, retaining walls or garden beds, and some vegetation. It is also noted that the new pathways would generally mirror the existing alignment of pedestrian footpaths along Alfred Street and within Bradfield Park North. Design refinements up to detailed design have also included the retention of significant trees within the park area, as well as existing heritage interpretation elements such as the sandstone strips outlining previous subdivisions and road alignments. The design also proposed to include more heritage interpretation opportunities in this area, including use of native plantings and use of paving finishes and potentially the reuse of the parapet cutting, subject to detailed design. These would all result in **minor positive**

Design feature	Listing(s) impacted	30% Concept Design Impact	70% Detailed Design Impact	Discussion
				impacts to the overall setting of the heritage precinct.
Alfred Street south cycleway and pedestrian pathway adjustments. Bus stop adjustments along Alfred Street. On-street parking adjustments. Associated landscaping.	**NHL:** • 105888: Sydney Harbour Bridge **SHR:** • 00781: Sydney Harbour Bridge, approaches and viaducts (road and rail) **North Sydney LEP:** • I0538: Bradfield Park (including northern section)	**Minor adverse to Neutral**	**Minor adverse to Neutral**	The proposed works potential impact remains consistent between concept design and detailed design, February 2023. The proposed works along Alfred Street South, such as the associated pathway adjustments and transport and amenity adjustments, would result in a **minor adverse to neutral** physical impact to nearby listings. These works would see a change to the existing arrangement of Alfred Street South but would not detrimentally impact the heritage values of any nearby listed items. It is noted majority of these works would occur outside of the curtilage of the listed items but may intersect with a listing boundary closer to the Bradfield Park side of the street. These works would result in a change to the streetscaping and amenities along Alfred Street south which would see a **minor positive** impact to the efficiency, useability and character of the street.
New pedestrian crossings and round about adjustments on both Middlemiss and Lavender Streets. Associated landscaping.	**NHL:** • 105888: Sydney Harbour Bridge **SHR:** • 00781: Sydney Harbour Bridge, approaches and viaducts (road and rail)	**Minor adverse to Neutral**	**Minor adverse to Neutral**	The proposed works potential impact remains consistent between concept design and detailed design, February 2023. The proposed works at the roundabout intersection with Middlemiss, Lavender and Alfred Streets would result in a **minor adverse to neutral** physical impact to nearby listings. These works would see a change to the existing arrangement of the roundabout but would not detrimentally impact the heritage values of any nearby listed items. It is noted majority of these works would occur

Design feature	Listing(s) impacted	30% Concept Design Impact	70% Detailed Design Impact	Discussion
				outside of the NHL and SHR curtilages but may intersect with a listing boundary closer to the Bradfield Park side of the intersection. These works would result in a change to the streetscaping and amenity at this intersection which would see a positive impact to the efficiency, useability and character of the street. It is also noted that the palm tree in the middle of the roundabout is to be retained, maintaining the visual appeal and notability of this intersection.
Ancillary sites during construction.	**NHL:** • 105888: Sydney Harbour Bridge **SHR:** • 00781: Sydney Harbour Bridge, approaches and viaducts (road and rail) **TAHE Section 170 Register:** • 4301067: Sydney Harbour Bridge, approaches and viaducts **North Sydney LEP:** • I0538: Bradfield Park (including northern section) • I0530: Sydney Harbour Bridge approach viaducts, arches and bays under Warringah Freeway	**Negligible to Neutral**	**Negligible to Neutral**	The proposed works potential impact remains consistent between concept design and detailed design, February 2023. The use of sites such as the space adjacent to the Northern Bowling Green and Burton Street archway as ancillary sites during the construction phase of this proposal would result in **negligible to neutra**l direct physical impacts. The impacts would be temporary in nature and are not expected to have any heritage impact.

Table 16: Comparison of potential direct heritage impacts (vibration and settlement) to the Sydney Harbour Bridge and surrounding heritage listings

Design feature	Listing(s) impacted	30% Concept Design Impact	70% Detailed Design Impact	Discussion
Excavation in Bradfield Park Central and North, and on each side of Burton Street for the columns footings and associated works.	**NHL:** • 105888: Sydney Harbour Bridge **SHR:** • 00781: Sydney Harbour Bridge, approaches and viaducts (road and rail) **TAHE Section 170 Register:** • 4301067: Sydney Harbour Bridge, approaches and viaducts **North Sydney LEP:** • I0538: Bradfield Park (including northern section) • I0530: Sydney Harbour Bridge approach viaducts, arches and bays under Warringah Freeway	**Negligible to Neutral**	**Negligible to Neutral**	The proposed works potential impact remains consistent between concept design and detailed design, February 2023. Excavations associated with these works is expected to have **negligible to neutral** potential direct physical impacts (vibration and settlement). It is unlikely any excavation associated with the construction phase of this proposal would result in any adverse potential physical impacts to the heritage listings and features of the precinct. However, it is possible that indirect physical impacts such as cracking or displacement could be caused by works associated with trenching, piling, jackhammering or concrete cutting within the vicinity of heritage items.

Table 17: Comparison of indirect heritage impacts to the Sydney Harbour Bridge and surrounding heritage listings

Design feature	Listing(s) impacted	30% Concept Design Impact	70% Detailed Design Impact	Discussion
Removal of part of a parapet near the Burton Street stairs along the viaduct. The connection between the newly built ramp and the existing cycleway on the bridge. Raised median strips in the middle of the upper connection platform. Paving finishes and line marking between on the existing cycleway and new cycleway.	**NHL:** • 105888: Sydney Harbour Bridge **SHR:** • 00781: Sydney Harbour Bridge, approaches and viaducts (road and rail) **TAHE Section 170 Register:** • 4301067: Sydney Harbour Bridge, approaches and viaducts **North Sydney LEP:** • I0530: Sydney Harbour Bridge approach viaducts, arches and bays under Warringah Freeway	**Minor**	**Minor adverse**	The proposed works potential impact remains consistent between concept design and detailed design, February 2023. There would be a **minor adverse** visual impact as a result of the partial demolition of the parapet and construction of a connection between the new ramp and the existing cycleway. Whilst the removal of an 8m section of the parapet would alter the visual appearance of the viaduct structure, as it is a relatively small section in the scheme of the whole bridge, its impact overall would be minor to the understanding of the bridge and its structures. Potential impacts would include the construction of a linear cycleway ramp and its connection with the existing approach and staircase near Burton Street. Whilst the cycleway ramp would run parallel with the bridge, it has been designed to be as small in scale and architecturally streamline as possible to ensure that minimal visual impacts occur to the bridge and viaduct structures. The cycleway's linear design has been purposefully designed through iteration in the project to achieve this minimised impact. The proposed works would have a localised impact at the area of the cycleway approach near the staircase at Burton Street, but would not compromise the visual prominence of the bridge itself. The existing steps would remain functional and would not be altered as part of the design.

Design feature	Listing(s) impacted	30% Concept Design Impact	70% Detailed Design Impact	Discussion
Creation of a landing point for the ramp in Bradfield Park.	**North Sydney LEP 2013:** I0538: Bradfield Park (including northern section)	**Moderate**	**Moderate adverse**	The proposed works potential impact remains consistent between concept design and detailed design, February 2023. The construction of a landing in Bradfield Park would see a direct **moderate adverse** visual impact to the park layout and a disturbance to the landscape features of Bradfield Park north. This change would see the existing wayfinding altered and the visual appeal of the park as an open, public space partially obstructed.
Partial obstruction of the Burton Street entrance to Milsons Point Station and the Burton Street archway.	**SHR:** • 01194: Milsons Point Railway Station Group **TAHE Section 170 Register:** • 4801026: Milsons Point Railway Station **North Sydney LEP 2013:** • I0539: Milsons Point Railway Station Group	**Minor to negligible**	**Minor adverse to negligible**	The proposed works potential impact remains consistent between concept design and detailed design, February 2023. The new structure would partially obstruct the Burton Street archway and entrance to Milsons Point Station. This would result in **minor adverse to negligible** direct visual impact to these key heritage features in the precinct. Renders from Alfred Street South facing the viaducts show that the new ramp structure and piers would not fully block viewpoints to these features but would see a **minor adverse** interruption from the public domain. The archway and the entrance to the Station would remain legible. The cartouche would remain visible as viewed from within the garden.
Introduction of a new structure into the setting of Bradfield Park, Milsons Point Station and the Bradfield Highway	**NHL:** • 105888: Sydney Harbour Bridge	**Moderate to Minor**	**Moderate adverse**	The proposed works potential impact remains consistent with the upper threshold of impact assessed in the concept design compared to the detailed design, February 2023.

Design feature	Listing(s) impacted	30% Concept Design Impact	70% Detailed Design Impact	Discussion
approaches of the bridge.	**SHR:** • 00781: Sydney Harbour Bridge, approaches and viaducts (road and rail) • 01194: Milsons Point Railway Station Group **TAHE Section 170 Register:** • 4301067: Sydney Harbour Bridge, approaches and viaducts • 4801026: Milsons Point Railway Station **North Sydney LEP:** • I0538: Bradfield Park (including northern section) • I0539: Milsons Point Railway Station Group • I0530: Sydney Harbour Bridge approach viaducts, arches and bays under Warringah Freeway			A **moderate adverse** visual impact would result from the construction of the elevated ramp. The proposed cycleway ramp, whilst it has been designed with a heritage focus in mind, it would still involve the construction of a new structure within Bradfield Park and the landscape around Milsons Point Station, and would alter the original visual understanding of the parapet and approaches as seen from the streetscape. The construction of the new structure would see temporary indirect visual impacts to the wider heritage precinct in the form of construction works, temporary hording, and plant movement. These works would also see temporary interruption to free-flowing movement and amenity in the public domain of the parks, the Burton Street archway and staircase, and the entrance to Milsons Point Station.
A change to the layout of Bradfield Park, including the removal of some landscaping elements, vegetation, and introduction of new pedestrian and cycle pathways.	**North Sydney LEP:** I0538: Bradfield Park (including northern section)	**Minor**	**Minor adverse**	The proposed works potential impact remains consistent between concept design and detailed design, February 2023. The proposal would see a change to the layout of Bradfield Park Central and North, with the construction of the ramp structure and landing, as well as the introduction of new pedestrian and cycle pathways within and along the parks. **Minor adverse** visual impacts would result from this change however it is noted that the layout of the park would remain largely similar to the existing with small changes such as the

Design feature	Listing(s) impacted	30% Concept Design Impact	70% Detailed Design Impact	Discussion
				removal of some landscaping elements, retaining walls or garden beds, and some vegetation. It is also noted that the new pathways would generally mirror the existing alignment of pedestrian footpaths along Alfred Street and within Bradfield Park North. Design refinements up to detailed design have also included the retention of significant trees within the park area, as well as existing heritage interpretation elements such as the sandstone strips outlining previous subdivisions and road alignments. The design also proposed to include more heritage interpretation opportunities in this area, including use of native plantings and use of paving finishes and potentially the reuse of the parapet cutting, subject to detailed design. These would all result in **positive** impacts to the overall setting of the heritage precinct.
Alfred Street south cycleway and pedestrian pathway adjustments. Bus stop adjustments along Alfred Street. On-street parking adjustments. Associated landscaping.	**NHL:** • 105888: Sydney Harbour Bridge **SHR:** • 00781: Sydney Harbour Bridge, approaches and viaducts (road and rail) **North Sydney LEP:** • I0538: Bradfield Park (including northern section)	**Minor to Neutral**	**Minor adverse to neutral**	The proposed works potential impact remains consistent between concept design and detailed design, February 2023. The proposed works along Alfred Street South, such as the associated pathway adjustments and transport and amenity adjustments, would result in a **minor adverse to neutral** visual impact to nearby listings. These works would see a change to the existing arrangement of Alfred Street South but would not detrimentally impact the heritage values of any nearby listed items. It is noted majority of these works would occur outside of the curtilage of the listed items but may intersect with a listing boundary closer to the Bradfield Park side of the street.

Design feature	Listing(s) impacted	30% Concept Design Impact	70% Detailed Design Impact	Discussion
				These works would result in a change to the streetscaping and amenities along Alfred Street south which would see a **positive** impact to the efficiency, useability and character of the street.
New pedestrian crossings and round about adjustments on both Middlemiss and Lavender Streets. Associated landscaping.	**NHL:** • 105888: Sydney Harbour Bridge **SHR:** • 00781: Sydney Harbour Bridge, approaches and viaducts (road and rail)	**Minor to Neutral**	**Minor adverse to neutral**	The proposed works potential impact remains consistent between concept design and detailed design, February 2023. The proposed works at the roundabout intersection with Middlemiss, Lavender and Alfred Streets would result in a **minor adverse to neutral** visual impact to nearby listings. These works would see a change to the existing arrangement of the roundabout but would not detrimentally impact the heritage values of any nearby listed items. It is noted majority of these works would occur outside of the NHL and SHR curtilages but may intersect with a listing boundary closer to the Bradfield Park side of the intersection. These works would result in a change to the streetscaping and amenity at this intersection which would see a positive impact to the efficiency, useability and character of the street. It is also noted that the palm tree in the middle of the roundabout is to be retained, maintaining the visual appeal and notability of this intersection.
Ancillary sites during construction.	**NHL:** • 105888: Sydney Harbour Bridge **SHR:** • 00781: Sydney Harbour Bridge, approaches and viaducts (road and rail) **TAHE Section 170 Register:**	**Negligible to Neutral**	**Negligible to neutral**	The proposed works potential impact remains consistent between concept design and detailed design, February 2023. The use of sites such as the space adjacent to the Northern Bowling Green and Burton Street archway as ancillary sites during the construction phase of this proposal would

Design feature	Listing(s) impacted	30% Concept Design Impact	70% Detailed Design Impact	Discussion
	• 4301067: Sydney Harbour Bridge, approaches and viaducts **North Sydney LEP:** • I0538: Bradfield Park (including northern section) • I0530: Sydney Harbour Bridge approach viaducts, arches and bays under Warringah Freeway			result in **negligible to neutral** indirect visual impacts. The impacts would be temporary in nature and are not expected to have any heritage impact.

8.4 Key features and impacts of the proposal

The following table (Table 18) summarises the key features of the concept design proposal and assesses the consistency of the detailed design, February 2023 with the previous assessment. Where the assessment differs, Artefact has noted the reasoning behind this difference.

Table 18: Comparison of key features and impacts of the proposal

Concept Design	Assessment of the Detailed Design
The proposal design process recognises and addresses the heritage values of the Sydney Harbour Bridge	Consistent
The placement of the proposed elevated linear bike ramp retains a large proportion of the park setting and retains the park for public use	Consistent
The introduction of the proposed elevated linear bike ramp provides new opportunities for interpretation of the Sydney Harbour Bridge and Bradfield Park	Consistent
The introduction of the proposed elevated linear bike ramp allows the park to be viewed and experienced from above as well as at ground level	Consistent
The visual impacts of the proposed elevated linear bike ramp are ameliorated to some extent by placement to the east (close to the bridge approach) and extending the proposed elevated linear bike ramp to make it a linear addition consistent with the bridge approach structure, while also reducing the gradient of the bridge and maximising the topography of the site	Consistent
Providing a contemporary and original design that embraces the Indigenous and non-Indigenous history and heritage of the place	Consistent
The proposal introduces a large, new structure within a park setting. The elevated linear bike ramp will be highly visible from street level and from all vistas within Bradfield Park. This impact is mitigated through good contemporary design, by locating the proposed elevated linear bike ramp close to the concrete bridge approach, and by graduating the proposed elevated linear bike ramp from its connection to the Sydney Harbour Bridge and to Bradfield Park.	Consistent

8.5 Cumulative impacts

The following assessment of cumulative impacts for the detailed design, February 2023 remains consistent with the concept design. No additional cumulative impacts have arisen out of the detailed design stage.

The introduction of the elevated ramp and upgrades to Alfred Street south cycle path can be understood within the context of change to the Sydney Harbour Bridge over time to meet new and evolving requirements and would be one of many changes to the Sydney Harbour Bridge since its construction. Other changes in the last 5 years to the physical and visual context of the Sydney Harbour Bridge include the following works:

- Removal of the Cahill Expressway toll booths
- Lift added to the east side of the bridge to provide step-free access to Bradfield Park for pedestrians

- Arch Maintenance Units and Compound sites

The cumulative impacts of the works to the bridge have been undertaken in the context of maintenance of the structure and fabric, as well as improvements for users. Overall, the recent changes to the bridge have been assessed as having **minor to moderate adverse** impacts to the original design of the Sydney Harbour Bridge and its visual setting and context.

The proposed cycleway, like previous works in and around the bridge is proposed to improve amenities for cyclist and is considered the first substantial change to the northern cycleway for many decades. The proposal is in keeping with the history of change over the structure, and has been assessed as having a **minor to moderate adverse** impact on the original design of the Sydney Harbour Bridge and its visual setting and context including to Bradfield Park.

The proposed elevated linear bike ramp should also be viewed as a complete, permanent addition to the Sydney Harbour Bridge: an addition that is unlikely to be altered substantively during its lifetime. Therefore, the elevated linear bike ramp is part of the evolution of the Sydney Harbour Bridge to meet commuter needs. However, it does represent a new intervention that contributes to the cumulative change that comes with catering for contemporary commuter requirements.

8.6 Impacts to archaeological resources

It is anticipated that locally significant archaeology would be impacted by the proposed works.

Bradfield Park has high potential to contain substantially intact locally significant archaeological resources associated with Phase 2 (1861-1920s). The intersection of proposed excavation works with Phase 2 buildings footings (as detailed from the 1891 Sydney Water Board plans) are illustrated in Figure 66 to Figure 69.

Bradfield Park has moderate potential to contain intact archaeological resources associated with Phase 1 (1788 – 1860s).

The remainder of the study area has low potential to contain intact archaeological resources (Figure 65).

Excavation impacts within areas of high archaeological potential would be relatively localised and associated with the following project works:

- Deep excavation for piers
- Excavation for landscaping
- Excavation for installation of signage
- Early works investigations (boreholes and NDD slot trenches).

The proposed columns pass through both the frontages and yards of former 1890s properties. Yards are more likely to contain archaeological ‘relics’ within backfilled wells and cesspits. The presence of artefact deposits associated with structural remains and wells/tanks containing artefactual material has been previously demonstrated through archaeological excavation in the vicinity.

Overall, there is potential for the works to impact locally significant archaeological resources. It is assumed that these impacts can be partially mitigated through archaeological management and the implementation of heritage interpretation strategies where appropriate.

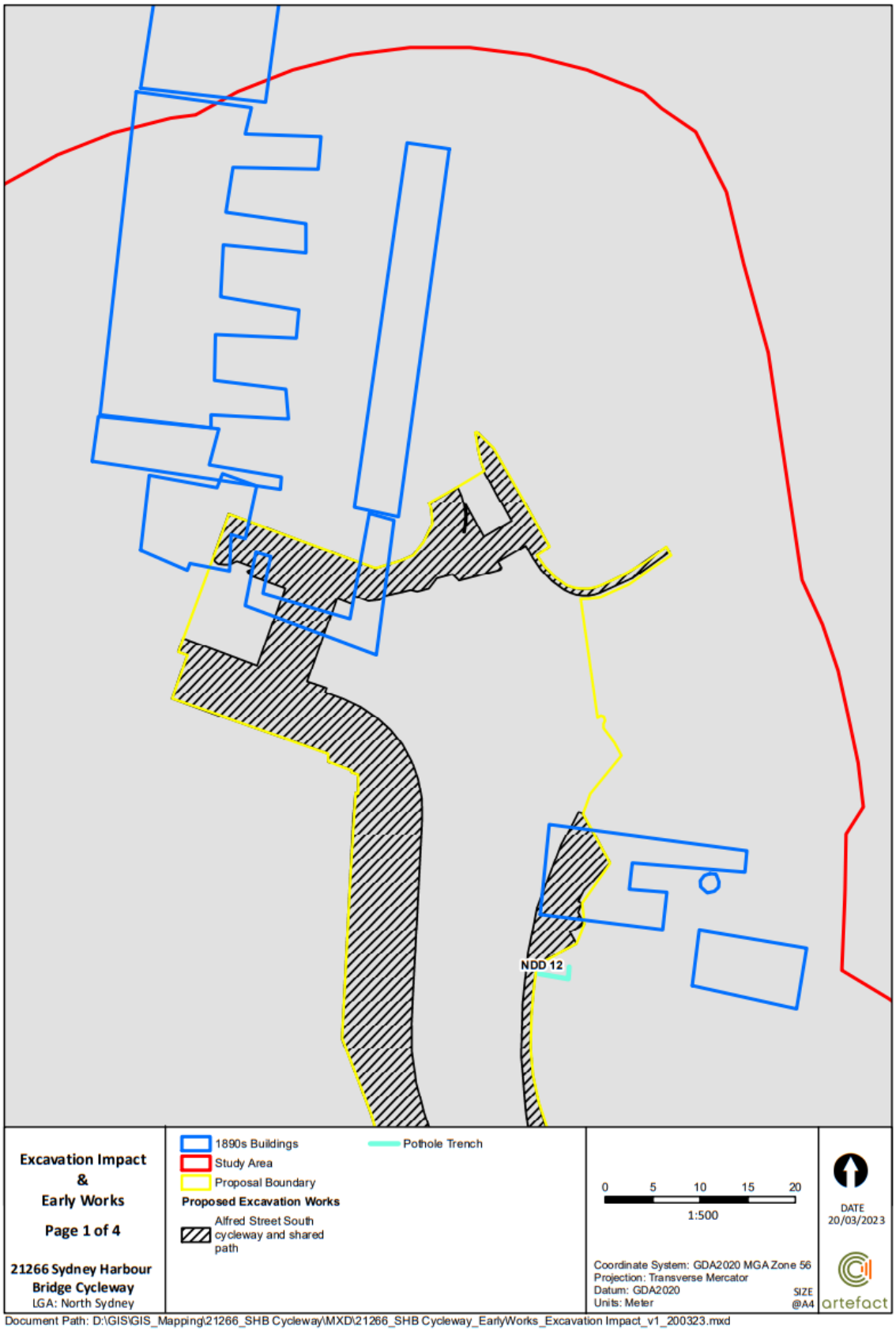

Figure 66: Proposed excavation impacts and intersection with potential Phase 2 archaeological remains (as detailed from 1891 Sydney Water Board plans)

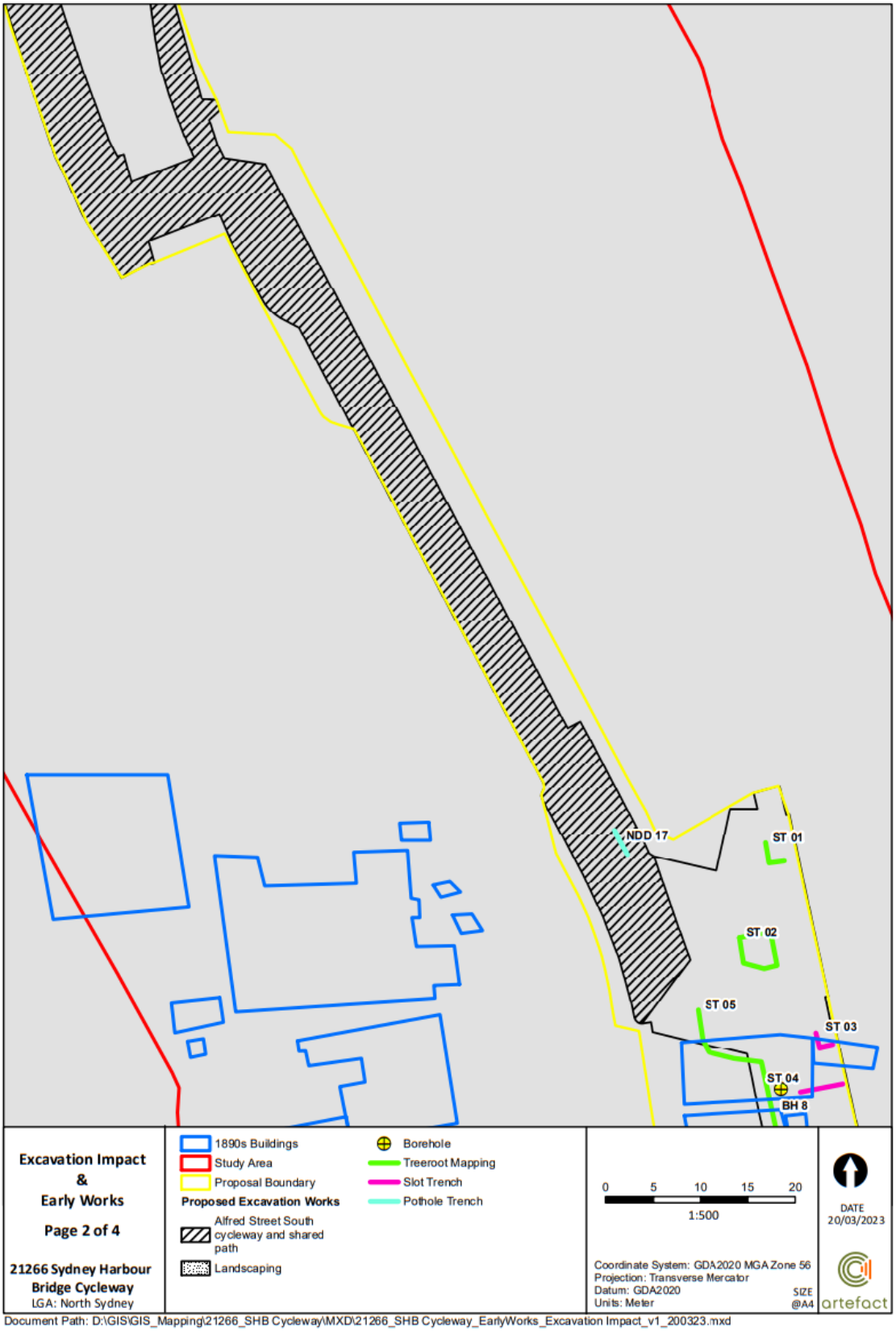

Figure 67: Proposed excavation impacts and intersection with potential Phase 2 archaeological remains (as detailed from 1891 Sydney Water Board plans)

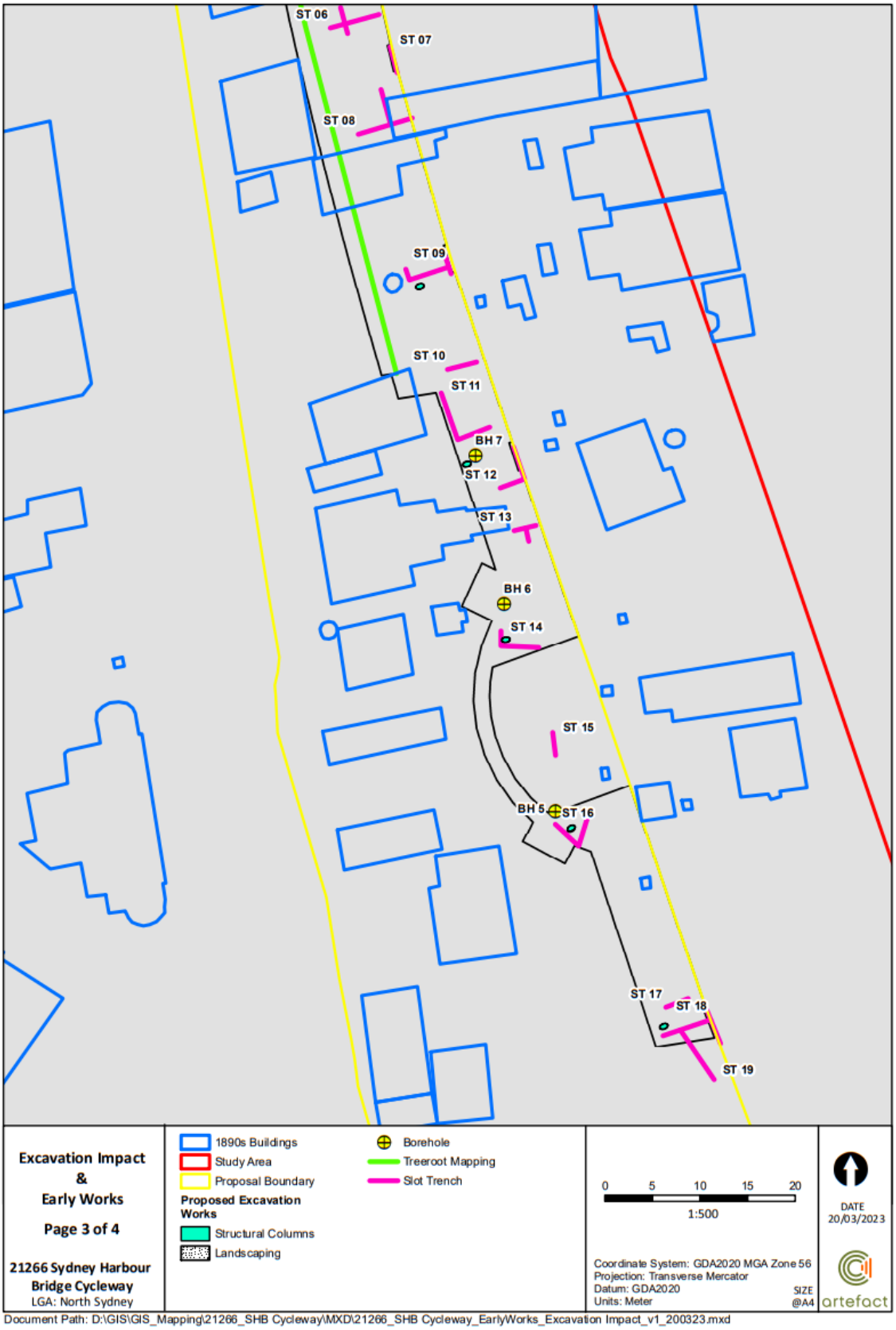

Figure 68: Proposed excavation impacts and intersection with potential Phase 2 archaeological remains (as detailed from 1891 Sydney Water Board plans)

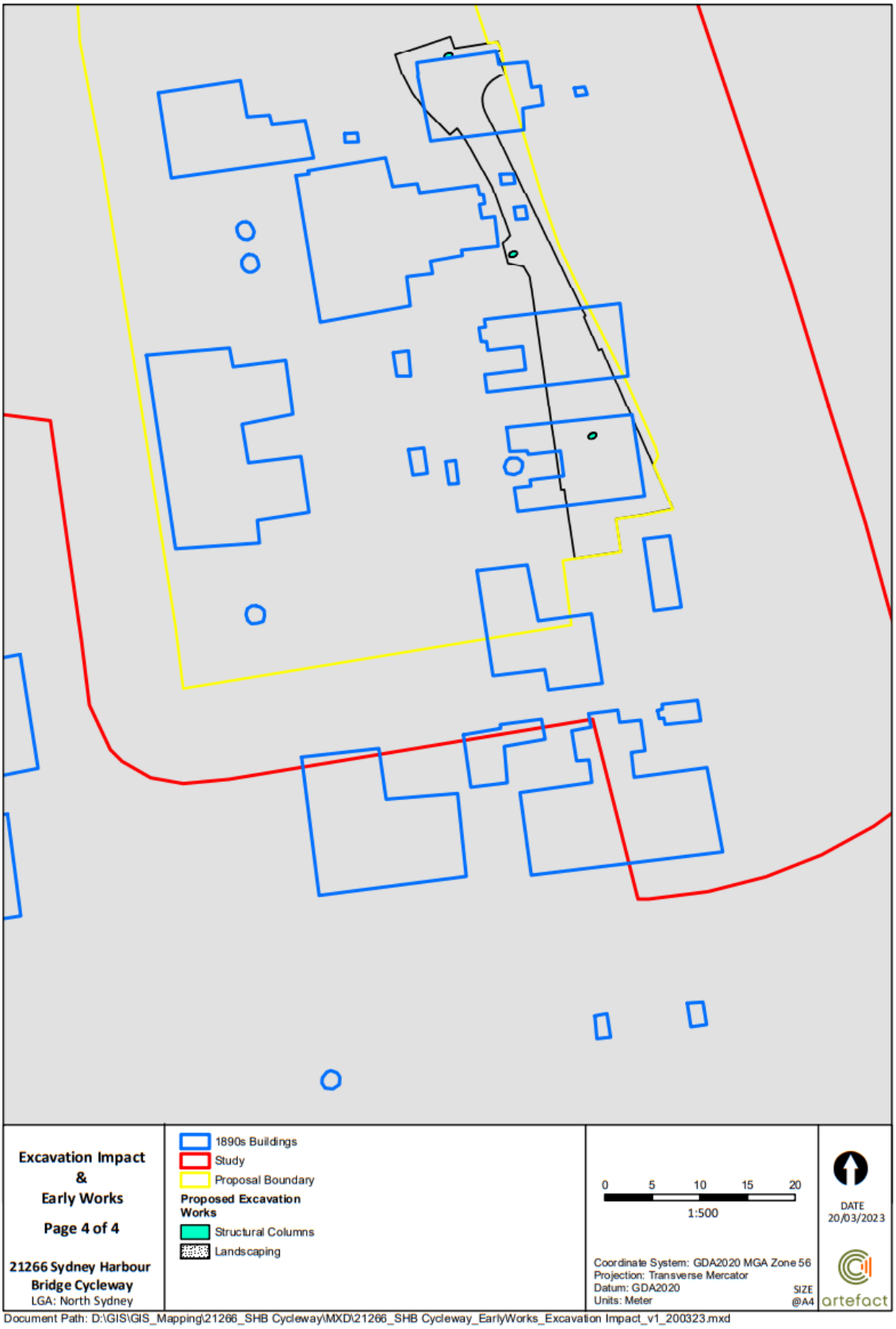

Figure 69: Proposed excavation impacts and intersection with potential Phase 2 archaeological remains (as detailed from 1891 Sydney Water Board plans)

8.7 Impact on National Heritage Values of the Sydney Harbour Bridge

This following section is the impact assessment on the National Heritage values of the Sydney Harbour Bridge (ID #105888) in accordance with the *Matters of National Environmental Significance: Significant Impact Guidelines 1.1* (Department of the Environment, 2003). For further information on the process and Significant Impact Guidelines, refer to Section 2.2.1.

8.7.1 National Heritage Values – Summary of Statement of Significance

The following is the Summary Statement of Significance of the National Heritage values of the Sydney Harbour Bridge.

> *The building of the Sydney Harbour Bridge was a major event in Australia's history, representing a pivotal step in the development of modern Sydney and one of Australia's most important cities. The bridge is significant as a symbol of the aspirations of the nation, a focus for the optimistic forecast of a better future following the Great Depression. With the construction of the Sydney Harbour Bridge, Australia was felt to have truly joined the modern age, and the bridge was significant in fostering a sense of collective national pride in the achievement.*
>
> *The Sydney Harbour Bridge was an important economic and industrial feat in Australia's history and is part of the nationally important story of the development of transport in Australia. The bridge is significant as the most costly engineering achievement in the history of modern Australia, and this was extraordinary feat given that it occurred at the severest point of the Great Depression in Australia.*
>
> *The bridge is also significant for its aesthetic values. Since its opening in 1932, the Sydney Harbour Bridge has become a famous and enduring national icon, and remains Australia's most identifiable symbol. In its harbour setting, it has been the subject for many of Australia's foremost artists, and has inspired a rich and diverse range of images in a variety of mediums – paintings, etchings, drawings, linocuts, photographs, film, poems, posters, stained glass - from its construction phase through to the present.*
>
> *The Sydney Harbour Bridge is also significant as one of the world's greatest arch bridges. Although not the longest arch span in the world, its mass and load capacity are greater than other major arch bridges, and no other bridge in Australia compares with the Sydney Harbour Bridge in its technical significance. In comparing Sydney Harbour Bridge with overseas arch bridges, Engineers Australia has drawn attention to its complexity in combining length of span with width and load carrying capacity. The construction of Sydney Harbour Bridge combined available technology with natural advantages provided by the site. The designers took advantage of the sandstone base on which Sydney was built, which enabled them to tie back the support cables during construction of the arch, and to experiment with massive structures. Although designed more than 80 years ago, the bridge has still not reached its loading capacity.*
>
> *The bridge is also significant for its important association with the work of John Job Crew Bradfield, principal design engineer for the New South Wales Public Works Department, who ranks as one of Australia's greatest civil, structural and transport engineers.*

8.7.2 National Heritage Criteria

The Sydney Harbour Bridge is registered on the National Heritage List for meeting its listing criteria A, E, F, G and H.

The values of the Sydney Harbour Bridge that meet the National Heritage criteria are set out in full in the listing on the National Heritage List, available here: https://www.environment.gov.au/cgi-bin/ahdb/search.pl?mode=place_detail;place_id=105888

8.7.3 Summary assessment of heritage impact on National Heritage values

While acknowledging there will be some negative impacts to significant fabric, the overall impact of this proposal will be positive.

With this new structure and associated elements, a better experience of cycling and commuting across the Sydney Harbour Bridge will be available to people who may never have been able to access the cycleway before. It would also ensure the continuation of the Sydney Harbour Bridge being a critical transport link between north and south Sydney, which is consistent with the identified National Values under criterion A 'Events and Processes'.

The improved functionality and accessibility of the northern cycleway would potentially enhance the accessibility to the Sydney Harbour Bridge and to both the inner city and North Sydney areas, which will continue to attract national and international visitors to cycle or walk across the Sydney Harbour Bridge as well as every day local Sydneysiders and commuters.

The proposed upgrades to the cycleway would result in some adverse physical impacts on the significant fabric of the Sydney Harbour Bridge parapets, which are part of the creative and technical achievement of the bridge's design. However, the design aesthetic and choice of materials of the new design respects and is sympathetic to the original fabric. These impacts are acknowledged as not insubstantial, but the design renders, as well as the peer review and optioneering process, have confirmed that improvements of commuter experience and mobility across the Sydney Harbour Bridge cycleway would be considerable, with the positive impacts of this improved amenity outweighing the potential minor to moderate adverse physical and visual impacts which would be caused by the construction of the cycleway. These impacts are therefore considered necessary to ensure the Sydney Harbour Bridge continue to be used as a critical and iconic transport link. The proposed works would not impact the ability to understand the Sydney Harbour Bridge as one of the world's greatest arch bridges, and its prominent landmark qualities within Sydney Harbour.

Our conclusion is that the accessibility and functionality related to the new cycleway ramp works would strengthen the core function of the Sydney Harbour Bridge as an iconic and critical transport link and provides a continuation of the core purpose of the Sydney Harbour Bridge as a transport conduit, evolving with transportation methods and needs over time. The proposed cycleway is therefore a significant contribution to the maintaining the relevance of the Sydney Harbour Bridge to users and their changing needs, and is therefore considered that it would have a positive impact on its National Heritage values.

8.7.4 Summary assessment of heritage impact on National Heritage values according to the National Heritage Significant Impact Criteria

The Significant Impact Criteria for a National Heritage place, as stated in the *Significant Impact Guidelines* are as follows:

> *An action is likely to have a significant impact on the National Heritage values of a National Heritage place if there is a real chance or possibility that it will cause:*
>
> - *one or more of the National Heritage values to be lost*
> - *one or more of the National Heritage values to be degraded or damaged, or*

- *one or more of the National Heritage values to be notably altered, modified, obscured or diminished.*

Comment:

The above assessment concludes that none of the National Heritage values of the Sydney Harbour Bridge will be lost, degraded or damaged through these proposed cycleway works.

None of the National Heritage values would be altered, modified, obscured, or diminished by the early investigation works or the proposed cycleway and northern access. Whilst physical fabric of the Sydney Harbour Bridge approaches would be altered and modified, and would have minor adverse impacts to a small section of the parapet which is part of the creative and technical achievement of the bridge, these are not considered significant impacts as the majority of the parapet would remain unaltered and continue to be understood physically and visually. The potential impacts would not impact the main National Heritage values of the bridge, which generally pertain to the cultural landmark status and engineering marvel that is the bridge. It is noted these changes would see improved access and amenity to the bridge's users and potentially enhance the ability of the Sydney Harbour Bridge to attract more users and admirers.

An action is likely to have a significant impact on historic heritage values of a National Heritage place if there is a real chance or possibility that the action will:

Historic heritage values:

- *permanently remove, destroy, damage or substantially alter the fabric of a National Heritage place in a manner which is inconsistent with relevant values*
- *extend, renovate, refurbish or substantially alter a National Heritage place in a manner which is inconsistent with relevant values*
- *permanently remove, destroy, damage or substantially disturb archaeological deposits or artefacts in a National Heritage place*
- *involve activities in a National Heritage place with substantial and/or long-term impacts on its values*

Comment:

Whilst the proposed early investigation works would have a temporary localised impact to significant fabric and landscaping, this would be repaired and made good on completion of the works. The proposed works related to the cycleway and northern access would however see the permanent remove some fabric of the Sydney Harbour Bridge, specifically an 8-metre section along the parapet where the cycleway ramp would connect with the existing cycleway. All these works would be carried out in a manner that is consistent with the relevant National Heritage values of the bridge. Whilst the works would involve a permanent physical and visual change to the Sydney Harbour Bridge approaches, the impacts are considered minor in relation to the overall fabric and visual understanding of the bridge within its setting and context, and would not result in a substantial impact to the National Heritage values of the places, particularly its ability to be understood as a landmark within Sydney Harbour.

- *involve the construction of buildings or other structures within, adjacent to, or within important sight lines of, a National Heritage place which are inconsistent with relevant values, and*
- *make notable changes to the layout, spaces, form or species composition of a garden, landscape or setting of a National Heritage place in a manner which is inconsistent with relevant values.*

Comment:

Construction of the ramp structure would occur within sight-lines of the Sydney Harbour Bridge but would not obscure or block any significant views to and from the bridge.

Whilst Bradfield Park would see some changes in layout, form and some plantings, the park would not be detrimentally impacted by these works. It is noted that Bradfield Park falls within the National Heritage listing of the Sydney Harbour Bridge but is not specifically identified in the listing citation. However, it is also noted that Bradfield Park is recognised within the SHR statement of significance for the Sydney Harbour Bridge as well as in its own LEP listing, as forming an important aspect of the setting of the Bridge on the northern side and is afforded community esteem via its individual local listing.

Furthermore, the design of the ramp, including the overall alignment close to the viaduct, the minimal architectural form of the ramp, and configuration of landing plaza have all been developed with close regard to the landscape value of Bradfield Park and have been designed to minimise the impacts to the park and the station entry plaza, as well as its important contribution to the visual, setting and landscape character at the northern approaches of the Sydney Harbour Bridge. The proposed works would not result in impacts to the ability to understand the Sydney Harbour Bridge as a landmark within Sydney Harbour and its larger landscape, urban and aquatic setting.

Other cultural heritage values:

- *restrict or inhibit the continuing use of a National Heritage place as a cultural or ceremonial site causing its values to notably diminish over time*
- *permanently diminish the cultural value of a National Heritage place for a community or group to which its National Heritage values relate*
- *destroy or damage cultural or ceremonial, artefacts, features, or objects in a National Heritage place, and*
- *notably diminish the value of a National Heritage place in demonstrating creative or technical achievement.*

Comment

The proposed early investigation works and proposed cycleway and northern access would not restrict or inhibit the continuity of use of the Sydney Harbour Bridge, nor would they permanently diminish the cultural value of the bridge to the local community. This proposal would potentially enhance the continued use of the Sydney Harbour Bridge and its value to the community. The proposed works would not destroy or damage cultural or ceremonial, artefacts, features or objects associated with the Sydney Harbour Bridge. They would also not diminish the value of the Sydney Harbour Bridge from demonstrating its creative and technical achievement as an engineering feat.

8.7.5 National Heritage impacts – self-assessment process

As the study area is contained within an NHL Place, this SOHI has been guided by the self-assessment process outlined in *Significant Impact Guideline 1.1* of the EPBC Act, to assess the impact of the proposed action on the heritage values for the Sydney Harbour Bridge. This assessment process is different to Section 8.7.3 and 8.7.4 of this report which assess the proposal against the National Heritage Values. The self-assessment process assesses the environmental context of the Place, the proposed impact and avoidance or mitigation strategies to determine if a significant impact will occur. The self-assessment provides a recommendation whether the proposed works would require referral under the EPBC Act.

Table 19: Summary of the National Heritage self-assessment findings

Action	Comments
Permanently remove, destroy, damage or substantially alter the fabric of a National Heritage place in a manner which is inconsistent with relevant values	The proposal would not remove, destroy, damage or substantially alter the significant fabric of the place. The relevant and significant values of the Sydney Harbour Bridge are primarily focussed on its extraordinary engineering associated with John Job Crew Bradfield, and the symbology it provides to the Australian people and the world as a cultural landmark. In addition, another key value is the place is an integral transport link between the north and south sides of the Harbour. The proposal would positively contribute to its key function and would not inhibit the significant values of the place.
Extend, renovate, refurbish or substantially alter a National Heritage place in a manner which is inconsistent with relevant values	Whilst the proposal offers a change to the existing pedestrian/cycle pathways along the Sydney Harbour Bridge, the proposal would not unreasonably alter the place or detract from its significant values.
Permanently remove, destroy, damage or substantially disturb archaeological deposits or artefacts in a National Heritage place	The proposal is unlikely to permanently remove, destroy, damage or substantially disturb archaeological deposits or artefacts of National or State Heritage significance.
Involve activities in a National Heritage place with substantial and/or long-term impacts on its values	Substantial and/or long-term impacts are not expected from this proposal on the significant values of the Place. The proposal does see a change to the Place, but it would not cause unacceptable impacts to significant values associated with the iconic structural elements of the Sydney Harbour Bridge, such as the arch span.
Involve the construction of buildings or other structures within, adjacent to, or within important sight lines of, a National Heritage place which are inconsistent with relevant values, and	The proposal would not involve construction of buildings within sight lines of the place however it would involve the construction of structures adjacent to the Place. These structures, in the form of ramps and pathways, would not impact the sight lines nor inhibit appreciation of the Place from the public domain. The proposal is actively discrete and would contribute to the ongoing function of the Sydney Harbour Bridge as a key transport link.

Action	Comments
Make notable changes to the layout, spaces, form or species composition of a garden, landscape or setting of a National Heritage place in a manner which is inconsistent with relevant values.	While Bradfield Park would see some changes in layout, form and some plantings, the park would not be detrimentally impacted by these works. It is noted that Bradfield Park falls within the National Heritage listing of the Sydney Harbour Bridge but is not specifically mentioned in the listing citation for the Bridge. However Bradfield Park is recognised for its significant landscape and setting contributions to the Bridge on the northern side in the SHR listing for the Bridge and the LEP listing for the Park. Overall, the changes introduced by the proposal would be consistent with the existing form and setting, and would not impact the significant values of the Sydney Harbour Bridge.

8.7.6 Conclusion

Works proposed as part of the Sydney Harbour Bridge Cycleway Northern Access proposal (including early investigation works) are substantial and would have some adverse physical impacts on fabric of the Burton Street viaducts, the visual setting of the Sydney Harbour Bridge within Bradfield Park, and also on views to the northern approaches of the bridge. However, the technical achievement of the Sydney Harbour Bridge's design and its status as an iconic cultural landmark would be respected and not diminished by these works.

Over the years a range of upgrade projects have been successfully delivered at the Sydney Harbour Bridge over time, with technology, function and transport having evolved alongside the operation of the Bridge since its construction. These include projects which have introduced new elements to the Sydney Harbour Bridge, such as new pedestrian lifts, removal of toll booths, replacement of the arch maintenance units, sleeper replacement and replacement of other rail infrastructure on the rail line, arch maintenance projects, as well as replacement of flags and associated flag poles. All past projects have complied with the conservation objectives of the Conservation Management Plan for the Bridge and support its ongoing use and function without detracting from National Heritage values.

The impacts on fabric and spaces by the proposal are permanent but are considered to be minor in nature and would not have a 'significant impact' on the National Heritage values.

It is important to note the accessibility and functionality related to the new cycleway ramp works would strengthen the core function of the Sydney Harbour Bridge as an iconic and critical transport link and provides a continuation of the core purpose of the Sydney Harbour Bridge as a transport conduit, evolving with transportation methods and needs over time. The proposed cycleway is therefore a significant contribution to the maintaining the relevance of the Sydney Harbour Bridge to users and their changing needs, and is therefore considered that it would have a positive impact on its National Heritage values.

It is concluded that the proposal is not likely to cause the loss, degradation or diminishment of National Heritage values (i.e. would not constitute a significant impact) and therefore an EPBC Act referral is not recommended.

8.8 Assessment against CMP policies

The following table records only those policies that are assessed as directly relevant to the proposal. It also assesses whether the detailed design, February 2023 is consistent with the CMP in comparison with the concept design.

Table 20: Terminology for assessing the magnitude of heritage impact

Policy #	Overarching policy	Policy detail	Are works consistent with CMP policy? (Yes/No?)	Comments
1.2	Policy 1 – Retention of cultural significance	Any change in ownership, future uses, maintenance, repair and/or **adaptation works** and asset management programs should include retention and appropriate care of the significant elements and attributes of the place as a matter of highest priority.	Yes	The proposed works remains consistent between concept design and detailed design. The proposal comprises adaptation works that retain significant elements and attributes in the study area of the Sydney Harbour Bridge.
1.5		Alternatives to actions with adverse heritage impacts to the heritage values of the Sydney Harbour Bridge must be explored and assessed before such actions are undertaken	Yes	The proposal has been subject to extensive assessment and consideration of design options. Optioneering process and outcomes of the design competition undertaken by TfNSW sought to have heritage as a key consideration in the decision making including the overall design outcome to be a linear scheme. The early investigation works have been designed to minimise adverse impacts and are to be located in areas which would be impacted by the proposed cycleway works later. The detailed design is a result of the refinement and development of the Design

Policy #	Overarching policy	Policy detail	Are works consistent with CMP policy? (Yes/No?)	Comments
				by Design 5 in collaboration with Aspect and TfNSW to minimise impacts on the Sydney Harbour Bridge fabric. The potential visual impact of options were assessed in the LCVIA which helped to determine the best design solution which minimised physical and visual impacts. Throughout the design process, the TZG heritage framework was referred to.
3.1	Policy 3 – Coordination with management plans	The analysis and recommendations of the CMP should be checked against and coordinated with any associated management plans for the Sydney Harbour Bridge to ensure consistency of aims, approach and outcomes.	Yes	Relevant management plans have informed the development of the proposal.
6.3	Policy 6 – Professional heritage advice	Transport for NSW or its agent must obtain advice from an external heritage practitioner where an approval under s60 of the Heritage Act is required.	Yes	Transport for NSW has obtained advice from Artefact Heritage, TZG Architects, and from design and heritage professionals at Aspect. Design 5 Architects are engaged by the winning design team and have informed the concept design with specialist advice Design 5.
9.1	Policy 9 – Priority of cultural heritage value	Decisions regarding change to the Sydney Harbour Bridge should be based on a clear and balanced understanding of the impacts on its cultural heritage values – positive and negative, and measures taken to either avoid or mitigate adverse impacts including cumulative impacts.	Yes	The proposal has been subject to extensive consultation, optioneering and assessment. The resultant proposal has been assessed in this document – including analysis of cultural heritage values and cumulative impacts. The consultation outcomes are included in the REF.
10.1	Policy 10 – Management objectives	Ongoing management of the Sydney Harbour Bridge should aim to: • Retain its fundamental cultural heritage values and attributes	Yes	The potential impacts of the proposed works remain consistent between concept design and detailed design.

Policy #	Overarching policy	Policy detail	Are works consistent with CMP policy? (Yes/No?)	Comments
		• Conserve significant elements and values • Enhance opportunities for presentation and interpretation of the history of the Sydney Harbour Bridge to the public. • Continue its function as the main road, rail, pedestrian and cycle connection across Sydney Harbour, in continuous use since 1932 • Continue and enhance its linkage with associated elements within the setting of the Sydney Harbour Bridge, including Bradfield Park and Plaza, Dawes Point (Tar-Ra) Park and other foreshore areas within the view lines of the Sydney Harbour Bridge (via interpretation, related activities, transport routes, etc).		The proposed early investigation works and the proposed cycleway and northern access would not have a negative impact on the cultural heritage values and attributes of the Sydney Harbour Bridge or other adjacent heritage places. The proposal also provides opportunities for improved interpretation and for improved linkages (primarily for cyclists).
12.1	Policy 12 – Maintaining key views of the Sydney Harbour Bridge in its setting	The significant physical and visual character of the Sydney Harbour Bridge within its harbour setting should be conserved.	Yes	The potential impacts of the proposed works remain consistent between concept design and detailed design. The proposed early investigation works would be located in areas proposed to be impacted by the elevated linear bike ramp construction. The coreholes would be repaired and made good on completion of investigation therefore impacts would be temporary. The proposed elevated linear bike ramp is to be in a relatively discrete location in the context of the Sydney Harbour Bridge in its entirety. The proposed elevated linear bike ramp would result in localised view impacts however these are ameliorated to some extent by the design and configuration of the elevated linear bike ramp and that the elevated linear bike ramp is recessive in relation to the northern approaches, to Milsons Point Railway Station and to the

Policy #	Overarching policy	Policy detail	Are works consistent with CMP policy? (Yes/No?)	Comments
				Sydney Harbour Bridge. It does not impact negatively on the Sydney Harbour Bridge within its harbour setting.
12.2		Views and vistas to and from the Sydney Harbour Bridge from key points to the north, south, east and west should be maintained.	Yes	The potential impacts of the proposed works remain consistent between concept design and detailed design. See comment for 12.1 above. The proposed early investigation works and elevated linear bike ramp would not obscure any view of the Sydney Harbour Bridge from the north or west but does involve localised view impacts to the park and to Milsons Point Railway Station and bridge approaches.
12.3		New structures or large plantings on the harbour foreshores of Dawes Point and Milsons Point should not obscure the visual form and setting of the Sydney Harbour Bridge.	Yes	The potential impacts of the proposed works remain consistent between concept design and detailed design. See comments above for 12.1 and 12.2.
12.4		New structures or large plantings on the northern or southern side of the harbour should not obscure or detract from views of Sydney Harbour and the city from the Sydney Harbour Bridge.	Yes	The potential impacts of the proposed works remain consistent between concept design and detailed design. See comments above for 12.1 and 12.2.
13.1	Policy 13 – Retention of existing open space for public use/recreation	The existing parklands adjacent to the Sydney Harbour Bridge are of Exceptional significance and should remain as public parks to continue to provide passive recreation and facilitate unimpeded views to the Sydney Harbour Bridge.	Yes	The potential impacts of the proposed works remain consistent between concept design and detailed design. The proposed early investigation works and the proposed cycleway would not change the current use of Bradfield Park and does not impede access to the park or restrict views to the Sydney Harbour Bridge. It does

Policy #	Overarching policy	Policy detail	Are works consistent with CMP policy? (Yes/No?)	Comments
				result in a visual impact, but this is ameliorated by good design and by locating most of the proposed elevated linear bike ramp at elevation. The preferred design has been selected with a view to preserving the open nature of the plaza and parklands, with some inevitable change to current conditions due to the need to land the ramp near where concrete bandstand is and construct new piers
13.2	Policy 13 – Retention of existing open space for public use/recreation	The future management of the Sydney Harbour Bridge, approaches and parklands should ensure the continuation of their open character and scale, providing an unencumbered setting whilst retaining the existing open spaces and historic viewing areas.	Partially	The potential impacts of the proposed works remain consistent between concept design and detailed design. See comment for 13.1 above. The installation of the proposed elevated linear bike ramp to some extent detracts from the existing setting but retains the open space and existing use of Bradfield Park.
14.1	Policy 14 – Integrity of original design	The clarity of the main structural form and silhouette of the Sydney Harbour Bridge and its associated elements, when viewed from key points around the harbour should be maintained and not obscured.	Partially	The potential impacts of the proposed works remain consistent between concept design and detailed design. The proposed elevated linear bike ramp does not obscure the Sydney Harbour Bridge from any key viewing points. The design of the proposed elevated linear bike ramp respects the design of the Sydney Harbour Bridge.
14.2		Views of the original form of the granite pylons and approach span piers should be maintained, and any appropriate new uses accommodated within these elements.	Yes	The potential impacts of the proposed works remain consistent between concept design and detailed design.

Policy #	Overarching policy	Policy detail	Are works consistent with CMP policy? (Yes/No?)	Comments
				Views of the granite pylons and approach spans are not impeded. The proposed elevated linear bike ramp does interrupt the view of the concrete approach from the park and Alfred Street South but the design of the cycleway ameliorates the hard visual transition between the park and the concrete approach.
14.3		The fabric and design integrity of the main components of the Sydney Harbour Bridge, comprising the arch, hangers, roadway, pylons, approach spans, piers; and approaches including tunnels, tenancy spaces, the substation and switch house, and Milsons Point Railway Station, should be conserved.	Yes	The potential impacts of the proposed works remain consistent between concept design and detailed design. The proposed elevated linear bike ramp does not involve the removal of components identified in policy 14.3 but it does involve some physical intervention where the proposed elevated linear bike ramp connects to the bridge approach, however the parapet section to be removed could be relocated in the park for interpretation, subject to landowner agreement.
14.4		Significant/original decorative and or functional minor elements, such as cast-iron railings, steel windows, rainwater elements, pressed metal awnings, balustrades, lighting, steps and decoration, should be conserved.	Partially	The potential impacts of the proposed works remain consistent between concept design and detailed design. The work involves minimal impact to fabric in the location of the proposed coreholes and boreholes and where the proposed elevated linear bike ramp connects to the Sydney Harbour Bridge northern approach. There is no significant impact to significant decorative and or functional minor elements.

Policy #	Overarching policy	Policy detail	Are works consistent with CMP policy? (Yes/No?)	Comments
14.6		Where feasible and reasonable, original design elements that contribute to the heritage value of the bridge should be restored or recreated, and the introduction of distracting elements minimised.	Not applicable	The potential impacts of the proposed works remain consistent between concept design and detailed design. The proposed elevated linear bike ramp respects and embraces the heritage values of the Sydney Harbour Bridge.
16.4	Policy 16 – Use appropriate specialist personnel	Significant fabric should be retained and maintained in situ and, where feasible, in its current state and form.	Yes. Further details may be required.	The potential impacts of the proposed works remain consistent between concept design and detailed design. The section of the bridge parapet to be removed could be relocated in the park for interpretation, subject to landowner agreement.
17.1	Policy 17 – Records of intervention and maintenance	All works to the Sydney Harbour Bridge should be appropriately recorded, and the records catalogued and stored as part of the management of the Sydney Harbour Bridge archives. This includes any specialist heritage advice used to support s60 approvals and/or s57 Standard Exemptions.	Yes	Transport for NSW is required to document all works and approvals and to retain records. An archival recording is required prior to commencement of the proposed elevated linear bike ramp.
18.1	Policy 18 – General management of adaptation and change	All proposals for intervention, adaptation and change should be evaluated in terms of the nature of the proposal, its purpose, long-term context and how this relates to the identified cultural heritage values of the Sydney Harbour Bridge. Protection and enhancement of the significant elements of the Sydney Harbour Bridge through appropriate adaptation and change for new or additional necessary functions should be a key management goal.	Yes	There has been extensive work to address heritage and other considerations during planning and evaluation of the proposed elevated linear bike ramp. The REF should be referred to for further details of planning and evaluation, etc. to manage adaptation and change.
18.2		Changes to the Sydney Harbour Bridge due to its ongoing historically significant function as the main road, rail, pedestrian and **cycle** connection across Sydney Harbour, in continuous use since 1932 should be given priority over	Yes	The potential impacts of the proposed works remain consistent between concept design and detailed design.

Policy #	Overarching policy	Policy detail	Are works consistent with CMP policy? (Yes/No?)	Comments
		changes determined by the needs of secondary uses such as tourism and recreation.		The proposed elevated linear bike ramp is consistent with an historically significant function: the use of the Sydney Harbour Bridge for cycle access.
18.3		Assess and minimise the impact of physical alterations on the cultural heritage significance of the Sydney Harbour Bridge, particularly where these changes are outside the Standard or Site-Specific Exemptions under Section 57(2) of the *Heritage Act*.	Yes	See comments above for Policy 18.2.
18.4		Any adverse impacts on the heritage values of the Sydney Harbour Bridge, as a whole or its particular components arising from new work, should be minimised by: • Exercising caution and reviewing the imperative for any new work with potentially adverse heritage impacts • Examining alternative solutions and their relative impacts to determine the option with the least adverse heritage impacts • Ensuring, where possible, that changes (to use, layout and fabric) are reversible and/or have minimal adverse impacts on the cultural heritage significance of the Sydney Harbour Bridge. This should include restricting changes to areas/fabric of no/less heritage value which have higher tolerances/thresholds for change.	Yes	The elevated linear bike ramp has been subject to rigorous assessment and design development to minimise impacts. Refer responses to Policy 1.5
18.5		New work must aim to facilitate the continuation of the historically significant function of the Sydney Harbour Bridge as the main road, rail, pedestrian and cycle connection across Sydney Harbour, without obscuring or adversely affecting the integrity of the original design, significant fabric or its heritage values.	Yes	The potential impacts of the proposed works remain consistent between concept design and detailed design. The proposed elevated linear bike ramp is consistent with an historically significant function: the use of the Sydney Harbour Bridge for cycle access.

Policy #	Overarching policy	Policy detail	Are works consistent with CMP policy? (Yes/No?)	Comments
18.6		Proposals affecting the Sydney Harbour Bridge should be assessed to determine whether their purpose is compatible with the fundamental heritage values and historic use of the Sydney Harbour Bridge as the main road, rail, pedestrian, and cycle connection across Sydney Harbour.	Yes	The proposed elevated linear bike ramp has been subject to rigorous assessment and design development, etc. to minimise impacts and to ensure compatibility while addressing the need for improved cycle access. Refer responses to Policy 1.5
18.7		The introduction of new services should be designed to be as unobtrusive as possible, Redundant original or early services should be recorded prior to removal.	Yes.	The potential impacts of the proposed works remain consistent between concept design and detailed design. Most services would be installed on the proposed elevated linear bike ramp.
18.8		The attachment of services to steelwork should be minimised and located as unobtrusively as possible. Where existing services, such as electrical power and compressed air, are obtrusive, opportunities should be investigated for their relocation to reduce visual impact on significant fabric.	Yes.	See comments to Policy 18.7
18.9		Services should not be fixed to the external surfaces of granite or rendered concrete elements such as the pylons or approach span piers.	Yes.	See comments to Policy 18.7
18.10		New work should be designed in accordance with Burra Charter principles, particularly the requirements of Article 22.2 that it readily be identifiable as new work, but at the same time respect and have minimal impact on the cultural significance of the Sydney Harbour Bridge.	Yes	The design development and heritage assessment for the proposal has considered principle 22.2 of the Burra Charter.
18.11		Heritage practitioners must consider the cumulative impacts of proposals on the Sydney Harbour Bridge, particularly where their advice would accompany a section 60 approval application or be used to assess the appropriateness of a particular exemption.	Yes	The potential impacts of the proposed works remain consistent between concept design and detailed design.

Policy #	Overarching policy	Policy detail	Are works consistent with CMP policy? (Yes/No?)	Comments
				See 8.5, in particular: The proposed elevated linear bike ramp does represent a new intervention that contributes to the cumulative change that comes with updating of the place over time to cater to modern needs. The proposal follows other proposals such as the new lifts, new lighting, and upgrading of sleepers from timber to concrete, none of which adversely affect historic function, form and overall integrity of the Sydney Harbour Bridge but rather, support ongoing and continued use of the Sydney Harbour bridge as a major transport link, a use which is intrinsic to the item's heritage value.
19.1	Policy 19 - lighting	All remaining original Sydney Harbour Bridge lighting should be retained, conserved and used where possible.	Not applicable.	The potential impacts of the proposed works remain consistent between concept design and detailed design. Lighting is to be installed on the proposed elevated linear bike ramp. There is no impact to existing lighting.
19.2		The design and installation of new light fittings for use on the Sydney Harbour Bridge should complement the design character of significant bridge elements and be reversible.	Yes	The potential impacts of the proposed works remain consistent between concept design and detailed design. The new light fittings will be contemporary and are to be installed on the proposed elevated linear bike ramp only.
20.3	Policy 20 – Traffic, safety and directional signage	All new signs (including leased areas of the approaches, pedestrian, cycling, traffic, safety and directional) installed on the bridge, approaches and approach spans should form part of an integrated range of signs that complement the history and character of the Sydney Harbour Bridge.	Yes	Signage for the project has been designed to complement and integrate with the existing signs. Wayfinding signs for cycling and pedestrians would be provided, as well as regulatory signage.

Policy #	Overarching policy	Policy detail	Are works consistent with CMP policy? (Yes/No?)	Comments
				Existing council interpretation signage would be retained where possible, or relocated where impacts are unavoidable.
20.4		All signage is to conform to work Health and Safety requirements.	Yes	Regulatory signage would be provided.
24.1	Policy 24 - Advertising	The Sydney Harbour Bridge, including the arch, pylons, approach spans and approaches, should not be used for commercial advertising in any form including signage, projections, or other media, except as follows: • Advertising associated with commercial tenancies as discussed in Policy 23.4	Not applicable.	The proposal does not include any advertising.
29.1	Policy 29 – Conservation of archaeological resources	The surviving archaeological resources of the area within the curtilage of the CMP, particularly the remains of the Dawes Point Battery and associated material, should be conserved and managed in accordance with their cultural heritage values.	Subject to ARD and site investigations	Should intact archaeological remains survive within the footprint of the proposal, and it is highly likely they will, then these remains are likely to be subject to moderate to major impact. It is likely that archaeological relics would be impacted, although such deposits would be isolated and limited. This is in comparison to the potential for structural remains, the presence of artefact deposits associated with structural remains and wells/tanks containing artefactual material, which has already been demonstrated at the site in previous projects. Further assessment is required prior to and during detailed design phase to minimise impacts to historical archaeology.
29.2		Opportunities should be investigated, and appropriate measures implemented to interpret to the public the archaeological resources of the area within the curtilage of the Sydney Harbour Bridge.	Yes	The proposed elevated linear bike ramp is an opportunity to refresh current interpretation and amenity in Bradfield Park, to make these elements cohesive with the

Policy #	Overarching policy	Policy detail	Are works consistent with CMP policy? (Yes/No?)	Comments
				palette of materials and finishes to be used for the ramp, and to make consistent with other elements in the park/plaza. Interpretation opportunities including the preparation of a Heritage Interpretation Strategy will be developed during detailed design.
29.3		Any subsurface disturbance of land that may have archaeological potential should be carried out in accordance with archaeological provisions of the Heritage Act and the Transport for NSW *Heritage Guidelines*.	Yes	A Section 60 approval is required for all excavation works within the SHR curtilage of the SHB. Areas outside the SHR curtilage have the potential to contain locally significant archaeological 'relics' associated with residential occupation of the study area from the early to late 19th century (historical phases 1 and 2). It is therefore recommended that a Section 140 approval is obtained from HNSW prior to works commencing.
29.4		In the event of archaeological investigations being carried out on land within the CMP curtilage, appropriate measures should be implemented to interpret the purpose, process and outcomes of the investigation to the public.	Not applicable	No investigations proposed
30.1	Policy 30 – Engagement and interpretation	The current circulation functions of the Sydney Harbour Bridge, including roads, rail tracks, **cycleways**, and pedestrian paths and stairs, should be utilised where practicable to provide opportunities to interpret the history and cultural significance of the Sydney Harbour Bridge to the public.	Yes	Interpretation is embedded in the winning design proposal. The proposed elevated linear bike ramp is an opportunity to refresh the interpretation of Bradfield Park and surrounds as well as opening new views and vantage points from the proposed elevated linear bike ramp itself.

Policy #	Overarching policy	Policy detail	Are works consistent with CMP policy? (Yes/No?)	Comments
				The design also features Aboriginal art and interpretation on the cycleway path to interpret the significance of Aboriginal culture in association with the area and Bridge.
30.2		Entry/exit points for access to and across the Sydney Harbour Bridge (particularly for pedestrian and **cyclists**) should be a focus for interpretation of both its tangible and intangible heritage values, including historic or other associational links between different circulation routes and/or components.	Yes.	Refer comments to Policy 30.1
32.1	Policy 32 – Interpretation requirements	Measures to appropriately interpret the significance of the Sydney Harbour Bridge should be considered in conjunction with all future proposals for change and development.	Yes.	Refer comments to Policy 30.1
32.2		The *Sydney Harbour Bridge Interpretation Plan 2007* should be referred to for guidance on how to interpret the heritage values of the Sydney Harbour Bridge.	Yes.	Refer comments to Policy 30.1 Interpretation in accordance with the 2007 plan, the CMP and the Supplementary Detailed Heritage Framework (TZG, draft 2021) should all be considered in detailed design. The proposal could potentially also prepare a HIS during this stage.
34.1	Policy 34 – Coordination of statutory compliance	A range of individuals and organisations have an ongoing interest in the future heritage management of the Sydney Harbour Bridge. Ongoing consultation with these is integral to effective heritage management of the site. The following must be consulted and involved in any proposal for the Sydney Harbour Bridge or its broader context that have the potential to significantly impact on its heritage values: • Heritage agencies; for example, the Department of Agriculture, Water and the Environment (Clth) (now DCCEW); Heritage NSW and the NSW Department of Planning, Industry and Environment.	Yes	The optioneering phase for this proposal involved extensive stakeholder consultation Refer comments to Policy 1.5.

Policy #	Overarching policy	Policy detail	Are works consistent with CMP policy? (Yes/No?)	Comments
		• Affected landowners and managers of land within the heritage curtilage; for example, the City of Sydney Council, north Sydney Council, RailCorp and Property NSW. • Community organisations; for example, the National Trust of Australia (NSW), Engineers Australia, etc.		
34.2		The polices of this CMP and associated management plans for the Sydney Harbour Bridge should be coordinated with the relevant requirements and guidelines of statutory heritage instruments under which the Sydney Harbour Bridge is listed. Potential areas of conflict between these documents which relate to conservation requirements/imperatives should be subject to discussion/negotiation to ensure consistency in process and outcomes.[14]	Yes	The statutory requirements are addressed in this report and in earlier reports.

[14] Sydney Harbour Bridge Conservation Management Plan, Godden Mackay Logan and Transport for NSW, (Draft) 2021

9.0 CONCLUSION

Summary of Findings

The proposed works as assessed in this SoHI which form the early works investigations and the detailed design have been designed with a heritage focus. Refinements in the design between concept design and detailed design have overall improved the heritage outcomes for the Sydney Harbour Bridge and its significant context, including Bradfield Park. The works have been designed with the following input:

- Heritage feedback and input from Design 5
- Expert design input from the DRP
- Engineering and Safety SME input
- Stakeholder consultation.

Below, Table 21 provides a summary of the findings of this SOHI.

Table 21: Summary of heritage impacts (direct and indirect) to the Sydney Harbour Bridge and surrounding heritage listings as assessed for the detailed design, February 2023

Design feature	Listing(s) impacted	Direct and Indirect Impacts
Early investigation works including Geotech boreholes (4 no.), slot trenches (16 no.), tree root survey, core holes to parapet, concrete reinforcement and cycleway slab at bridge deck.	**NHL:** • 105888: Sydney Harbour Bridge **SHR:** • 00781: Sydney Harbour Bridge, approaches and viaducts (road and rail) **TfNSW Section 170 Register:** • 4301067: Sydney Harbour Bridge, approaches and viaducts **North Sydney LEP:** • I0530: Sydney Harbour Bridge approach viaducts, arches and bays under Warringah Freeway	**Negligible direct impact** **Negligible indirect impact**
Removal of part of a parapet near the Burton Street stairs along the viaduct. The connection between the newly built ramp and the existing cycleway on the Sydney Harbour Bridge. Raised median strips in the middle of the upper connection platform. Paving finishes and line marking between on the existing cycleway and new cycleway.	**NHL:** • 105888: Sydney Harbour Bridge **SHR:** • 00781: Sydney Harbour Bridge, approaches and viaducts (road and rail) **TfNSW Section 170 Register:** • 4301067: Sydney Harbour Bridge, approaches and viaducts **North Sydney LEP:** • I0530: Sydney Harbour Bridge approach viaducts, arches and bays under Warringah Freeway	**Minor to Moderate adverse direct impact** **Minor adverse indirect impact**

Design feature	Listing(s) impacted	Direct and Indirect Impacts
Creation of a landing point for the ramp in Bradfield Park.	**North Sydney LEP:** • I0538: Bradfield Park (including northern section)	**Moderate adverse direct impact** **Moderate adverse indirect impact**
Partial obstruction of the Burton Street entrance to Milsons Point Station and the Burton Street archway.	**SHR:** • 01194: Milsons Point Railway Station Group **TAHE Section 170 Register:** • 4801026: Milsons Point Railway Station **North Sydney LEP 2013:** • I0539: Milsons Point Railway Station Group	**Moderate adverse indirect impact**
Introduction of a new structure into the setting of Bradfield Park, Milsons Point Station and the Bradfield Highway approaches of the Sydney Harbour Bridge.	**NHL:** • 105888: Sydney Harbour Bridge **SHR:** • 00781: Sydney Harbour Bridge, approaches and viaducts (road and rail) • 01194: Milsons Point Railway Station Group **TfNSW Section 170 Register:** • 4301067: Sydney Harbour Bridge, approaches and viaducts **TAHE Section 170 Register:** • 4801026: Milsons Point Railway Station **North Sydney LEP:** • I0538: Bradfield Park (including northern section) • I0539: Milsons Point Railway Station Group • I0530: Sydney Harbour Bridge approach viaducts, arches and bays under Warringah Freeway	**Moderate adverse direct impact** **Moderate adverse indirect impact**
A change to the layout of Bradfield Park, including the removal of some landscaping elements, vegetation, and introduction of new pedestrian and cycle pathways.	**North Sydney LEP 2013:** • I0538: Bradfield Park (including northern section)	**Minor adverse direct impact** **Minor adverse indirect impact**
Alfred Street south cycleway and pedestrian pathway adjustments. Bus stop adjustments along Alfred Street. On-street parking adjustments. Associated landscaping.	**NHL:** • 105888: Sydney Harbour Bridge **SHR:** • 00781: Sydney Harbour Bridge, approaches and viaducts (road and rail) **North Sydney LEP:** • I0538: Bradfield Park (including northern section)	**Minor adverse to neutral direct impact** **Minor adverse to neutral indirect impact**

Design feature	Listing(s) impacted	Direct and Indirect Impacts
New pedestrian crossings and round about adjustments on both Middlemiss and Lavender Streets. Associated landscaping.	**NHL:** • 105888: Sydney Harbour Bridge **SHR:** • 00781: Sydney Harbour Bridge, approaches and viaducts (road and rail)	**Minor adverse to neutral direct impact** **Minor adverse to neutral indirect impact**
Ancillary sites during construction.	**NHL:** • 105888: Sydney Harbour Bridge **SHR:** • 00781: Sydney Harbour Bridge, approaches and viaducts (road and rail) **TfNSW Section 170 Register:** • 4301067: Sydney Harbour Bridge, approaches and viaducts **North Sydney LEP:** • I0538: Bradfield Park (including northern section) • I0530: Sydney Harbour Bridge approach viaducts, arches and bays under Warringah Freeway	**Negligible to neutral direct impact** **Negligible to neutral indirect impact**
Excavation in Bradfield Park Central and North, and on each side of Burton Street for the columns footings and associated works.	**NHL:** • 105888: Sydney Harbour Bridge **SHR:** • 00781: Sydney Harbour Bridge, approaches and viaducts (road and rail) **TAHE Section 170 Register:** • 4301067: Sydney Harbour Bridge, approaches and viaducts **North Sydney LEP:** • I0538: Bradfield Park (including northern section) • I0530: Sydney Harbour Bridge approach viaducts, arches and bays under Warringah Freeway	**Negligible to Neutral potential direct (vibration and settlement)**

Approval pathway

Impacts to the SHR within the study area would be managed via the Section 60 process of the Heritage Act. All excavation works within the SHR curtilage of the SHB would be subject to a Section 60 approval as well.

Areas outside the SHR curtilage have the potential to contain locally significant archaeological 'relics' associated with residential occupation of the study area from the early to late 19th century (historical phases 1 and 2). It is therefore recommended that a Section 140 approval is obtained from HNSW prior to works commencing.

The proposal would not result in a significant impact to the National Heritage values of the Sydney Harbour Bridge (see 8.6), and therefore is not recommended referral under the EPBC Act.

Recommendations

The following recommendations and mitigations are provided to ensure no unnecessary impacts occur prior to and during the construction of the proposal, and that the operation of the proposal also avoids impact.

Approvals and management measures

The following measures should be implemented prior to finalisation of the detailed design:

- The design must continue to progress in accordance with the conservation policies and management measures outlined in the *Sydney Harbour Bridge Conservation Management Plan* prepared by GML (2021) and *the Supplementary Detailed Heritage Framework* (draft) prepared by TZG (2021).
- A Heritage Interpretation Strategy (HIS) for the proposal must be prepared. Heritage interpretation opportunities must be considered during progression of detailed design for the proposal, in accordance with the recommendations in the *Sydney Harbour Bridge Conservation Management Plan* prepared by GML (2021) and the *Supplementary Detailed Heritage Framework* (draft) prepared by TZG (2021), as well as any other future heritage interpretation documentation prepared for the proposal. Appropriate heritage interpretation must be incorporated into the design for the proposal in accordance with the NSW Heritage Office's *NSW Heritage Manual* (1996), *Interpreting Heritage Places and Items Guidelines* (2005b), and *Heritage Interpretation Policy* (2005a). The *Sydney Harbour Bridge Interpretation Plan* 2007 must also be referred to during the preparation of the HIS. Opportunities for interpretive displays in appropriate locations should be explored as part of the HIS.
- The following archival recordings of the Sydney Harbour Bridge should be undertaken prior to the commencement of construction
    - Photographic Archival Recording of the project footprint area and surrounding areas.
    - A 3D scanning of the Bridge of the project footprint area
    - A point-cloud survey of the Bridge of the project footprint area
- Preparation of a vibration management plan to guide vibration levels and provide advice on vibration monitoring during works.

Construction

The following must be considered and implemented in the construction of the proposal:

- The Design Integrity Panel (DIP), incorporating heritage, design and Connecting with Country expertise, should have continued involvement throughout the construction of the proposal. Heritage NSW should be invited to attend meetings as observers.
- A Construction Environmental Management Plan (CEMP) must be prepared for the proposal prior to construction works commencing. This plan must outline all relevant environmental

and heritage constraints, mitigations and control measures to ensure unapproved impacts are avoided.

- A Heritage Interpretation Plan must be prepared to guide the interpretation of the Bridge, Bradfield Park and the changes undertaken. The Plan must provide guidance for the interpretation of the removed section of the parapet.
- No changes to the overall design intent, overall design footprint or constructability of the proposal can occur in this phase of the proposal without consultation with the proposal heritage specialist.
- Early investigation works core holes into the parapet are to be stopped 100mm short of the opposite face, so as not to break through the face of the parapet and minimise damage to the fabric for later interpretative use in the park.
- All bore holes and slot trenches in the park should be monitored by an Archaeologist and an Arborist
- Site rehabilitation measures related to construction sites will be incorporated within an Urban Design and Landscape Plan or similar documents. The objective of the rehabilitation will be to minimise long-term impacts on the visual amenity of the items by recreating a sympathetic environment. A landscape scheme would be prepared for the North Sydney LEP listed Bradfield Park to capture the new plantings, retained plantings and overall landscaping within and around the item's curtilage. The scheme will consider appropriate plantings, including those proposed as part of the Connecting with Country plan for the project.
- A heritage induction briefing should be prepared for the proposal to be delivered to all staff working on the proposal. The briefing should be prepared by a qualified heritage specialist, and ideally delivered by the proposal heritage specialist. It should contain key information about heritage significance, areas to avoid and key do's and dont's within the heritage areas.
- Construction vibration monitoring is recommended throughout the construction phase of the proposal to ensure no indirect impacts occur to heritage items and the public domain as a result of the works. This should be guided by the vibration management plan. Vibration monitors should be applied to significant fabric (beeswax), and regular visual monitoring of lesser significant elements should be undertaken in conjunction with the monitors.
- Operating plant (swinging, reversing, moving etc.) must adhere to standard setbacks and clearances from heritage structures and items which are not identified to be impacted.
- Temporary hoarding and signage should be placed around heritage buildings and structures to be avoided during works, and should consider interpretative signage or artwork on the hording to lighten the visual impacts during construction.
- Protection of significant fabric should be put in place to ensure that no inadvertent damage occurs to fabric, including protection from concrete splatter.
- Repair of parapet and bridge deck should be undertaken after completion of early investigation works. Surfaces and fabric should be made good to match existing. Protect surrounding fabric during repair works to insure non inadvertent damage occurs to fabric, including concrete splatter.
- The removed section of parapet should be carefully stored on site or in a facility off-site until such time when its installation within the garden as part of the interpretation of the site is required.

Operation

There are no specific operational heritage recommendations for this proposal.

Historical archaeology

The management of potential archaeological impacts and excavation methodology should be guided by the Archaeological Research Design prepared by Artefact Heritage, March 2023.

10.0 REFERENCES

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11.0 APPENDIX A: HERITAGE DESIGN STATEMENT

Memo

To	Ben Nacard, Transport for NSW	**CC**	Eleana Prentice, Transport for NSW Scott Badham, ASPECT Studios
Project	Sydney Harbour Bridge Cycleway Northern Access Project	**From**	Jason Packenham, ASPECT Studios Alan Croker, Design 5 – Architects
Issue (date)	Issue 2 (14 March 2023)	**Pages**	12

Supplementary design statement to feedback received from Heritage Council Approvals Committee

This memo has been prepared to address comments raised by the Heritage Council in meeting(s) with Transport for NSW in which the project was presented. It is intended that this memo support the lodgement of the Section 60 application. It supplements the detailed overview of the design contained with the Detailed Design Report (ASPECT Studios, February 2023), which includes a heritage chapter. It also supplements the detailed analysis of heritage impacts prepared by Artefact Heritage in their Statement of Heritage Impact reports.

Topics covered within this memo include:

- Balustrade and deflection rail
- Columns
- Materials and finishes
- Landscape at landing points

1.1 Balustrade and deflection rail

Balustrade

The concept for the balustrade was first conceived during the design competition phase of the project by a multi-disciplinary design team that included Alan Croker from Design 5 Architects. The concept was underpinned by a desire to produce an elegant, contemporary balustrade that is lightweight in appearance and in keeping with the site's heritage setting.

The balustrade has been designed to be as elegant and as complimentary to the structure as possible while meeting relevant engineering, safety, and design standards. The balustrade adopts a series of repeating metallic elements that form a barrier up to 1400mm high. Its design is generally open with strong vertical lines to minimise visual impacts by making the balustrade as transparent as possible. Each individual pair of verticals and the connecting arch at the top is connected back to the deck edge beam. This connection will be via a shared baseplate with vertical fixings for each side. The fixings will be accessible for installation, removal, and replacement from the bridge deck via a removable kerb plate.

The design of the balustrade element lends itself to be formed as a custom formed prefabricated element with the form accurately tailored to the geometry for structural performance, and to use the minimum volume of material while maintaining the architectural aesthetic and performance requirements.

As a result of design development, the proposed design has been rationalised into a combination of casting and plate alloy elements which are combined to form the required geometry. The individual elements are to be invisibly welded prior to finishing e.g. glass bead-blasting in order to provide a uniform high quality appearance.

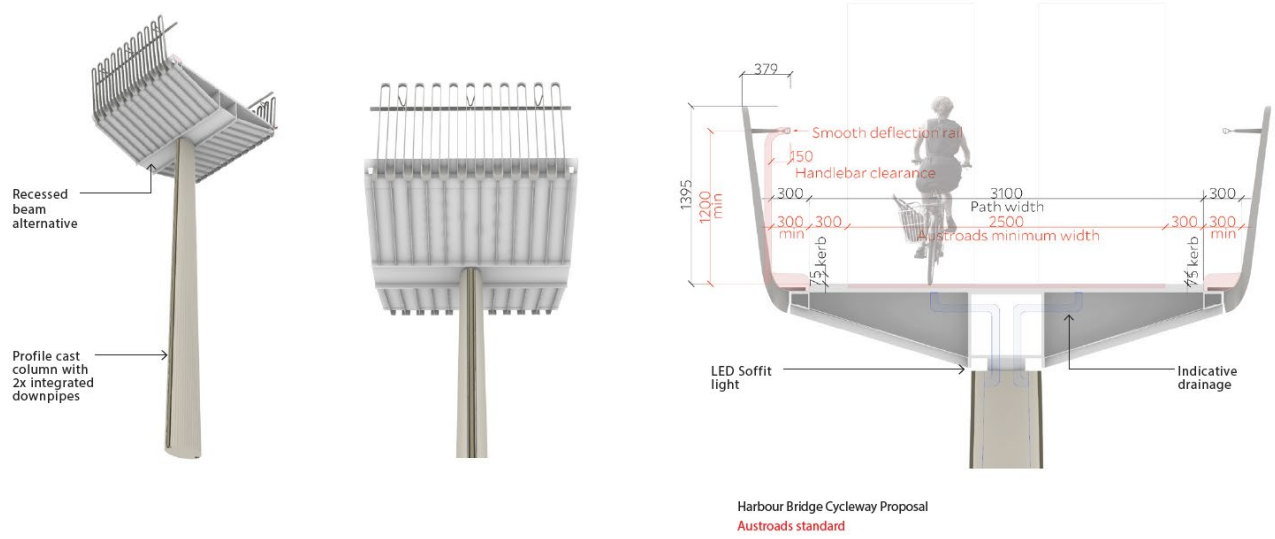
Deflection rail

In accordance with Austroads Guide to Road Design Part 6A a deflection rail is deemed a requirement for the new ramp. The design of this element reflects a self-supported addition that will not add to the weight and bulk of the balustrade and will afford the opportunity to integrate lighting. This also allowed the design integrity of the balustrade to be maintained, as described further below.

The deflection rail is incorporated as a separate independently supported element, supported similarly from an inclined upright that appears to mirror the angle of the balustrade screen, providing a visual balance.

The independent support offers the opportunity for an alternative finish, perhaps a subtle or stronger contrast to the proposed treatment of the balustrade. Glare free LED lighting is incorporated into the handrail providing an even level of illumination across the cycleway surface.

Attaching the deflection rail directly to the balustrade was explored during the Concept Design phase of the project. Due to the need to increase the size of the balustrade element to support the additional loading of the deflection rail, the decision was made to not pursue this option so as to keep the size—and resulting visual prominence—of the balustrade to a minimum. Design exploration of the deflection rail attached to the balustrade are included below.



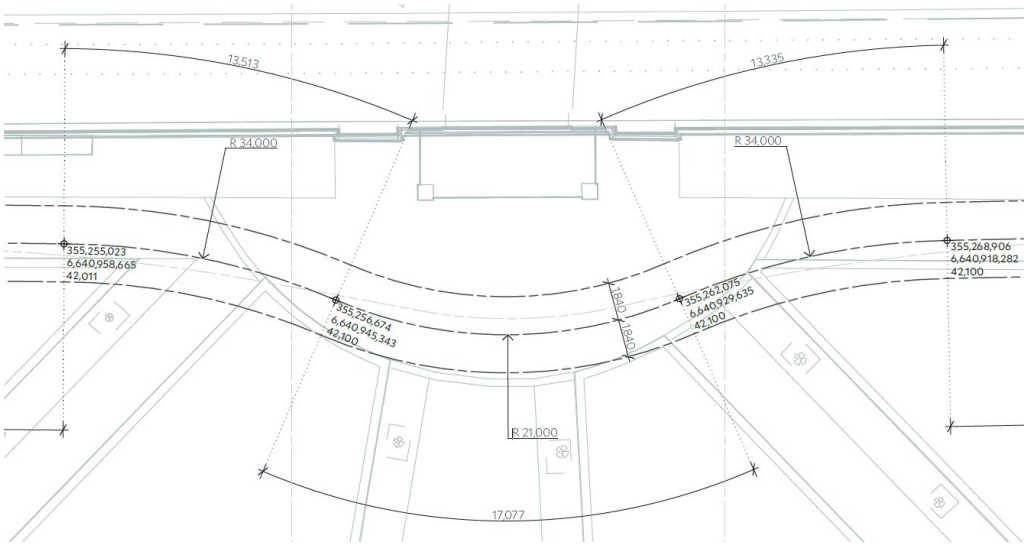
Design exploration of the deflection rail attached to the balustrade.

1.2 Columns

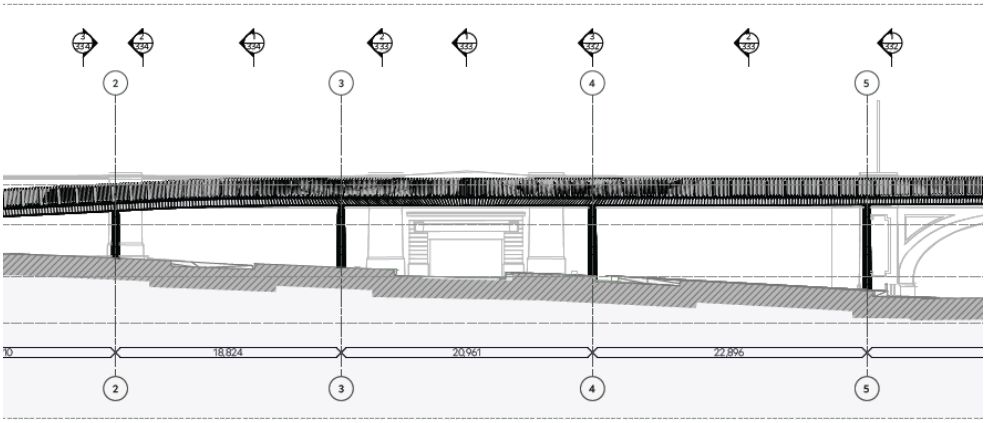
As detailed further in the Detailed Design Report (ASPECT Studios, February 2023), the structural and architectural design of the ramp has aimed to minimise the overall number of columns that will land in Bradfield Park North. This has been achieved by increasing the spans and therefore decreasing the footprint of the new structure within the park.

Column placement has been carefully considered to minimise impacts to the park, as well as respect the configuration and rhythm of the adjacent Sydney Harbour Bridge approach and Milsons Pont Station entry.

Column design and placement has also prioritised minimum disruption of views to the existing bridge viaduct and station entry within this sensitive heritage location.



Plan diagram of the symmetrical setout of columns at Milsons Point station.



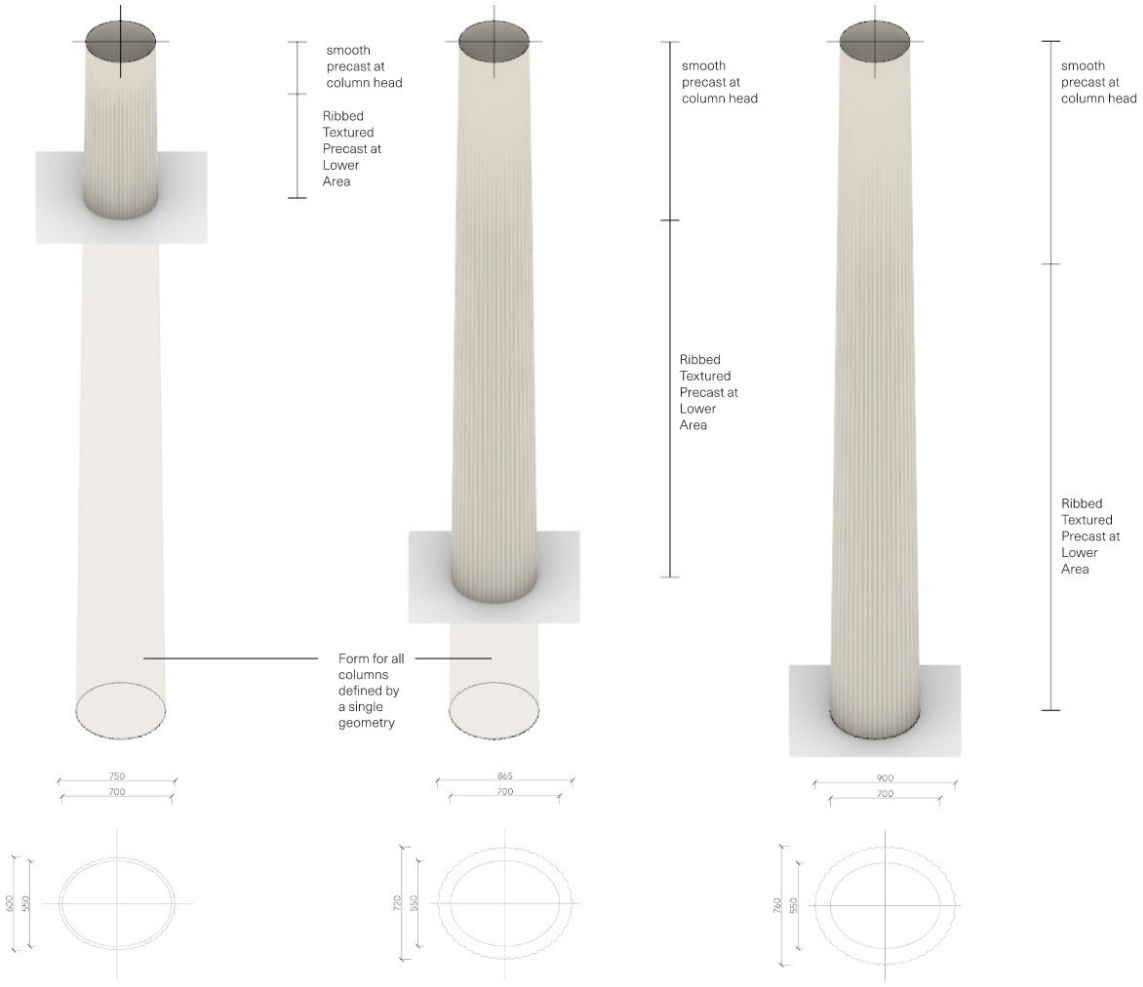
Elevation of the symmetrical setout of columns at Milsons Point station.

The column itself will be formed as a tapered ellipse profile with the smallest dimension of the column aligned to the axis of the bridge. This means the column is as small as possible in elevation while providing the lateral support against sway and sideways wind loading.

The dimensions of the columns are shown as 700mm x 550mm ellipse at the top tapering down to a 900mm x 700mm ellipse at the base. This is based on the max height column of approximately 8m. For the shorter columns the geometry of the larger column will be maintained and reduced from the bottom maintaining the top profile and shape but reducing the base profile.

The columns are precast concrete in order to reduce on site formwork and associated disruption including long build times. In addition, the precast solution will allow a higher degree of quality control, precision and consistency from the factory formwork.

Surface treatment of the columns is an off-form finish including a feature tapering fluted profile. The rib-profile has been designed to discourage graffiti and bill-poster attachment, and gradually decreases in depth towards the head of the column. It is intended that the majority of columns can be formed from a single or similar mould.



Concrete column design illustrating the tapered fluting.

The cycleway columns will be seen in relation to the massive rendered wall of the approach structure with its regular spaced simple pilasters and continuous parapet relieved only by the prominent but elegantly proportioned Milsons Point station entry. The visual power of this masonry structure is further emphasised by its broad sweeping curve as it approaches the skeletal steel structure of the bridge itself. The simplicity and elegance of the proposed columns respect the simplicity and rhythm of the masonry approach structure with careful placement to avoid visual intrusion into pedestrian paths, key view lines and to frame the station entry.

The surface appearance of the column will be a pigmented precast appearance with integral colour applied by oxide or similar additives to the concrete mix, to match or compliment the oxidised render colour and appearance of the existing bridge.

Six of the eight columns land within areas of paving, and therefore planting is not provided to the base of columns or as climbers up the columns, with the intent of the landscape design at these locations to align with existing areas.

Two of the six columns land in areas of planting (the two most northern columns). In these locations, gravel mulch will be installed to cover column fixings and footings, while allowing planting to be installed as close as practicable to the base of the columns. The additional of climbing plants to these columns has been avoided in order to maintain consistency across the full suite of columns, to keep the visual prominence of the columns to a minimum, and to avoid additional visual bulk that climbing plants would create.

The surface finish will be further characterised by a light sand-blasted or acid-washed finish to provide a softened weathered texture, colour, and finish to work in with the overall palette of the ramp to deliver a cohesive outcome. A clear anti-graffiti finish will be applied over all concrete. Alternative anti-graffiti systems will be tested during the prototyping stage.

1.3 Materials and finishes

Balustrade

The proposed balustrade has been conceived as a self-finished metallic assembly, constructed from individual elements custom formed by precision investment casting from a non-ferrous alloy. The choice of alloy will be determined to best balance structural and performance requirements, together with capital and maintenance costs, as well as aesthetic characteristics in the short and longer term.

Materials are to be robust and capable of developing an acceptable and aesthetically pleasing appearance over time, i.e. be selected with a surface finish that ages gracefully and requires little or no maintenance to maintain its appearance.

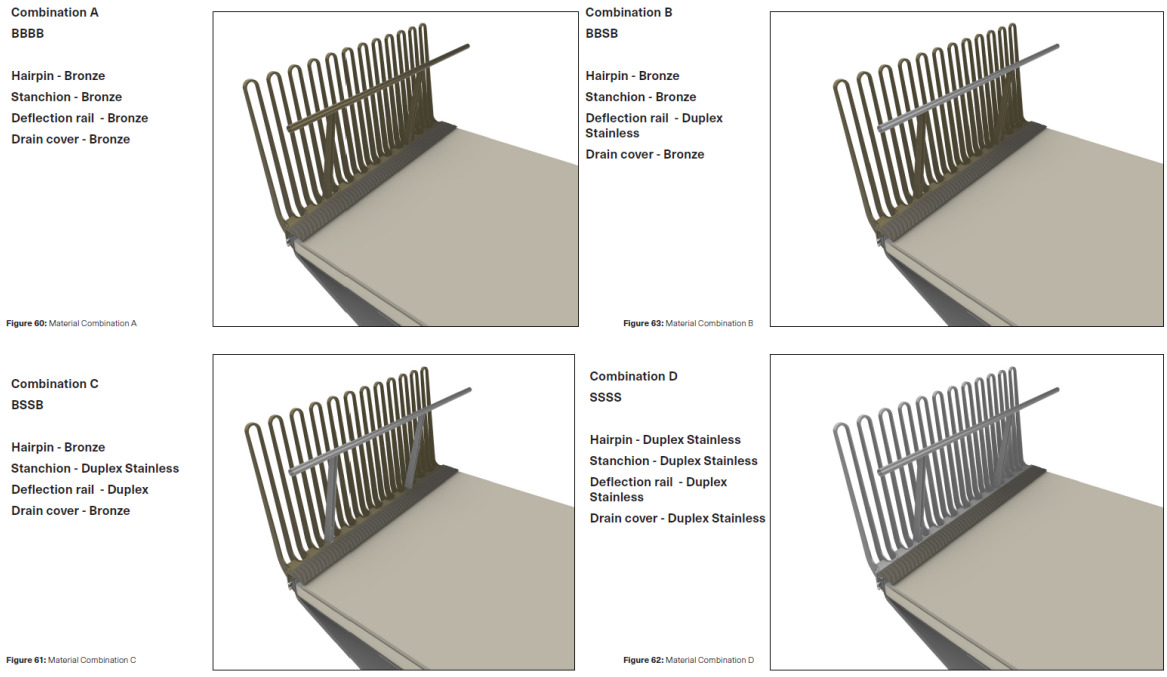
Whilst likely resulting in a higher initial capital cost, it is anticipated that by significantly minimising costs associated with long term maintenance and replacement, the initial costs are balanced out by lower operational costs over the lifespan of the project.

Alternative alloys considered by the design team include:

- Copper Aluminium Alloy (Bronze 82)
- Copper Aluminium Alloy (Gunmetal type)
- Aluminium Alloy
- Duplex Stainless steel.

Following detailed discussions with NSW based industry specialists, Copper Aluminium Alloy (Bronze 82) and Duplex Stainless Steel have been investigated in further detail. Combinations of these materials are possible subject to appropriate bi-metallic separation.

In consultation with heritage design advice (from Alan Croker, Design 5 Architects), all finishes have been determined to have some level of merit from a 'design in context' and Harbour Bridge CMP point of view, coming as they do from a complimentary palette drawing materials and colours found in the SHB and approaches as well as in the Milsons Point Station.



Balustrade material combination alternatives.

Soffit

The expressed structural steel soffit has been conceived as an efficient expressive, architecturally defined structure that provides a visually interesting appearance whilst fulfilling its structural performance requirement with the minimum of means.

The appearance of the soffit is characterised by the undulating central beam and expressed soffit plate with integrated support ribs. The visible steel structure presents three alternative possibilities for corrosion protection.

1. Paint applied protective coating systems.

The requirements for protective coating systems are defined by AS/NZS 2312:2002 as well as TfNSW document: QA SPECIFICATION B220- PROTECTIVE TREATMENT OF BRIDGE STEELWORK. System SC19 has been identified as suitable for the project. The traditional approach to protective coating of steel, a wide range of protective coating systems are available. Colours and finishes can be selected to compliment the final choice of material and finish on the feature balustrade, to provide a visually complimentary appearance.

2. Duplex grade 2205 Stainless Steel

Duplex stainless steels are a family of stainless steels. They are designed to provide better corrosion resistance, particularly chloride stress corrosion and chloride pitting corrosion, and have higher strength than standard austenitic stainless steels such as Type 304 or 316. Duplex grade 2205 stainless has minimal repair and maintenance requirements and several advantages in terms of reduced maintenance requirements, simplification of detailing, avoidance of bi-metallic separation, and sustainability benefits including recyclability.

Duplex stainless steels can be provided with a range of alternative finishes e.g. matt and satin finishes and the finish is frequently selected for high profile bridge projects where appearance and long term maintenance requirements are key project criteria.

3. Galvanized steel

The galvanizing of steel via a hot dipping process provides a robust high quality protective system to steel through the application of molten zinc as a corrosion protection system.

Galvanised steel has a robust industrial appearance but has not been considered for the Northern Access Cycleway project due to its long-term limited durability when compared to other alloys in this exposed marine environment.

Soffit and Balustrade combination alternatives.

Materials and finishes will continue to be developed, prototyped, and refined in consultation with expert heritage advice and with close consideration for the historic context.

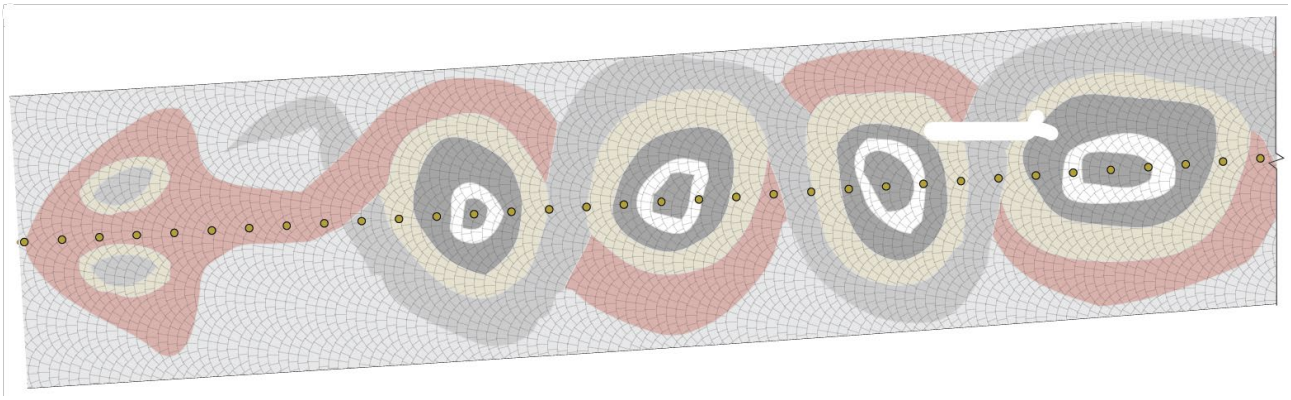
Connecting with Country approach

Through the project teams' Connecting with Country work in earlier phases of the project, and in discussion with the project's Design Integrity Panel, the paving surface of the cycleway ramp was identified as an opportunity for incorporating an Aboriginal artwork. Incorporating the artwork into the deck ensures that it is a subtle addition that doesn't contribute to visual impacts on the locality, while still allowing Country to be expressed at scale.

A project-specific artwork is currently being developed by First Nations artists Maddison Gibbs and Jason Wing. Alternative strategies for the formation of the artwork have been investigated in consultation with the artists and members of the design team.

The proposed strategy is based on a traditional 'Calcada' paving technique, common in Spain and Portugal for the paving of public spaces with patterns and artworks using a mosaic of cut stone pavers. The strategy enables a high degree of flexibility with the artwork in effect formed by pixels of the individual stones.

A 60mm paving zone is proposed atop the structural concrete slab of the ramp. This would incorporate a 40mm stone paver in a variety of stone types, finishes and colours that with form the artwork. Final detailing, including material choice and profile, will be confirmed following further consideration of slip resistance, loading, and constructability.



Interpretation as a paving pattern and including the bronze centre line markings with various colour tones of granite unit paver;
fan pattern shown for illustrative purposes only.

Illustrative render shown of the 60mm x 60mm stone paver with a bronze inlay demarcating the cycleway centre line (left) and an example image of bicycle promenade in Alicante, Spain (right).

1.4 Landscape at landing points

Bradfield Park North

The ramp landing within Bradfield Park North is the structure's primary public domain interface. The design seeks to reduce impacts on the sensitive park setting as much as practical while providing a safe pedestrian and cyclist environment. To help achieve this outcome the ramp lands adjacent the SHB viaduct, as close to the viaduct as possible to minimise impacts on the space and amenity of the park as well as potentially less disturbed archaeology further away from the viaduct while still maintaining required clearances to the viaduct. This location also minimises disturbance of the relatively recent interpretive inlays marking Willoughby Street and adjacent buildings removed for the construction of SHB. Cycle lanes separated by a central median connect to Alfred Street, adopting a curved alignment that balances the need to reduce cyclist speed without introducing too tight (and potential dangerous) turning movements. The cycle lane alignment respects the configuration of the removed Willoughby Street and strengthens its interpretation.

It is important to recognise that it is common for cyclists to utilise the northern end of the existing cycleway at Milsons Point as a place to gather and discuss their next movements. This may be stopping at Kirribilli for a coffee, continuing through to North Sydney or simply discussing aspects of their outing. In this context, it is important that a generous amount of space is provided at the base of the ramp to allow these social activities to take place without conflicting with other users of Bradfield Park North or Alfred Street.

The design meets this objective by landing the cycleway close to the existing viaduct, set away from the eastern edge of Alfred Street. A new gathering space has been proposed to provide additional seating and bike hoops. Cyclists and pedestrians are clearly separated wherever possible to reduce conflicts, with visual cues incorporated in the landscape design to provide safe wayfinding while minimising the need for signage.

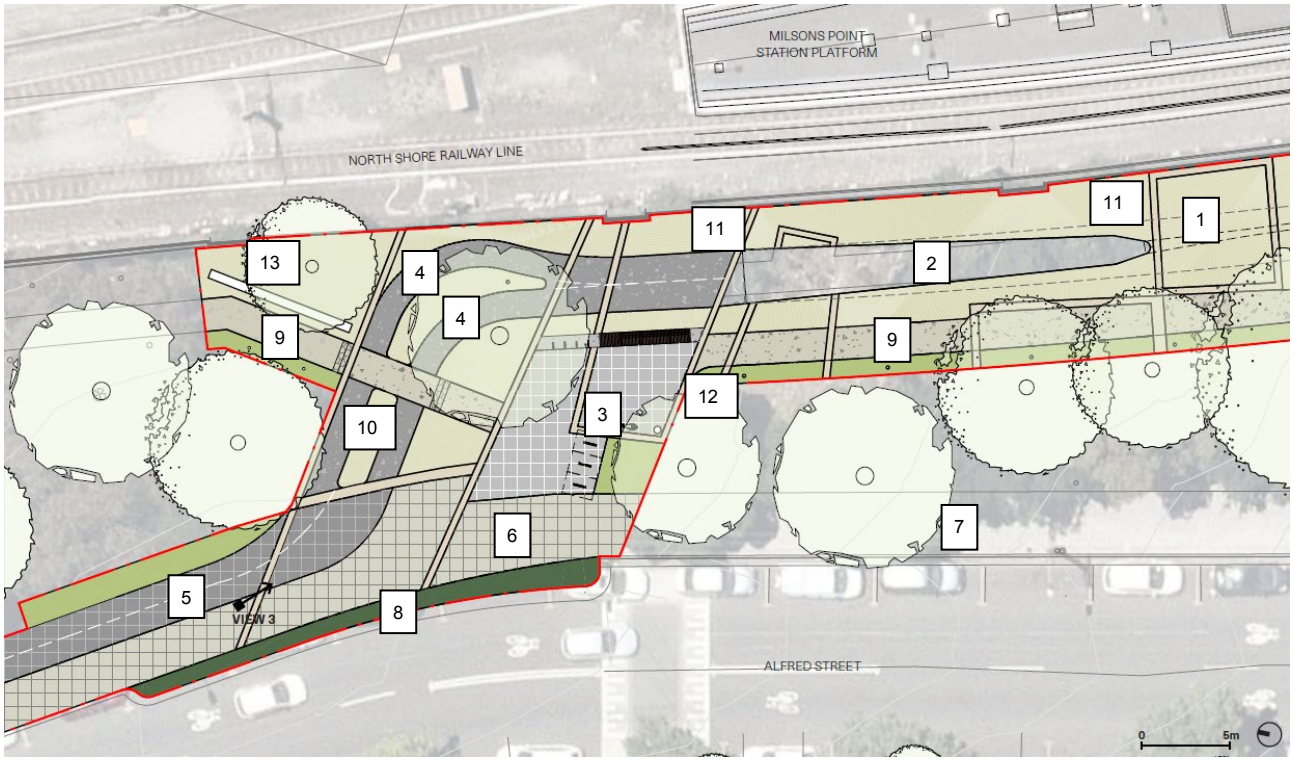
This ramp alignment was the preferred alignment of North Sydney Council's project representative.

The section of parapet removed from the cycleway ramp's connection to the existing Sydney Harbour Bridge cycleway is installed in this location within the garden adjacent the cycleway. This location is preferred as its former location and meaning will be readily understood, coinciding with the cycleway landing. An alternative location immediately below or very close to its original position was considered but due to its height could be easily perceived as an accidental fall.

Photomontage of cycleway ramp landing in Bradfield Park North.

Key elements of the design at Bradfield Park North are listed here and numbered on the concept plan below.

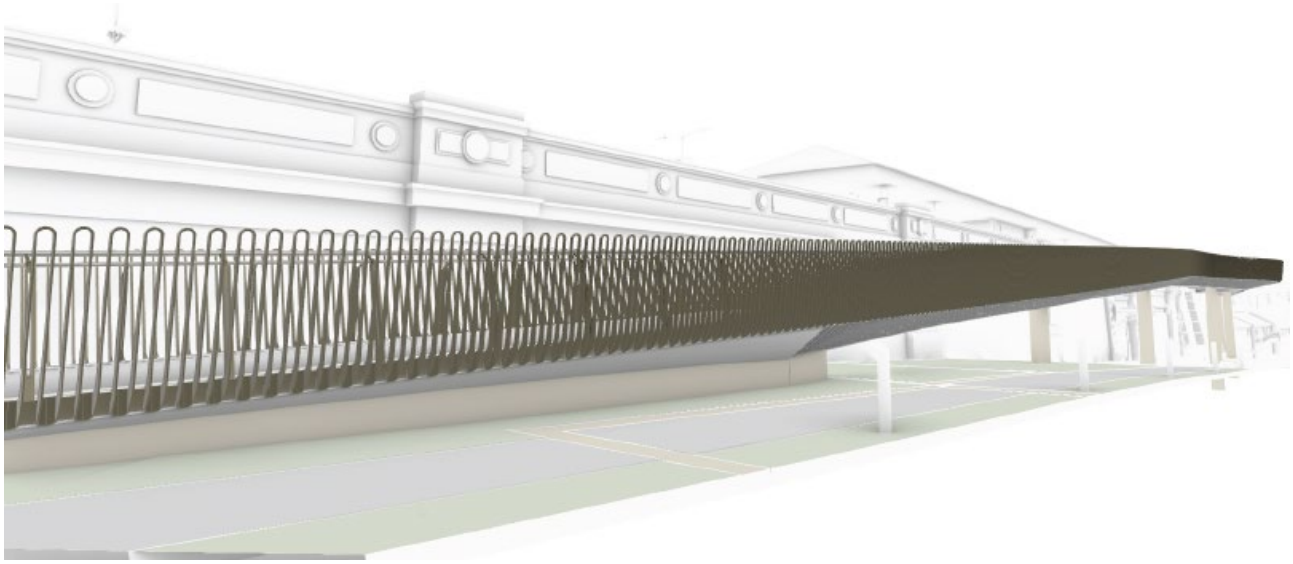
1. Cycleway ramp (shown dashed)
2. Ramp abutment (refer Chapter 6 - Ramp Architecture)
3. Bike parking, repair kit and e-bike charger, drinking fountain
4. Cycleway lanes bounded by planting to provide safe separation, reduce visual impacts of cycling infrastructure, and discourage pedestrian access to the cycleway ramp
5. Connection to separated cycleway north along Alfred Street
6. Connection to shared path south along Alfred Street
7. Existing Alfred Street shared path to be retained
8. Realigned kerbs to maximise space for walking and cycling
9. Existing park footpath realigned to maintain pedestrian access through park
10. Pedestrian priority delineated with paving materials and signage asrequired (detailed pavement design under development)
11. Existing Poplar trees to be removed
12. Existing interpretative inlays in the park for previous locations of Willoughby Street and adjacent buildings
13. Location of removed parapet section



Landscape plan of the cycleway ramp landing in Bradfield Park North.

Where the cycleway ramp lands in the Bradfield Park North, support will be given to the central beam by a precast concrete spine wall at the lowest point of the structure. The finish and treatment of the precast will closely resemble the surface finish of the columns. The length of the precast wall is determined by beam spans, and requirements for maximised visibility of the landscape area between the old and new structures per CPTED principles.

The proposed abutment wall support at the northern end of the cycleway offers opportunities for continuation of landscape finishes below, as well as allowing the proposed soffit lighting to continue to the lowest level of the structure.

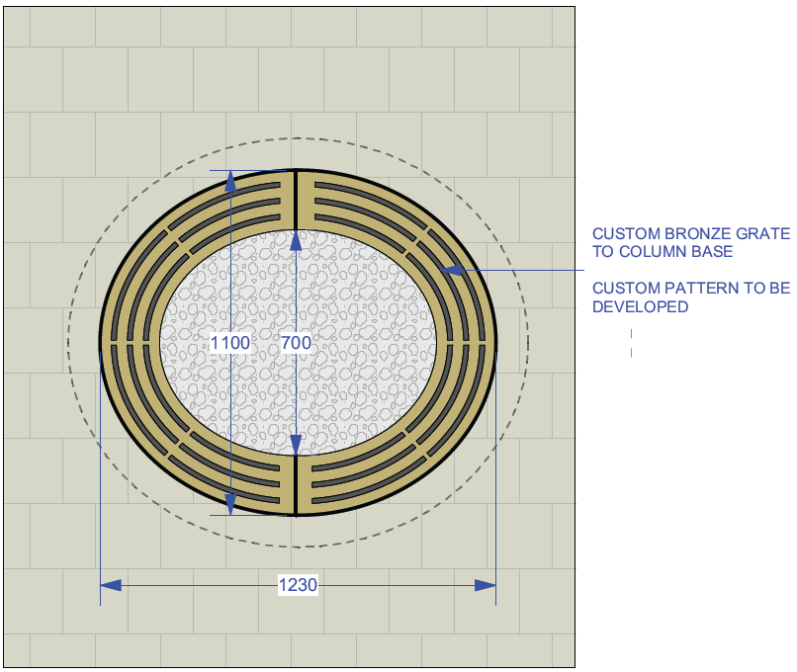


View south to Bradfield Park North landing showing retention of the significant heritage view to the viaduct's sweep of the Bridge.

View east to Bradfield Park North landing from Alfred Street.

Base of columns

Where the columns land in paved surfaces, the base of the column is provided with a bronze trim to highlight the column landing and provide a transition to surrounding paving materials. This will also allow for inspection of the column footing.



Custom grate to base of columns.

Kind regards

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