

Commonwealth Avenue Bridge

Heritage Assessment

Report prepared for Major Projects Canberra
and the National Capital Authority

September 2020



Sydney Office Level 6, 372 Elizabeth Street Surry Hills NSW Australia 2010 T +61 2 9319 4811

Canberra Office 2A Mugga Way Red Hill ACT Australia 2603 T +61 2 6273 7540

GML Heritage Pty Ltd ABN 60 001 179 362

www.gml.com.au

Report Register

The following report register documents the development and issue of the report entitled Commonwealth Avenue Bridge—Heritage Assessment, undertaken by GML Heritage Pty Ltd in accordance with its quality management system.

Job No.	Issue No.	Notes/Description	Issue Date
18-0678D	1	Draft Report	31 July 2020
18-0678D	2	Final Report	10 September 2020

Quality Assurance

GML Heritage Pty Ltd operates under a quality management system which has been certified as complying with the Australian/New Zealand Standard for quality management systems AS/NZS ISO 9001:2016.

The report has been reviewed and approved for issue in accordance with the GML quality assurance policy and procedures.

Copyright

Historical sources and reference material used in the preparation of this report are acknowledged and referenced at the end of each section and/or in figure captions. Reasonable effort has been made to identify, contact, acknowledge and obtain permission to use material from the relevant copyright owners.

Unless otherwise specified or agreed, copyright in this report vests in GML Heritage Pty Ltd ('GML') and in the owners of any pre-existing historic source or reference material.

Moral Rights

GML asserts its Moral Rights in this work, unless otherwise acknowledged, in accordance with the (Commonwealth) *Copyright (Moral Rights) Amendment Act 2000*. GML's moral rights include the attribution of authorship, the right not to have the work falsely attributed and the right to integrity of authorship.

Right to Use

GML grants to the client for this project (and the client's successors in title) an irrevocable royalty-free right to reproduce or use the material from this report, except where such use infringes the copyright and/or Moral Rights of GML or third parties.

Cover Image: Commonwealth Avenue Bridge viewed from northern bank of Lake Burley Griffin.
(Source: GML, October 2019)

Contents	Page
1.0 Introduction	1
1.1 Project Background	1
1.2 Study Area.....	1
1.3 Heritage Statutory Context.....	3
1.3.1 <i>Heritage Status</i>	3
1.3.2 <i>Environment Protection and Biodiversity Conservation Act 1999</i>	3
1.3.3 <i>National Capital Plan</i>	3
1.4 Methodology.....	3
1.5 Natural Heritage Values and Context.....	4
1.6 Authorship	4
1.7 Terminology.....	5
1.8 Endnotes	6
2.0 Historical Context.....	7
2.1 Molonglo River Crossings	7
2.2 Planning of the Bridges over Lake Burley Griffin.....	9
2.3 Bridge Construction, 1961–1963.....	9
2.4 Construction Contract.....	12
2.4.1 <i>Contractor: M.R Hornibrook Pty Ltd</i>	12
2.4.2 <i>Construction Process</i>	12
2.4.3 <i>Completion and Opening</i>	13
2.5 Subsequent Changes to the Bridge	15
2.6 Endnotes	17
3.0 Physical and Engineering Context.....	18
3.1 Landscape Setting	18
3.1.1 <i>Lake Burley Griffin and Commonwealth Avenue Landscape</i>	18
3.1.2 <i>Parliament House Vista</i>	18
3.2 Design Aesthetic	19
3.3 Physical Description of the Bridge.....	19
3.4 Design and Engineering.....	20
3.4.1 <i>Prestressed concrete and modular box girder construction in Australia</i>	20
3.4.2 <i>The setting and specification</i>	21
3.4.3 <i>Digital Structural Analysis</i>	25
3.5 Condition and Integrity.....	25
3.6 Endnotes	26
4.0 Aboriginal Cultural Landscape	27
4.1 Ethnographic Context.....	27
4.2 Archaeological Background	29
4.2.1 <i>ACT Heritage Data</i>	29
4.2.2 <i>Archaeological Sites Data and Previous Investigations</i>	29
4.3 Aboriginal Community Consultation	31
4.3.1 <i>Buru Ngunawal Aboriginal Corporation—Wally Bell—18 May 2020</i>	31
4.3.2 <i>Mirrabee—Paul House—11 June 2020</i>	32

4.3.3 King Brown's Tribal Group	32
4.3.4 Ngarigo Currawong Clan.....	32
4.4 Summary	32
4.5 Endnotes.....	33
5.0 Assessment of Heritage Values.....	35
5.1 Assessment Methodology	35
5.1.1 The EPBC Act and Regulations.....	35
5.2 Heritage Assessment of Commonwealth Avenue Bridge.....	35
5.3 Summary Statement of Significance	41
6.0 Next Steps.....	43
6.1 Recommendations.....	43
7.0 Appendices.....	45
Appendix A	
<i>Commonwealth Avenue Bridge—Community Engagement and Heritage Assessment, Aesthetic and Social Values report prepared by GML Heritage for Major Projects and National Capital Authority, May 2020</i>	
Appendix B	
<i>Additional Technical Information and Images</i>	
Appendix C	
<i>Modern Bridges: Comparative Analysis</i>	

Executive Summary

GML Heritage Pty Ltd (GML) has been engaged by the ACT Government/Major Projects Canberra and the National Capital Authority (NCA) to prepare a comprehensive assessment of heritage values for Commonwealth Avenue Bridge, Canberra. The purpose of this Heritage Assessment (HA) is to provide the NCA and relevant stakeholders with an approved and clear set of heritage values and attributes that can be used to guide future management and conservation of Commonwealth Avenue Bridge.

This HA expands on the Community Engagement and Heritage Assessment prepared by GML in May 2019, which explored the community-based values of the bridge and assessed them against Commonwealth Heritage criteria (e) aesthetic characteristics and (g) social value—as outlined in 10.03A of the *Environment Protection and Biodiversity Conservation Act Regulations 2000* (EPBC Act Regulations).

The assessment in Section 5.2 finds that Commonwealth Avenue Bridge meets criteria (a) historic processes, (b) rarity, (c) research potential, (d) characteristic, (e) aesthetic, (f) creative or technical achievement, (g) social and (h) significant people, and is eligible for nomination and inclusion in the CHL. The summary statement of heritage significance for Commonwealth Avenue Bridge is provided in Section 5.3.

The following points are provided as preliminary recommendations for the management of the bridge's identified heritage values.

- Consider preparing a nomination of Commonwealth Avenue Bridge to the CHL—if deemed appropriate by the NCA.
- Conserve and manage the heritage values of Commonwealth Avenue Bridge in accordance with the EPBC Act, the National Capital Plan and best-practice heritage management.
- Ensure that future change or any works associated with Commonwealth Avenue Bridge that may have, or are likely to have a significant heritage impact, are planned in accordance with the EPBC Act and the NCA's internal self-assessment processes (the steps that the NCA undertake to determine whether or not a proposed action is likely to have a significant impact on the environment, which includes the heritage values of a place).

1.0 Introduction

1.1 Project Background

The ACT Government/Major Projects Canberra and the National Capital Authority (NCA) have engaged GML Heritage Pty Ltd (GML) to undertake a comprehensive assessment of heritage values for Commonwealth Avenue Bridge, Canberra.

Commonwealth Avenue Bridge is not individually listed on the Commonwealth Heritage List (CHL) or the National Heritage List (NHL), but it is an integral component of the Central National Area¹ and is located within, or adjacent to several listed or nominated heritage places (see Section 1.3.1).

This comprehensive assessment expands on the Community Engagement and Heritage Assessment for Commonwealth Avenue Bridge prepared by GML in May 2020 (GML 2020), which explored community-based values of the bridge and assessed them against Commonwealth Heritage criteria (e) aesthetic characteristics and (g) social value, as outlined in 10.03A of the *Environment Protection and Biodiversity Conservation Act Regulations 2000* (EPBC Act Regulations).

This heritage assessment (HA) has been prepared to identify any potential natural, Indigenous or historic values of the place. It expands on GML 2020 and provides an assessment against all nine CHL criteria, as outlined in 10.03A of the EPBC Regulations. The results obtained from the previous assessment with regard to criteria (e) and (g) have been summarised and incorporated into this report. The full GML 2020 report is provided in Appendix A.

The purpose of the current assessment is to provide the NCA and relevant stakeholders with an approved and clear set of heritage values and attributes that can be used to guide future management and conservation of Commonwealth Avenue Bridge.

1.2 Study Area

Commonwealth Avenue Bridge is a road bridge spanning Lake Burley Griffin between Parkes and the City. It is located approximately 2 kilometres north of Australian Parliament House along Commonwealth Avenue and defines the western edge of the National Triangle.²

For the purposes of this HA, the study area is defined as the physical bridge structure and includes the twin structures spanning Lake Burley Griffin between north and south abutments, including stairs, and the dual four-span underpass structures that extend over Flynn Drive from the southern abutment. The study area does not extend to the roadways of Barrine Drive (north), Flynn Drive (south) or the pedestrian footpath network that connects to the bridge stairs.

The boundary of the study area has been determined using the original plans of Commonwealth Avenue Bridge (Figure 3.1) which demonstrate that the underpass structure formed part of the overall design of Commonwealth Avenue Bridge.³

Figure 1.1 shows the location of the study area in relation to Canberra. A detailed aerial of the study area and its features shown in Figure 1.2.



Figure 1.1 Aerial showing the location of Commonwealth Avenue Bridge (the study area). (Source: Nearmap with GML overlay, 2019)



Figure 1.2 Detail of study area. This HA is limited to the physical bridge structure and does not extend to Barrine Drive, Flynn Drive or the pedestrian footpath network that connects to the bridge stairs. (Source: Nearmap with GML overlay, 2019)

1.3 Heritage Statutory Context

1.3.1 Heritage Status

Commonwealth Avenue Bridge is not listed on the CHL or the NHL as an individual heritage place, but is included within, or adjacent to, the boundaries of the following heritage places:

- Lake Burley Griffin and Adjacent Lands/Lake Burley Griffin and Lakeshore Parklands (nominated CHL/NHL);
- National Land Roads (nominated CHL);
- Parliament House Vista (listed CHL); and
- Canberra the Planned National Capital (nominated NHL).

Commonwealth Avenue Bridge is a contributory element/attribute to these heritage places.

1.3.2 Environment Protection and Biodiversity Conservation Act 1999

The study area is located on Commonwealth land and is managed by a Commonwealth agency (the NCA), therefore it is subject to the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) (EPBC Act) and its regulations.

The EPBC Act is the federal government's central piece of environmental legislation. Under the EPBC Act, a Commonwealth agency that owns or controls a place that has, or might have, one or more Commonwealth Heritage values must take all reasonable steps to assist the Minister and the Australian Heritage Council in the identification, assessment and monitoring of the place's Commonwealth Heritage values (s341Z). For best practice, all heritage aspects should be evaluated, including historic, natural and Indigenous, and the assessment should be undertaken against the Commonwealth Heritage criteria set out in the Section 10.03A of the EPBC Regulations.⁴

1.3.3 National Capital Plan

The National Capital Plan (NCP) forms the strategic planning framework for Canberra and the ACT. In accordance with Section 10(1) of the *Australian Capital Territory (Planning and Land Management) Act 1988* (Cwlth), the NCP sets out detailed conditions for planning design and development to ensure that 'Canberra and the Territory are planned and developed in accordance with their national significance'.

The NCP specifies areas of land that have 'special characteristics of the National Capital' to be Designated Areas. The NCA has responsibility for determining detailed planning policy and the provision of Works Approval to ensure development is consistent with the NCP.⁵ Designated Areas are divided into a series of precincts, with detailed conditions of planning, design and development—Precinct Codes and General Codes—outlined for each precinct.⁶

Commonwealth Avenue Bridge is located within the boundaries of the Lake Burley Griffin and Foreshores Precinct Code, and Commonwealth Avenue is identified as one of the main avenues of the Main Avenues and Approach Routes Precinct Code.

1.4 Methodology

This HA has been prepared in accordance with the following guidelines and requirements:

- EPBC Act and Regulations for the assessment of places against Commonwealth Heritage criteria and Commonwealth Heritage management principles;
- *Australia ICOMOS Burra Charter, 2013* (Burra Charter);
- Australian Heritage Commission (2002) *Ask First: A Guide to Respecting Indigenous Heritage Places and Values*; and
- Australian Heritage Council (2010), *Identifying Commonwealth Heritage Values*.

Further discussion of the consultation is provided in Section 4.0 of this report.

1.5 Natural Heritage Values and Context

All aspects of the heritage environment should be evaluated when undertaking a Commonwealth heritage assessment, which includes natural, Indigenous and historic heritage values.

As a built structure, the Commonwealth Avenue Bridge does not have natural heritage value. This has been confirmed through a review of the EPBC protected matters database, which does not list any protected matters applicable to the immediate location of the bridge.

The natural heritage context of the bridge beyond the study boundary is briefly explained here for background. Additional context about the landscape setting of the bridge and the designed landscape of Lake Burley Griffin is provided in Section 2.0 and Section 3.0.

Commonwealth Avenue Bridge is located within the Limestone Plains on what was once the central floodplain of the Molonglo River. The pre-European vegetation of the area was largely comprised of eucalypt dry open forest on the hills and upper slopes, grassy woodlands on the lower slopes and river flats, and riparian forest (*Casuarina* and eucalypt) along the waterways.⁷ The central parts of the Limestone Plains, which are now covered by Lake Burley Griffin and the built-up area of central Canberra, were predominately natural temperate grassland.⁸

Following European settlement, the grasslands of the river plain were used for grazing stock with non-native grass species introduced to improve pastures. With the creation of Lake Burley Griffin in 1964, the lake bed was extensively cleared and graded so that there would be minimal standing biomass in the impoundment area.⁹

Today, the forested hilltops and wooded slopes originally bounding the lake are mostly intact visually and biologically. However, the grasslands and riparian forest, which once covered the central parts of the Limestone Plains, have been severely disrupted by later development.¹⁰

1.6 Authorship

This report has been prepared by GML—Kaylie Beasley, Heritage Consultant and Rachel Jackson, Principal.

GML acknowledges the contribution and research undertaken by Keith Baker for this report. Keith is an engineer, who has qualifications in cultural heritage management. He is the author of *A Century of Canberra Engineering*, recipient of the Engineers Australia's John Monash Medal (2016) for 'outstanding contribution in raising awareness and conservation of Australia's engineering heritage, particularly in the ACT.

GML also acknowledges:

- special advisers to GML, Chris Johnston and Dr Stephen Brown, who assisted in the development of the GML 2020 report that informs this HA; and
- the assistance of ACT Government/Major Projects Canberra and the NCA in the preparation of this report.

1.7 Terminology

For ease of reference, the following company names are referred to throughout the report:

- G. Maunsell and Partners;
- W. Holford and Partners; and
- M.R. Hornibrook Pty Ltd.

These companies changed their names at various points. However, for consistency in this report, we have used the company names applicable at the time of the construction of Commonwealth Avenue Bridge.

The following general terminology is used throughout this report.

Term	Definition
Attribute	A feature that embodies the heritage values of a place.
Commonwealth Heritage criteria	Criteria for natural, Indigenous and historic heritage values of places owned or controlled by the Commonwealth—as prescribed by EPBC Regulations 10.03A (EPBC Act s35D).
Commonwealth Heritage List (CHL)	A list of heritage places owned or controlled by the Australian Government. Places in the list can have natural, Indigenous and/or historic heritage values, or a combination of these. Places included in the list have been found to be significant for one or more of the nine Commonwealth Heritage criteria (see above).
Commonwealth Heritage values	Commonwealth Heritage values are the formally listed values for which a place is included in the CHL. These can comprise one or more natural and cultural aspects, such as aesthetics, history, scientific importance, importance to the community or spiritual significance.
Condition	The measure of deterioration of a place or attribute.
Conservation	All the processes of looking after a place to retain its cultural significance.
Cultural significance	Aesthetic, historic, scientific, social or spiritual value for past, present or future generations. Cultural significance is embodied in the place itself—its fabric, setting, use, associations, meanings, records, related places and related objects. Places may have a range of values for different individuals or groups.

Term	Definition
Environment Protection and Biodiversity Conservation Act 1999 (Cwlth) (EPBC Act)	The EPBC Act provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities, world and national heritage places—defined as ‘matters of national environmental significance’ (MNES). The EPBC Act also protects Commonwealth land, including heritage values through the CHL, and controls actions taken by the Commonwealth that may have a significant impact on the environment, including heritage values.
Fabric	All the physical material of the place, including components, fixtures, contents, and objects.
Guideline	A statement framed to clarify or guide the implementation of a broader conservation policy, setting a preferred direction for such implementation.
Identified heritage values	Identified heritage values refers to those values that have been identified through a heritage assessment, tested and found to meet the applicable threshold but have not been nominated and formally listed.
Integrity	This is a measure of the wholeness and intactness of the place and its attributes.
Interpretation	All the ways of presenting the cultural significance of a place.
Maintenance	The continuous protective care of the fabric and setting of a place, as distinguished from ‘repair’. Repair involves restoration or reconstruction.
Place	Site, area, land, landscape, building, group of buildings or other works—may include components, contents, spaces and views.
Prestressed concrete	Structural concrete elements into which effective internal compressive stresses are induced deliberately prior to the loading of the structure, usually by means of tensioned steel wires or cables (tendons) placed in ducts cast into the concrete. If the cables are tensioned before casting of the concrete, the process is called pre-tensioning; if they are tensioned after casting, it is called post-tensioning.
Setting	The area around a place, which may include the visual catchment.
The Griffin Plan	Refers to the three main plans produced by the Walter Burley Griffin and Marion Mahony Griffin (‘the Griffins’) in 1911/1912, 1913 and 1918, together with a range of other Griffin texts which complement this primary material.
1925 Gazetted Plan	The ‘1925 Gazetted Plan’ is the result of the 1924 Seat of Government Act introduced by Parliament to protect the ‘Griffin Plan’. It is a two-dimensional version only, showing the streets. It does not contain the land-use, staging or the three-dimensional intentions of Griffin as shown in the 1918 Griffin Plan.

1.8 Endnotes

- ¹ Definition of Central National Area as specified by the National Capital Plan.
- ² Definition of the National Triangle as specified by the National Capital Plan, Appendix B.
- ³ Birkett, EM and Fernie, GN 1964, *Bridges in the Canberra Central Lake Area—Design*, *The Journal of the Institution of Engineers, Australia*, from the Nomination for National Engineering Landmark: Lake Burley Griffin Scheme, February 2001.
- ⁴ Commonwealth of Australia 2019, *Working Together Managing Commonwealth Heritage Places, A guide for Commonwealth agencies*, p 6.
- ⁵ Australian Government/National Capital Authority, ‘Designated Areas’, Canberra, <<https://www.nca.gov.au/planning-heritage/about-planning-act/designated-areas>>.
- ⁶ National Capital Authority 2019, *National Capital Plan*, Australian Government p39.
- ⁷ Godden Mackay Logan, Lake Burley Griffin—Heritage Assessment, report prepared for the National Capital Authority, May 2010, p 34.
- ⁸ Godden Mackay Logan, Lake Burley Griffin—Heritage Assessment, report prepared for the National Capital Authority, May 2010, p 142.
- ⁹ Godden Mackay Logan, Lake Burley Griffin—Heritage Assessment, report prepared for the National Capital Authority, May 2010, pp 146–147.
- ¹⁰ Godden Mackay Logan, Lake Burley Griffin—Heritage Assessment, report prepared for the National Capital Authority, May 2010, p 37.

2.0 Historical Context

This section provides an overview of the historical development of Commonwealth Avenue Bridge within the context of the development of central Canberra, the Griffin Plan, and the National Capital Development Commission's (NCDC) development of Lake Burley Griffin, bridges and roads.

2.1 Molonglo River Crossings

Before the formal foundation of Canberra in 1913, early crossings of the Molonglo River were low-level fords which were only passable in dry weather, such as Scott's Crossing near Blundell's Cottage.¹ With the establishment of an administrative area at Acton, work was placed in hand for the construction of the Lennox Crossing Bridge in 1911.² These two crossings became features of the Canberra landscape and remained for many years. Neither of them featured in the Departmental Board Design for Canberra, which was accepted by the Fisher Government in 1913, nor in the Griffin Plan of the same year. Scott's Crossing was upgraded from a ford to a low-level timber bridge with substantial concrete piers around 1929.

After prolonged discussion, the Griffin Plan was accepted and accordingly the first Commonwealth Avenue Bridge was constructed with restricted funding during World War I. It was completed in 1916, taking the form of a timber trestle and beam bridge.³ Constructed in 1920, Commonwealth Avenue became one of the first roads built under the Griffin Plan.

In May 1922, a contract was awarded for the construction of a timber bridge on Kings Avenue, although not on the same alignment as identified by the Griffin Plan. Materials for the construction of this bridge were on site when the Molonglo River flooded in July 1922 and the existing Commonwealth Avenue Bridge was damaged. The southern approach to the bridge was also breached, forming a gap of about 20 metres wide in the embankment and creating a billabong. As a result, the materials from the Kings Avenue timber bridge contract were diverted to construct what became known as the Billabong Bridge immediately south of the first Commonwealth Avenue Bridge. The proposed timber Kings Avenue bridge was not constructed.

A new, more substantial bridge (higher and with longer spans) was designed to replace the damaged Commonwealth Avenue Bridge. It was a timber truss bridge similar in appearance to the extant Tharwa Bridge (Tharwa, ACT), but with concrete piers and composite 'Leychester' trusses which incorporated steel in the lower chords. Works were completed on this second Commonwealth Avenue Bridge and Commonwealth Avenue was again open to traffic in October 1924.⁴

In May 1925, torrential rain again fell throughout the ACT region and rivers rose above the 1922 level. The new bridges on Commonwealth Avenue (both the Billabong Bridge and the second Commonwealth Avenue Bridge) were damaged, and washaways occurred on the embankment and bridge approaches. The roadway and bridge deck levels were subsequently raised by almost a metre and a further truss span was added to the second Commonwealth Avenue Bridge. The repairs were carried out in 1926 and completed in time for the opening of Provisional Parliament House in May 1927. Figures 2.1–2.6 show the Molonglo River crossings described above.



Figure 2.1 Lennox Crossing in 1928. (Source: National Australian Archives, A3560, 4633)



Figure 2.2 First Commonwealth Avenue Bridge, which was destroyed in the 1922 flood. (Source: National Australian Archives, A3560, 232).



Figure 2.3 Billabong Bridge in 1923. (Source: Canberra's Engineering Heritage, p18)



Figure 2.4 Second Commonwealth Avenue Bridge in 1924. (Source: National Australian Archives, A3560, 661)



Figure 2.5 Commonwealth Avenue Bridge, showing flood damage in 1925. (Source National Australian Archives, 3560,7668)



Figure 2.6 Second Commonwealth Ave Bridge, with additional truss span, in 1926. (Source National Australian Archives, A3560, 2079).

2.2 Planning of the Bridges over Lake Burley Griffin

Commonwealth Avenue and its bridges remained largely unchanged, apart from remedial works in 1951,⁵ until after the National Capital Development Commission (NCDC) was established in 1957. The NCDC recognised very early that the lake/water body of the Griffin Plan was essential to give Canberra the gravitas of a 'national capital'. As it was, the city was made up of a set of widely separated suburbs divided by a floodplain.

Planning associated with the implementation of the lake was a multi-faceted task and Prime Minister Menzies invited the British architect, Sir William Holford, a world authority on planning and development, to advise on planning and aesthetic aspects of a modified version of the Griffin Plan (the gazetted 1925 Griffin Plan).⁶ Holford's advice focused on the roads, bridges and landscape within the central and parliamentary areas, retaining the essential features of the Griffin Plan's parliamentary triangle flanked by Commonwealth and Kings Avenues.

Hydrological studies and model testing was undertaken by the Department of Works before the location of the associated bridges was determined.⁷ Although the Department of Works had earlier prepared a functional design for Kings Avenue Bridge, the NCDC invited the London firm of engineering consultants, G. Maunsell and Partners to submit a bridge design in association with architectural firm W. Holford and Partners. Since construction of a new bridge on Commonwealth Avenue would almost certainly necessitate the restricted use or demolition of the existing bridges, thereby disconnecting north and south Canberra in the event of a flood, it was decided to build Kings Avenue Bridge first.⁸

A construction contract was awarded for Kings Avenue Bridge to the Australian civil engineering firm M.R Hornibrook Pty Ltd and the work was undertaken from October 1959 to February 1962 under the supervision of the Commonwealth Department of Works.⁹

2.3 Bridge Construction, 1961–1963

Information on the construction of Commonwealth Avenue Bridge in this section of the report has largely been drawn from a paper prepared by Graeme Kelleher, who was the Supervising Engineer for the Commonwealth Department of Works during the construction of Commonwealth Avenue Bridge.¹⁰ More detailed information from a range of sources is included in the Appendices.

While construction of Kings Avenue Bridge was underway, G. Maunsell and Partners and W. Holford and Partners designed a second bridge, broadly similar but more prestigious in appearance, for the major ceremonial thoroughfare of Commonwealth Avenue. This bridge had three lanes in each direction rather than the two on Kings Avenue—Figure 2.7 shows the visual relationship between the two bridges.

Hydrological studies indicated that in times of flood the natural course of the Molonglo River was through the billabong and this was the channel that should be bridged. Since it was unnecessary to bridge the entire flood plain, it was decided to have earthen promontory on the northern end, providing geometric balance with the other side of the triangle.¹¹ This allowed the construction of the bridge predominantly on the dry floodplain, with the river later diverted under it to allow the northern promontory to be filled in. Figures 2.8—2.9 show some of the hydrological scale modelling.



Figure 2.7 Commonwealth Avenue Bridge in the foreground and the similar but different Kings Avenue Bridge flanking the Parliamentary Triangle in the background. (Source: K Baker 2013)



Figure 2.8 Hydrological scale modelling of the lake, with Scrivener Dam and bridges. (Source: National Library of Australia, nla.obj-143692477)



Figure 2.9 Flow measurement at Kings Ave Bridge, with Central Basin and Commonwealth Ave Bridge. (Source: National Library of Australia, nla.obj-143692313)

Commonwealth Avenue Bridge had some similarities with the Kings Avenue Bridge, but some significant differences. Both bridges consisted of separate parallel structures for the traffic to and from the Parliamentary Zone, both had massive concrete abutments at each end and both had concrete piers spaced between the abutments to support the superstructure forming the roadway deck—but the construction of the bridging superstructure was totally different.

Unlike the long precast beams that spanned from pier to pier on the Kings Avenue Bridge, the Commonwealth Avenue Bridge had multiple shorter hollow box segments which had to be supported between the piers until they could be held together by tensioned steel cables to form a solid concrete superstructure over the length of the bridge.

The foundations of Commonwealth Avenue Bridge cannot be seen, but are substantial. Piles below the piers and abutments consist of solid reinforced concrete cylinders poured in bored holes 2 to 3 metres in diameter and from 4.5 to 15 metres in depth, depending on the underlying rock. Each of the piers seen above the water level are supported on reinforced concrete pile caps sitting on four of the cylindrical piles. Two of the piers that occur over shattered rock have many steel piles driven at an angle to the vertical. In each case, the piers were then formed from reinforced concrete tied to the pile

cap and extending to the underside of the future superstructure, poured in one continuous operation. Figure 2.10 shows part of the piled foundation being bored,¹² while Figure 2.11 shows an abutment.



Figure 2.10 Boring the bridge pile, which was 2 metres in diameter. (Source: Hornibrook, 1964)



Figure 2.11 Bridge abutment, supporting an end span of the superstructure. (Source: National Library of Australia, c1962–1963, nla.pic-an24577607-v)

The superstructure, which is the most innovative feature of the bridge, was made of 102 identical precast multi-webbed box segments per bridge, each 3 metres long and weighing over 50 tonnes. They were cast on the river flat just east of the old Billabong Bridge and stored on site. An extensive timber falsework structure was erected between the abutments and straddling the piers to support the box segments and form a sweeping curve. The box segments were then accurately placed on the timber falsework—concrete stiffening diaphragms were poured in-situ above each pier and additionally within spans.¹³ The 7.6 centimetre gap between segments was filled with concrete as each span between piers was completed then tied together with steel cables. Lifting of the box segments into place was achieved using a mobile steel gantry, which had also been used to launch the beams on Kings Avenue Bridge.

When all box segments were in place end-to-end, they were further squeezed together using 80 steel cables running the length of the bridge, which were post-tensioned using large jacks and gripped by wedges (to hold the tension while the cables were encased in concrete to prevent future corrosion and cable failure). The bridge was then self-supporting and the timber falsework could be removed.

The precast box segments had steel reinforcement projecting from the outer edges, which were used to attach cantilevered footways, along with kerbs, paving, handrails, and lighting. Concealed services were passed along the outer web of the bridge and were covered by exposed aggregate finished panels. The services included two 45 centimetre diameter sewer mains, a 60 centimetre water main, several 11,000-volt power cables, lower voltage power cables for the lighting, and communication cables. The pylons at each end were primarily architectural, but one served as a ventilator for the sewer main.

A shorter concrete beam bridge was added at the southern end of the main bridge, passing over Flynn Drive, as part of the cloverleaf entry and exit to the bridge. The timber trestles forming the falsework were removed in March 1963, allowing the river to be diverted under the new bridge and earthworks to proceed on the northern approach.¹⁴ The eastern carriageway was opened to traffic in the following August and the western side in November.¹⁵

Lighting of the bridge and its approaches received particular attention to preserve the clean lines of the structure. This included high mast lighting over the southern cloverleaf and handrail lighting covering the walkways and roadway to avoid street lighting poles in the vicinity.

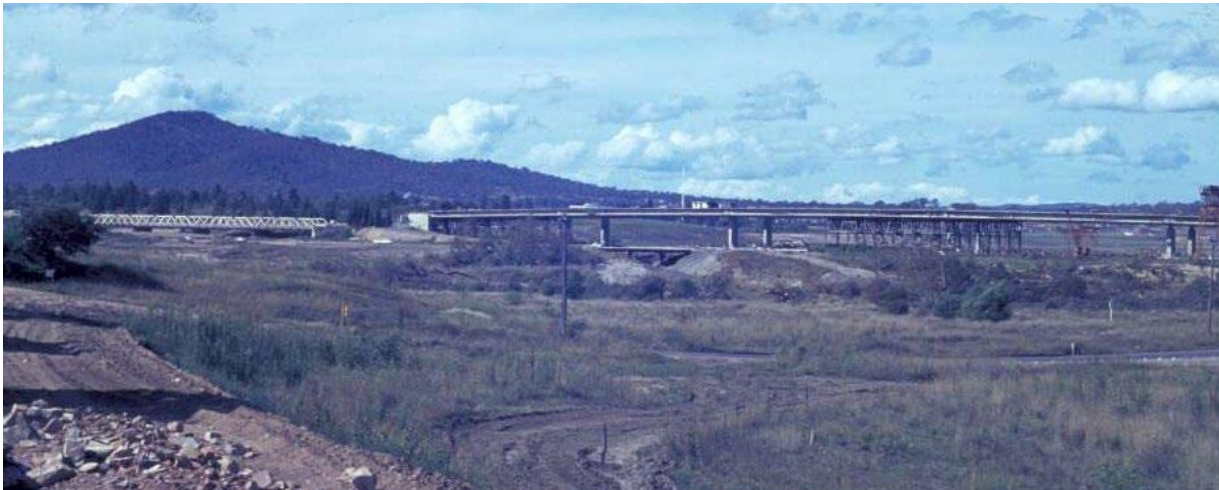


Figure 2.12 View from Acton, looking toward Russell, of the 1963 concrete Commonwealth Avenue Bridge nearing completion. The Old Commonwealth Avenue timber truss bridge is to the left and a temporary bridge over the diverted Molonglo River in the centre. (Source: National Library of Australia, nla.obj-143758504-1)

2.4 Construction Contract

2.4.1 Contractor: M.R Hornibrook Pty Ltd

Tenders were called in 1960 for the construction of the Commonwealth Avenue Bridge after the Kings Avenue Bridge was underway. The same contractor for Kings Avenue Bridge, M.R Hornibrook Pty Ltd, was successful. This time, in association with Henry J Kaiser of the USA. Construction was supervised by the Commonwealth Department of Works, with Graeme Kelleher as the site supervising engineer.

The contract was awarded for the new bridge in January 1961—at the same time the company was building the shells for the Sydney Opera House. Both projects required ‘repetitive casting’ and precise placement of large numbers of reinforced concrete segments and beams.

The company, founded by Manual Richard ‘MR’ Hornibrook in 1928, made its reputation building bridges and had become one of the largest construction companies in Australia. M. R Hornibrook Pty Ltd brought modern, mechanized methods of civil engineering construction to Australia, establishing the company’s own workshops for maintaining the heavy machinery that had become an essential part of large-scale contracting.¹⁶ Manual Richard Hornibrook was highly regarded across Australia and Papua New Guinea, and was knighted in 1960. Later, M.R Hornibrook Pty Ltd merged with Baulderstone. It is still one of Australia’s largest civil engineering companies.

2.4.2 Construction Process

The construction process for the Commonwealth Avenue Bridge is described in detail in the inspection notes prepared for the National Association of Australia State Road Authorities (NAASRA)¹⁷ symposium on bridges held in Canberra in 1969.¹⁸ Aspects are summarised below.

The construction of the twin structure for the bridge was carried out on the dry flat, located south of the diverted Molonglo River. Concrete for in situ casting of the piles, piers and abutments was ready mixed and delivered to the site in trucks. After the piers and abutments were cast, heavily braced timber

falsework was erected on concrete pads along the length of the bridge, with variations in height to follow the curve of the underside of the bridge superstructure in preparation for the placement of precast box segments.

For the precast box segments, a casting yard was established on the flat to the East of Pier 1 and across from the Billabong Bridge (near the current site of the National Library of Australia). The concrete used was mixed on site in an adjacent horizontal pan mixer and delivered to the casting yard in an automatic hopper mounted on a mono-rail. The box segments were cast in steel moulds on a prepared base in which the intricate reinforcement for each four-web box was placed. When hardened, the 50 ton concrete box segments were moved from the beds and erected on the timber falsework in three movements by two overhead gantries on rails, one of which spanned the casting yard and the other both bridge superstructures. One-hundred-and-two box segments were placed end-to-end.

After erection and final adjustment of the box segments and completion of the in situ pier diaphragms and anchor blocks, the box segments were jointed and each span was partially stressed, starting from the north end.

Final stressing was then carried out using 80 full-length high tensile steel tendons 28mm in diameter. Loads of 64 tonnes were simultaneously applied at the end of each tendon. This was at that time the longest single length of tendon that had been stressed. Further details of the stressing are provided in Appendix B.

On completion of the stressing, the false work was disassembled, the protective concrete around the cables was poured, and the cantilevered footways and road kerbs were constructed. The handrails, parapet lighting, pipe lines and exposed aggregate panels were then placed and bituminous hot mix laid on the bridge decking.

The timber trestles forming the falsework were removed in March 1963, allowing the river to be diverted under the new bridge and earthworks to proceed on the northern approach.¹⁹

2.4.3 Completion and Opening

The eastern carriageway was opened to traffic in August 1963, and the western side in November 1963.²⁰ A crack which became visible in the northern abutment after the bridge was opened to traffic caused some public concern.²¹ Less than a millimetre wide, it was found to be from normal shrinkage and not of any structural consequence. Its presence was known before traffic and load testing occurred and it was promptly filled with epoxy resin cement to guard against any entry of moisture. Similar shrinkage cracks appeared in the other three abutments over the next year,²² requiring similar treatment.

Granite blocks from London's historic Waterloo Bridge were placed on the abutments at either end of the bridge in February 1964.

There was no official opening of Commonwealth Avenue Bridge, but during the inauguration of Lake Burley Griffin at the lakeside adjacent to the bridge on 17 October 1964, Prime Minister Sir Robert Menzies described the bridge as 'the finest building in the National Capital'.²³



Figure 2.13 Multi-webbed box segments in place on top of the timber falsework. The concrete batching plant and casting yard are in the foreground. (Source: National Library of Australia, nla.obj-143758146-1)



Figure 2.14 Reinforcement placed around inner form of box segment. (Source: National Library of Australia, nla.obj 24577602)



Figure 2.15 Cast multi-webbed box segments curing before placement on timber falsework. Note the projecting reinforcement for addition of cantilever walkway once in place. (Source: National Library of Australia, nla.obj-145675273-1)



Figure 2.16 Multi-webbed box segments from adjoining spans placed over pier before preliminary tensioning. (Source: National Library of Australia, nla.obj-145675579-1)

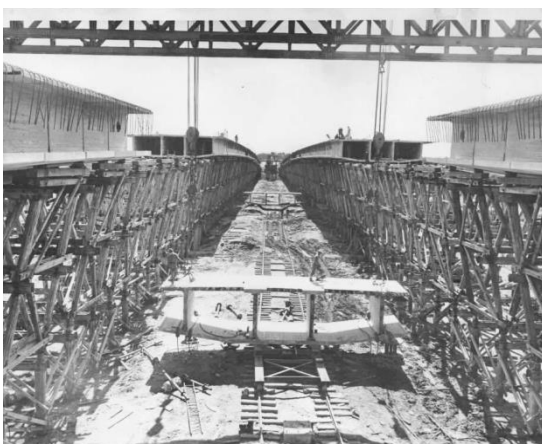


Figure 2.17 Multi-webbed box segment being hoisted into place. (Source: National Library of Australia, nla.obj-145674973-1)



Figure 2.18 Bridge superstructure self-supporting after post tensioning. The timber falsework is in process of being removed. (Source: National Library of Australia, nla.obj-143758408-1)

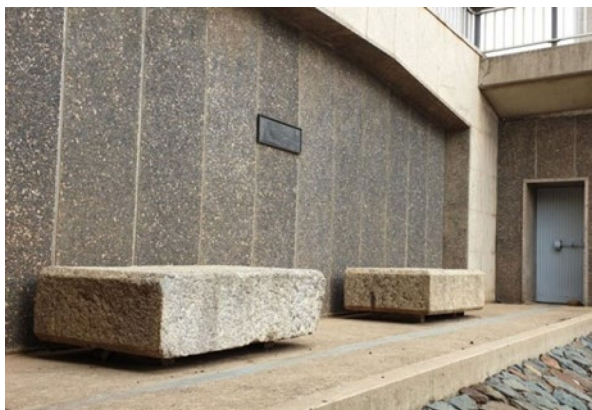


Figure 2.19 Granite blocks from London's Waterloo Bridge are located between the abutments at the southern end of Commonwealth Avenue Bridge. (Source: K Baker, 2020)



Figure 2.20 Traffic towards City Hill on the recently completed Western bridge. Note the absence of safety rails on kerb. (Source: National Library of Australia, nla.obj-143758801-1)

2.5 Subsequent Changes to the Bridge

Since the bridge was designed for the future it has served its purpose well and changes have been minimal. The only visible changes have been the addition of safety rails for pedestrians, motorists and cyclists.

Following a number of accidents in the 1960s, when cars mounted the kerb on the bridge, crossed the footway and hit or broke through the handrail, there was considerable public pressure for increased safety. The NCDC resisted any change to the bridge but indicated in 1969 that it was reviewing safety factors of the Commonwealth Avenue Bridge railing and intended to 'supplement these expeditiously'.²⁴ After more than a year, supplementary crash rails about a third of the height of the aluminium hand rails were installed,²⁵ as shown in Figure 2.21.

In 1980, the NCDC acknowledged the problems that cyclists faced using the pavement on the bridge and commenced work on the design for a protective railing.²⁶ Barriers were subsequently installed immediately above the heavier tubular crash rails (sometime between 1980 and 2012), but not on the western side of the bridge—apparently because of the diversion of funding to other priorities (see Figure 2.23). ACT cycling organisation, Pedal Power, lobbied for completion of the barriers on the western side, arguing that the low railings provided an insufficient barrier from motor vehicle traffic.²⁷ A temporary additional rail was made to the northbound bridge in 2017 (see Figure 2.24).²⁸

At some stage, the cycleway on the western bridge was widened by narrowing the roadway. This can be seen in Figure 2.22, where the base of the safety rail support has been moved, leaving a rectangular pad with three cut-off bolts. This pattern is repeated along the length of the bridge, as seen in Figure 2.24. A comparison of the roadside kerb and cycleway on the eastern and western sides of the bridge shows a difference in width. The pathway construction is also different, being cast in situ on the eastern side (see Figure 2.23) and precast slabs in the western (see Figure 2.24). It is unlikely that this difference existed in the original construction. Given the difference the safety rail supports, it suggests the cycleway on the eastern side of the bridge has also been widened, but at a different time, to provide a safer path for cyclists. A pre-tender G. Maunsell and Partners drawing shows precast paving slabs was the original intent.²⁹ While these later alterations are of interest, they do not impact the most significant engineering and design aspects of Commonwealth Avenue Bridge, or its heritage significance as a whole.

Commemorative installations and development adjacent to the bridge over time, such as the Captain Cook Memorial Jet (1970), Australians of the Year Walk, the RG Menzies Walk and the more recent construction of Henry Rolland Park (see Figures 2.25 to 2.28), have contributed to opportunities for pedestrians to use and appreciate the bridge in its setting.



Figure 2.21 Safety rails mounted on the concrete kerbs at the edge of the roadways. (Source: K Baker, 2020)



Figure 2.22 Evidence on the western bridge of cycleway widening and relocation of the safety rails. (Source: K Baker, 2020)



Figure 2.23 Addition of cyclist safety rails above the roadway rails on the eastern side of the bridge. (Source: K Baker, 2020)



Figure 2.24 Addition of temporary cyclist safety rails alongside the roadway rails on the western side of the bridge. (Source: K Baker, 2020)



Figure 2.25 Captain Cook Memorial Water Jet, opened 1970. (Source: K Baker, 2013)



Figure 2.26 Australians of the Year Walk, opened 2006. (Source: K Baker, 2020)



Figure 2.27 RG Menzies Walk, opened 2009. (Source: K Baker, 2020)



Figure 2.28 Henry Rolland Park, opened 2018. (Source: K Baker, 2020)

2.6 Endnotes

- ¹ It was subsequently replaced with a bridge in 1928. *The Canberra Times*, 23 March 1928.
- ² Gillespie, L, AGPS 1991, *Canberra 1820–1913*, p 276.
- ³ Andrews, WC 1990, *Canberra's Engineering Heritage, Chapter One, Roads and Bridges*, Institution of Engineers Australia, Canberra, p 14.
- ⁴ Andrews, WC 1990, *Canberra's Engineering Heritage, Chapter One, Roads and Bridges*, Institution of Engineers Australia, Canberra, p 17.
- ⁵ Kelleher, G 1964, *Commonwealth Avenue Bridge*, in *The Works*, Department of Works Canberra, p 5.
- ⁶ Holford, W 1957, *Observations on The Future Development of Canberra*, ACT, Commonwealth of Australia.
- ⁷ Condon, AJ, 'River Model, Spillway Model and Dam Design for the Canberra Lake Scheme—Part 1', in *Journal of the Institution of Engineers Australia*, September 1964.
- ⁸ Kelleher, G 1964, *Commonwealth Avenue Bridge*, in *The Works*, Department of Works, Canberra, p 9.
- ⁹ NCDC Plaque on east end of Kings Avenue Bridge.
- ¹⁰ Kelleher, G 1964, *Commonwealth Avenue Bridge*, in *The Works*, Department of Works, Canberra, and the more detailed report Kelleher, G and English, G 1964, *Commonwealth Avenue Bridge Construction Report*, Department of Works, Canberra.
- ¹¹ Kelleher, G 1964, *Commonwealth Avenue Bridge*, in *The Works*, Department of Works, Canberra, p 13.
- ¹² M.R Hornibrook Pty Ltd, 1965, *Commonwealth Avenue Bridge; Construction Achievement Award Entry*.
- ¹³ Birkett, EM and Fernie, GN 1964, 'Bridges in the Canberra Central Lake Area-Design', in *Journal of the Institution of Engineers Australia*, Vol 36.
- ¹⁴ *Canberra Times*, 8 March 1963.
- ¹⁵ *Canberra Times*, 24 August 1963 and 31 October 1993.
- ¹⁶ Whitmore, RL 1996, *Hornibrook, Sir Manuel Richard (1893–1970)*, Australian Dictionary of Biography, MUP.
- ¹⁷ The federal government in July 1989 disbanded NAASRA and created a new organisation, known as Austroads.
- ¹⁸ *NAASRA Symposium on Bridges, Inspection Notes and Data*, February 1969, Section 1, Commonwealth Avenue Bridge. The federal government in July 1989 disbanded NAASRA and created a new organisation, known as Austroads.
- ¹⁹ *Canberra Times*, 8 March 1963.
- ²⁰ *Canberra Times*, 24 August 1963 and 31 October 1993.
- ²¹ *Canberra Times*, 15 November 1963.
- ²² *Canberra Times*, 15 January 1965.
- ²³ Andrews, WC 1990, *Canberra's Engineering Heritage, Chapter One, Roads and Bridges*, Institution of Engineers Australia, Canberra, p 35.
- ²⁴ 'Action on Bridge Safety', *Canberra Times*, 10 June 1969.
- ²⁵ 'Bridge Rail Tenders', *Canberra Times*, 3 April 1970 and 10 November 1970
- ²⁶ 'Protection for Bridge Cyclists', *Canberra Times*, 29 December 1980.
- ²⁷ 'Lives are at risk on Commonwealth Avenue Bridge', *The Riot Act*, 30 March 2017.
- ²⁸ 'Increased safety for bike riders on Commonwealth Ave Bridge', *The Riot Act*, 19 June 2017.
- ²⁹ W. Holford and Partners and G. Maunsell and Partners, *Report on Commonwealth Avenue Bridge to NCDC*, October 1959.

3.0 Physical and Engineering Context

This section provides a physical and engineering context of Commonwealth Avenue Bridge. It has been informed by research into the engineering and design history of the bridge in its designed landscape setting, and site inspections undertaken in June and July 2020.

3.1 Landscape Setting

3.1.1 Lake Burley Griffin and Commonwealth Avenue Landscape

Commonwealth Avenue Bridge spans Lake Burley Griffin from north to south. Lake Burley Griffin is central to the designed landscape first conceived by Walter Burley Griffin and Marion Mahony Griffin in their 1911 design competition entry for Australia's federal capital. The shallow lake, which covers 664 hectares, is approximately 9 kilometres long and varies in width. The distance around the shoreline is 40.5 kilometres. The lake is a key component of the nation's designed, symbolic landscape within the central Canberra. It comprises several separate bodies of water, including East Basin, Central Basin, West Basin, West Lake, Taroola Reach and Yarramundi Reach, each distinct in its shape and form, lake edge treatments and uses.

Commonwealth Avenue Bridge forms an integral element of Commonwealth Avenue, a major thoroughfare linking northern and southern Canberra. It is one of three original and major components of the Griffin Plan, forming the western edge of the National Triangle. As a wide tree-lined avenue, it contributes the overall planning and landscape of Canberra with a number of significant commercial, government, educational, religious and entertainment-related buildings and memorials addressing it, such as the Captain Cook Memorial Jet, the Catholic Archbishop's Residence, the National Library of Australia, Albert Hall, the Hyatt Hotel Canberra and the high commissions of the United Kingdom, New Zealand and Canada.

3.1.2 Parliament House Vista

The Parliament House Vista is a place included in the CHL and expresses the core of the Griffin Plan—the design vision for Canberra by Walter Burley and Marion Mahony Griffin. The landscape of the vista embraces the central land axis and part of the water axis (Lake Burley Griffin), and most of the Parliamentary Zone and National Triangle. The vista combines urban planning, landscape and architecture, to achieve a grand vision of a symbolic, unified and visually dramatic place.¹

Parliament House Vista is considered important for its design pattern, with large landscape and waterscape spaces framed by treed avenues and, at the lake, bridges. The vista terminates at the Australian War Memorial and Mount Ainslie at its northern end, and Parliament House on Capital Hill at its southern end. However, while the Parliament House Vista's CHL boundary covers the Australian War Memorial, it does not include Mount Ainslie or Parliament House.²

The Parliament House Vista is also distinctive for the generally symmetrical organisation of monumental buildings in the landscape, the large body of water of Lake Burley Griffin, and the parklands and gardens contribute to the landscape setting of the broader vista area.³

3.2 Design Aesthetic

The design team of G. Maunsell and Partners and architectural firm W. Holford and Partners had a specific aesthetic they intended to achieve, as is evidenced in 'Report on Commonwealth Avenue Bridge to NCDC' by Holford and Maunsell in October 1959.⁴

General Character of the Bridge

Commonwealth Avenue in many ways presents the designer with an ideal site for a bridge. It offers reasonable foundation conditions, a dry river bed, a background of great natural beauty, and an assured pre-eminence among the bridges of the Federal Capital City. In return it demands a design of outstanding quality. Fully conscious of this high aim, and of the responsibility entrusted to them, the two firms have given close attention to the study of the landscape, and have surveyed the range of current engineering practice to find a technical solution that would provide a bridge exactly suited to its setting. The Consulting Architects and Consulting Engineers believe that the design they now submit for consideration would make a well-proportioned bridge, of unusual interest, not unworthy of the position for which it is intended.

Influence of the Landscape

The feature of the landscape that has had the most influence on the design of the bridge is the lowness of the relief in relation to surface distance. This characteristic- which is not at all the same thing as flatness-is the rule in Canberra. The hills are there in the middle distance the mountains in the far distance. For the most part the attenuated undulations of the landscape are apparent in lines that lie close above one another in the region of the horizon.

The 'Single-Arc' Superstructure

It is thus as important at Commonwealth Avenue as at King's Avenue that the spring of the bridge from bank to bank should be clearly defined. Any suggestion of arcuation⁵ of the individual spans would detract from the effect of the whole. In addition, at Commonwealth Avenue it is desirable to have a greater rise from abutment to mid-span. There are three reasons for this. First, its general character and its contours-particularly on the north side-demand a more pronounced vertical curve over the bridge; second, the type of construction adopted makes use of a parallel deck section which needs greater curvature than the bowed superstructure at King's Avenue to counteract an appearance of sagging at the centre; third, the maximum clearance between the underside of the deck and the water is needed to make the most of views under the bridge, including that of the formal waterside approach to the Australian National University.

3.3 Physical Description of the Bridge

Commonwealth Avenue Bridge forms a graceful low sweeping arch over Lake Burley Griffin. It is an integral part of the Commonwealth Avenue roadway (and broader National Land road network within central Canberra), and the unobstructed ceremonial entrance from central Canberra to the Parliamentary Zone and Parliament House. It is formed by two parallel reinforced concrete structures, separated by 10 metres to visually continue the avenue median.

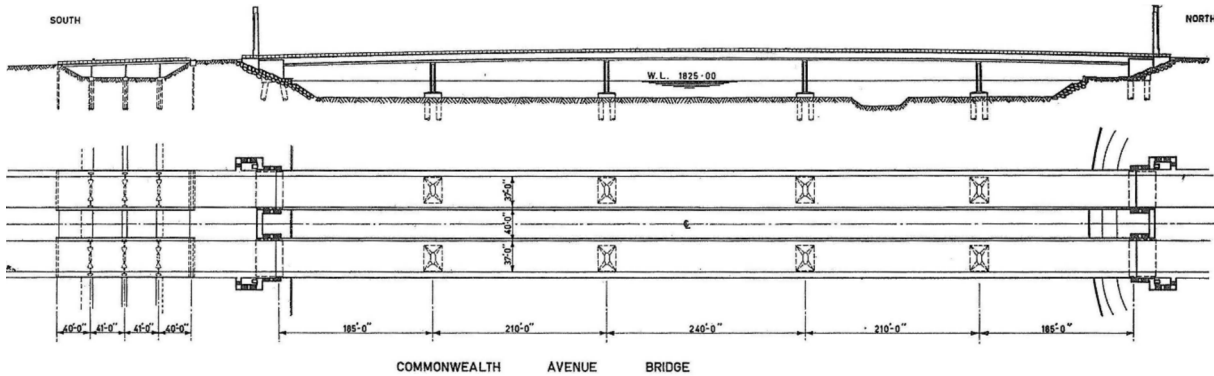


Figure 3.1 Elevation and plan showing five spans supported by four piers and the two abutments, with a shorter beam bridge at the southern end providing an underpass for Flynn Drive. Road access is provided under the main bridge at the northern end. (Source: Birkett 1964 p 140)

Slender reinforced concrete piers that support each span are fixed rigidly on piled foundations. The superstructure is then supported on roller bearings at the top of each pier but fixed at the south abutment so that expansion movement is taken up at the north abutment. The height of the bearings was adjustable within limits to provide even support on each pier while following the curve of the superstructure.

The abutments are of massive box-like construction, supporting the ends of the bridge, the start of the roadway and associated earthworks. The two sides of each abutment are connected by a central terrace area reached by broad stairs from the underpass walkway and allowing service access to the end spans and services.

While the main bridge structure is formed with precast multi-webbed box segments, cantilevered footpaths incorporate handrails of anodized aluminium which include continuous strip lighting for the roadway and footpaths. The exposed aggregate panels which enclose the outer cells of the box girder are illuminated on the outer side of each bridge by continuous strip lighting concealed beneath the outer footway.⁶

Art Deco pylons at each end of the bridge emphasise its importance while also being functional. Engineering services are carried through the hollow cross-section of the bridge, allowing clean lines when viewed from all directions, consistent with the high standard of precision and finish that was achieved during construction and maintained over its life.

The lines of the bridge are continued at the southern end to allow Flynn Drive to pass under Commonwealth Avenue as a cloverleaf for entering and exiting traffic. While appearing as part of the bridge, the overpass consists of four short, simply supported spans of precast pre-tensioned inverted 'T girders' placed in contact side. The reinforced concrete decks were poured in situ on top of precast girders. Piers are on each side of the Flynn Drive roadway and in the median.

3.4 Design and Engineering

3.4.1 Prestressed concrete and modular box girder construction in Australia

Reinforced concrete has been used in structures in Australia since the end of the nineteenth century, when the Monier system of reinforcement was pioneered by Monash and Anderson. In reinforced concrete, the reinforcing steel allows the structure to handle tension, since concrete without reinforcement is strong in compression but weak in tension, and tension is induced by loading which tends to cause bending.

In major structures pre-stressing is used to allow lighter or longer beams to carry heavy loads without the lower side of the beam being stressed to the point where it would otherwise crack under tension. The greater strength is achieved by inserting steel tendons which are permanently tensioned to compress the concrete along its length and counteract the tension that would occur under load. After World War II, prestressed concrete started to appear gradually in Australia, with the earliest prestressed concrete bridges being constructed in the mid to late-1950s.⁷

Precast concrete 'I' beams or 'T' beams were used in the earliest bridges of this period and continue to be used, but hollow box segments were more economical in materials⁸ and were more easily cast in repeated sections than in full lengths, then united after assembly when prestressed. The joints between the segments were most important and usually a mortar or fine concrete using high early strength cement was used. Associated developments in concrete materials and precise batching led to concretes with higher strength and improved durability for bridge construction.⁹

Pre-stressing techniques could vary depending on the application.¹⁰ For long beams, the usual approach was for wires or strands to be stretched before the concrete was cast and released after hardening, with the tension being maintained by the bond with the concrete. Alternative systems apply the tensioning after the concrete has hardened and the rods or cables are anchored through end plates by wedge grips or anchorage cones. In all cases a suitable jack is required to stretch the cables, wires or rods, and where not encased and bonded in the concrete beam, require the duct in which they were carried to be grouted up to prevent future corrosion.

Historically, the particular bridge design and construction techniques incorporating pre-stressing that were used depended on the skill and experience of the designer, contractor and quality control to instil confidence in the funding client/organisation to adopt leading edge engineering technology.

3.4.2 The setting and specification

The specification of Commonwealth Avenue Bridge followed from the Holford study of Canberra's revised development by the NCDC¹¹ and was developed by G. Maunsell and Partners in association with architectural firm W. Holford and Partners—in parallel with the design of Kings Avenue Bridge (which was constructed first). The details are described in the paper *Bridges in the Canberra Central Lake Area-Design*,¹² presented to the Institution of Engineers by two of the G. Maunsell and Partners engineers in 1964—Edward Birkett, who was the Australian-based partner, and Geoffrey Fernie, who was the firm's resident engineer based in Canberra. Their paper demonstrated significant differences in the detailed design of the two Canberra bridges, reflecting their location and relative importance (discussed in Section 2.3).

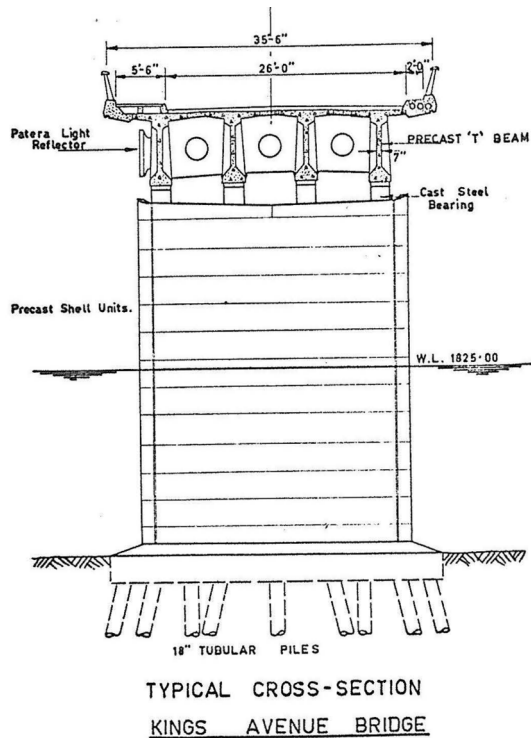


Figure 3.2 Kings Avenue Bridge design with broad precast sectional piers and prestressed 'T' beam superstructure. (Source: Birkett 1964 p 141)

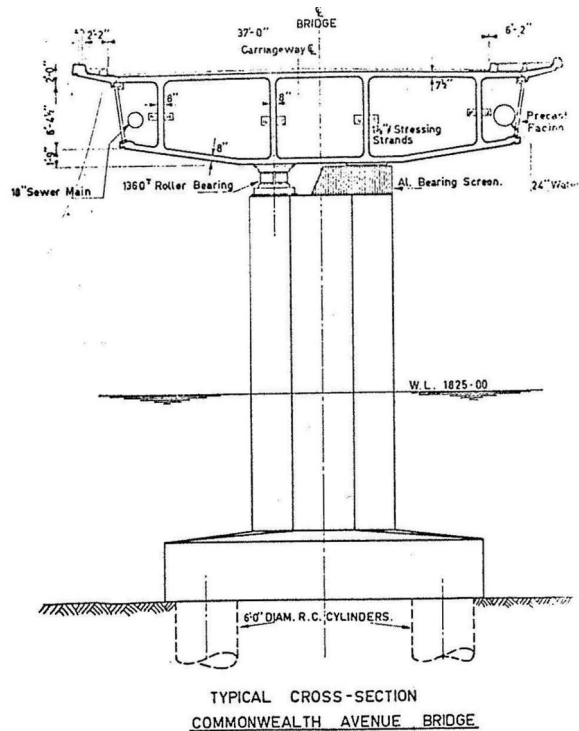


Figure 3.3 Commonwealth Avenue Bridge design with slender piers and wider precast box segment, post tensioned superstructure. (Source: Birkett 1964 p 142)

As separately recorded by William Andrews, at the time Associate Commissioner of the NDCD, both bridges had to reflect their importance as a lake crossing leading to the provisional Parliament House, as well as a link between the road systems north and south of the future lake. They also had to contribute to the water and landscape scene, withstand high flood flows and allow for future public transport space.¹³ In addition, the structure needed to be economical, built of materials available and appropriate for modern construction techniques, while the lighting had to reduce the cluttering effect of poles interrupting the smooth lines of a well-designed superstructure. The final design by G. Maunsell and Partners in association with W. Holford and Partners, met these criteria and was to consist of two separate structures corresponding to the dual carriageways of Kings Avenue.

Referring specifically to Commonwealth Avenue Bridge, Andrews recorded:

The new bridge demanded a design of outstanding quality, and was to accommodate six lanes of traffic, three on each of the dual structures, and with footways cantilevered out from them. Foreshore roads on each side of the lake were to pass under Commonwealth Avenue. In broad perspective, an aesthetically pleasing design was required, with a generally horizontal impression and with reasonably long spans resting on slim piers, in order to provide a sense of visual continuity between the central and west basins of the future lake.

Each bridge superstructure was designed in elevation as a single geometrical arc formed by a continuous prestressed concrete box girder having a uniform depth of nine feet throughout the 1020 feet length of the bridge. The roadway width was to be 37 feet, accommodating three traffic lanes eleven feet wide with the kerbside lane being widened by four feet. An asphaltic concrete wearing surface for the roadway was designed to be placed on the top element of the box girder members, and footways, six feet wide, were to be cantilevered out from these box girder members.

Building of the Commonwealth Avenue Bridge called for extremely close attention to dimensioning and to the procurement of the highest quality materials. Crucial to the design concept was the production of a high strength

concrete specified to achieve a standard compressive strength of 6,000 pounds per square inch at 28 days. ... In the final outcome, the average tested strengths of the concrete used in the superstructure proved to be over 7,000 pounds per square inch, a result reflecting great credit on the contractor, and on the design and supervision teams brought together in the building of the bridge. ...

From any viewpoint it was considered to be a fine and monumental example of skilled engineering science allied with a high level of aesthetic quality and form. It is appropriate that it remains the principal entry point into the Parliamentary area of the National Capital. A final accolade accorded the Commonwealth Avenue Bridge was bestowed by the Prime Minister Sir Robert Menzies in October 1964 when, in a ceremony marking the inauguration of the lake called 'Lake Burley Griffin', he described the bridge as 'the finest building in the National Capital'.¹⁴

Lighting of the bridge was an important requirement. Holford had made recommendations in his 'Observations on the Future Development of Canberra', regarding the lighting of Anzac Parade and other areas, and was innovative in his consulting role on the bridges design. The lighting that was developed for Kings Avenue Bridge was so successful that it was also adopted for Commonwealth Avenue Bridge.

Bill Minty, who was the NCDC project engineer for Lake Burley Griffin, described it thus:

In 1962, Kings Ave Bridge was completed with a new approach to lighting using a line of fluorescent tubes in each outer handrail. This was not an attempt to provide traffic route standard of lighting on the carriageway but the one line of tubes was used partly to light one footway and delineate the edge of the carriageway, and partly to shine on the white concrete parapet for night-time display of the bridge structure a splendid example of glare-free integral lighting. This was a decided improvement on the remote flood lighting so often developed as an afterthought when a bridge or building is complete. This lighting installation won the annual award of the Illuminating Engineering Society.

Kings Avenue bridge was so impressive in terms of the clean lines by day and fine lighting effect by night that the proposal to mount post-top lights on Commonwealth Avenue Bridge was abandoned. At the time, the design of the superstructure of Commonwealth Avenue Bridge was complete and construction of the bridge had started. Nevertheless, timber mock-ups were made in Canberra and new designs developed that would use a similar handrail lighting approach. Lines of tubes were also incorporated in the outer aluminium parapets to light the exposed aggregate panels of the bridge superstructure. This installation also won one of the annual awards of the Illuminating Engineering Society.¹⁵



Figure 3.4 Kings Avenue Bridge lighting in handrail and below to light roundel. (Source: K Baker, 2020)



Figure 3.5 Commonwealth Avenue Bridge lighting in handrail and behind aluminium parapet cover to illuminate panels below. (Source: K Baker, 2020)

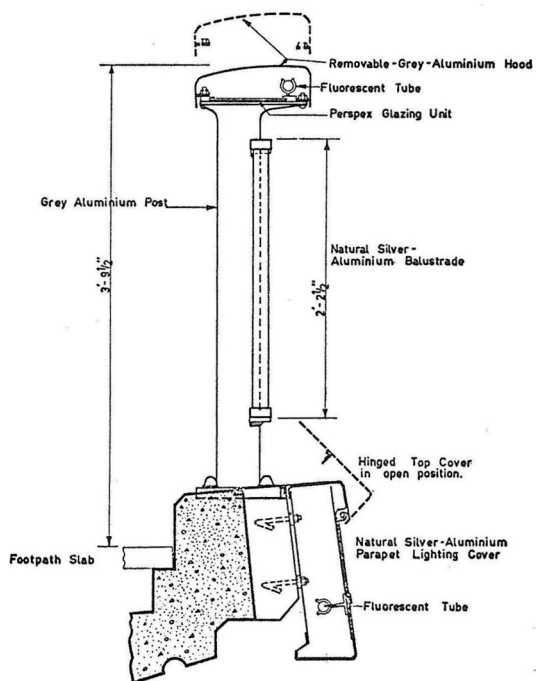


Figure 3.6 Commonwealth Avenue Bridge handrail and parapet lighting design. (Source: Birkett 1964 p 147)



Figure 3.7 Detail of integral handrail lighting of the Commonwealth Avenue Bridge. (Source: K Baker, 2020)



Figure 3.8 Commonwealth Avenue Bridge at sunset. (Source: Creative Commons Sam)

3.4.3 Digital Structural Analysis

A significant advance in bridge design that was made by G. Maunsell and Partners' was through the use of digital computing for structural analysis. The use of a computer for stress analysis and design, which was pioneered by Anthony Gee on the Gladesville Bridge in 1957. Anthony Gee made extensive use of a British Ferranti Pegasus computer, using paper tape input and programs he had written.¹⁶ He went further in correspondence to say:

*'When I tell my engineering acquaintances over here that I used a computer for bridge design in 1958, they flat out just don't believe me: the first recorded example of such a thing in America was in 1965 but fortunately I have 2 magazine articles to prove it!'*¹⁷

The same computer and programs were used by G. Maunsell and Partners engineer Edward Birkett in designing Commonwealth Avenue Bridge. Birkett stated:

*Use was made of the Ferranti "Pegasus" computer, first to calculate the section properties together with fixed end moment factors for the individual spans and, secondly, to obtain bending moment influence lines for the continuous structure. The latter operation involved rapid solution of the eight simultaneous equations evolved from slope deflection theory for five influence loading points taken separately in each span.*¹⁸

Computer-aided design of the multi-webbed box segments allowed for a reduction in concrete and a cost saving in erection as it used a single box segment the width of the roadway. The full-width box segment did not require infill of gaps between parallel segmented beams.

3.5 Condition and Integrity

The NCA conducts an ongoing capital works program, which involves replacing and upgrading assets on National Land under its management control. Assets are replaced and maintained in a manner fitting with their 'national significance'.¹⁹ Framing the western flank of the Parliament House Vista, Commonwealth Avenue Bridge has both heritage and national significance and, due to the increased demand and associated safety issues, is one of the NCA's highest priorities for upgrade.

The NCA has undertaken a number of investigations into the condition of Commonwealth Avenue Bridge due to its age and the changes in bridge design standards since its completion. Commonwealth Avenue Bridge now requires upgrades to meet contemporary standards for bridge strength, safety barriers, lane widths, and safety improvements for pedestrians and cyclists with increases to path widths.

Overall, the integrity of the bridge is high with some safety alterations since construction including the addition of kerbside crash barriers, cyclist safety rails and narrowing of the roadway to increase the width of the cycleway.

3.6 Endnotes

- ¹ Godden Mackay Logan, Lake Burley Griffin—Heritage Assessment, report prepared for the National Capital Authority, May 2010, p 23.
- ² Godden Mackay Logan, Lake Burley Griffin—Heritage Assessment, report prepared for the National Capital Authority, May 2010, p 23.
- ³ Godden Mackay Logan, Lake Burley Griffin—Heritage Assessment, report prepared for the National Capital Authority, May 2010, p 23.
- ⁴ W. Holford and Partners and G. Maunsell and Partners, *Report on Commonwealth Avenue Bridge to NCDC*, October 1959.
- ⁵ In this context it means bent to form an arc, or arranged in arches.
- ⁶ NAASRA 1969, *Symposium on Bridges, Inspection Notes and Data*, Section 1.1.
- ⁷ Austroads, *Guide to Bridge Technology*, Part 3.
- ⁸ Antill, JA and Ryan, PWS 1965, *Civil Engineering Construction*, Second edition, Angus and Robertson, Sydney, p 410.
- ⁹ *AGBT Part 1: Introduction and Bridge Performance* The setting and specification, Section 3.1.1, Austroads 2019
<https://austroads.com.au/publications/bridges/agbt-set>
- ¹⁰ Antill, JA and Ryan, PWS 1965, *Civil Engineering Construction*, Second edition, Angus and Robertson, Sydney, p 413.
- ¹¹ Holford, W 1957, *Observations on the Future Development of Canberra, ACT*, Commonwealth Government Printer, Canberra.
- ¹² Birkett, EM and Fernie, GN 1964, 'Bridges in the Canberra Central Lake Area-Design', in *Journal of the Institution of Engineers Australia*, Vol 36.
- ¹³ Andrews, WC 1990, *Canberra's Engineering Heritage, Chapter One, Roads and Bridges*, Institution of Engineers Australia, Canberra p 30.
- ¹⁴ Andrews, WC 1990, *Canberra's Engineering Heritage, Chapter One, Roads and Bridges*, Institution of Engineers Australia, Canberra pp 32–34.
- ¹⁵ Minty, AE 1990, *Canberra's Engineering Heritage, Chapter Seven, Public Lighting and Natural Gas*, Institution of Engineers Australia, Canberra, p 141.
- ¹⁶ NSW Roads and Maritime Services, *Gladesville Bridge Fifty Years Anniversary*, 2014.
- ¹⁷ Gee, A 2014, 'Correspondence with engineers Australia regarding the nomination of Gladesville for international recognition', Engineers Australia, viewed 30 July 2020 <<https://portal.engineersaustralia.org.au/heritage/gladesville-bridge-sydney-1964>>.
- ¹⁸ Birkett, EM and Fernie, GN 1964, 'Bridges in the Canberra Central Lake Area-Design', in *Journal of the Institution of Engineers Australia*, Vol 36.
- ¹⁹ 'National significance' as defined by the National Capital Plan.

4.0 Aboriginal Cultural Landscape

This section provides an overview of the Aboriginal cultural landscape context—occupation and historical background. It explores the meanings and values attributed to the landscape by Aboriginal communities, both in the past and in the present. It also discusses previous archaeological research and provides a summary of consultation undertaken with the Registered Aboriginal Organisations (RAOs) for this heritage assessment. The four RAOs for the ACT are:

- Buru Ngunawal Aboriginal Corporation;
- King Brown's Tribal Group (formerly known as the Consultative Body Aboriginal Corporation on Indigenous Land and Artefacts in the Ngunnawal Area);
- Mirrabee (formerly Little Gudgenby River Tribal Council); and
- Ngarigu Currawong Clan.

4.1 Ethnographic Context

For over 25,000 years, Aboriginal people have occupied the Molonglo Valley. The Aboriginal people of this region travelled seasonal routes in response to the availability of natural resources.¹ Archaeological evidence and oral histories provide valuable information relating to Aboriginal people's use of and connection to Country from deep time to the present. Evidence from hundreds of camp sites has been found across the ACT² and large quantities of artefacts have been recorded along parts of the Molonglo River floodplains prior to its inundation as Lake Burley Griffin, as well as on the foothills of Black Mountain, Mt Ainslie and Capitol Hill.

A reconstruction of clan boundaries based on Tindale's study indicates that the Canberra area fell within the tribal boundaries of the Ngunawal people.³ There is some uncertainty as to what language was spoken by the Aboriginal people of northern Canberra. This area appears to have been close to the linguistic boundary between the Gundungurra and Ngunawal languages. Eades observed that published grammars for these two languages are virtually identical.⁴ However, according to Eades' boundaries, the Ngunnawal of northern Canberra probably spoke the Gundungurra language.

References to the traditional Aboriginal inhabitants of the Canberra region are rare and often difficult to interpret.⁵ Jackson-Nakano notes that Aboriginal family groups within the Canberra/Queanbeyan district and surrounds were known by many names in the early nineteenth century but Europeans who knew them best referred to them as Kamberri—also spelled Kgamberri, Kamberra and even Nganbra (Ngambri).⁶ Jackson-Nakano notes that it is the preference of the descendants of the area to use the term 'Kamberri' to refer to the people and 'Kamberra' to refer to the geographical heart of their Country, which was centred around the area now referred to as the Acton Peninsula.⁷ She goes on to say that some Kamberri individuals intermarried with neighbouring Ngunnawal families from the 1880s and some descendants of such marriages re-identify in modern times as Ngunnawal. While maintaining their distinct association with the ACT and surrounds, members of Kamberri-Ngunnawal families might also identify personally as Ngunnawal, Walgalu, or even Wiradjuri through their familial links to these other groups.⁸

Today, the Ngunawal people, Ngambri people and Ngarigu people are connected to the ACT region. Black Mountain is a sacred place for the Ngunawal people in this region. It was used as a place of male initiation, with the mountain itself being representative of a boy becoming a man. Mt Ainslie, on the other

hand, is a place of women's business. Together, these two mountains were often referred to by Ngunawal people as 'women's breasts'.⁹ These hills were also important landscape markers of trails, tracks and places associated with the sacred site on what is now Capitol Hill and the location of the Molonglo Valley.¹⁰ Mt Pleasant forms the tail end of the Mt Ainslie and Mt Majura ridge.

Records from the early phase of colonisation indicate that the landscape of the Molonglo Valley provided habitat to a large variety of animals. Prior to European occupation, this area was part natural temperate grassland and part grassy woodland. Images from the 1860s show the slopes of Mt Pleasant covered in open grassy woodland with extensive grasslands below.¹¹

Bird life was abundant on the water, land and in the air, and was an important source of food. The open grassy Limestone Plains, so called after the local geology and surrounding savannah woodland, were actively managed to attract animals such as kangaroos, wallabies, wallaroos, wombats, echidnas, snakes and many smaller creatures, including Bogong moths. European surveyors, such as Robert Hoddle, watched Aboriginal people manage the landscape through firestick farming or 'cool burning'. In May 1832, Hoddle noted that the mountainside had been blackened by fire to expose the ripe yams, remove saplings and encourage young grass to attract game.¹²

In 1842, early settler John Blundell of Blundells Flat noted that there were two distinct Aboriginal communities living on the Limestone Plains—a group he called the 'Pialligo Blacks' based at Pialligo (the site of the present-day RMC Duntroon) and the 'Canberry or Nganbra Blacks' on the lower slopes of Black Mountain.¹³

Early settlers recorded that there were Aboriginal corroboree sites near the entrance to the Australian National Botanic Gardens, another where the first Canberra racecourse was constructed (now submerged under West Basin), and one at the old Duntroon Dairy.¹⁴

Early accounts of Aboriginal lifestyles in the general area describe aspects of a successful hunting and gathering economy, social gatherings and inter-group contacts. The material culture, which is partly reflected in the surviving archaeological record, included stone and wooden artefacts, skin clothing and bark-and-bough temporary dwellings.¹⁵

Numerous local records written by white settlers refer to the continuing importance of the Molonglo River to the Aboriginal groups who coexisted with white settlers during the early pastoral phase of land use.¹⁶ However, in a little over 50 years from initial contact there was rapid depopulation and a desperate disintegration of traditional way of life.¹⁷ This was substantially accelerated by the impact of European diseases, which may have included the smallpox epidemic in 1830, influenza and a severe measles epidemic by the 1860s.¹⁸ By the 1850s, the traditional Aboriginal economy had largely been replaced by an economy based on European commodities and supply points. Reduced population, isolation from the most productive grasslands and the destruction of traditional social networks meant that gradually the region's Aboriginal culture and economy was centred on white settlements and properties.¹⁹ By 1856, the local 'Canberra Tribe' was reported to number around 70 individuals²⁰ and by 1872 it was recorded as comprising only five or six 'survivors'.²¹ But both these counts focus on the notion of 'pure blood' individuals which has now been rejected.

Despite the late-nineteenth century reporting on the reduction in Aboriginal population numbers, the Ngunnawal and Ngambri people of the Canberra region have continued to live in the area and maintain strong cultural connections to their land. Consultation with Ngunnawal and Ngambri Elders and custodians was undertaken for this project. Those discussions attest to the strength and depth of that ongoing culture.

Commonwealth Avenue Bridge has become a focal point for the local community and the reconciliation movement. Since the early 2000s, it has been the venue for National Sorry Day marches which have become a symbol for recognising past injustices to the Aboriginal community.

4.2 Archaeological Background

4.2.1 ACT Heritage Data

A search of the ACT Heritage Register was requested on the 24 January 2020 for the general surrounds of Commonwealth Avenue Bridge. Results were received from ACT Heritage on 5 February 2020.

Search results indicated that there are no recorded Aboriginal archaeological sites in the immediate area of the Commonwealth Avenue Bridge. However, formal and informal records have shown that the archaeological evidence of Aboriginal occupation of the area was widespread prior to the urban development in the centre of Canberra, the formation of the lake and the construction of the bridge.

4.2.2 Archaeological Sites Data and Previous Investigations

Several archaeological studies have been undertaken for areas in the near vicinity of the current study area. The most relevant of these include a Heritage Impact Assessment (HIA) undertaken for the Capital Metro, ACT Light Rail—Russell Extension Project, prepared by GML in 2015, and an Aboriginal Heritage Desktop Study undertaken for the Canberra Light Rail Stage Two Project, prepared by RPS Group (RPS) in 2017.

GML prepared a HIA for the Capital Metro ACT Light Rail Russell Extension in 2015.²² This study examined a project zone around Civic and along Constitution Avenue up to the Royal Military College (RMC), Duntroon. A search of the ACT Heritage Register was undertaken for this project and found no previously recorded Aboriginal heritage sites within or in the immediate area of the proposed works. Four Aboriginal heritage sites were located within the broader search area, on the basal slopes of Mount Pleasant approximately 2.5 kilometres east of the current study area. These sites included three stone artefact scatters (MPAS1, MPAS2 and NCAR-AS-1) and one isolated artefact (AIF2). An area of archaeological potential associated with MPAS1 was identified.

The HIA prepared for the Capital Metro ACT Light Rail—Russell Extension Project included a review of previous studies which highlighted several cultural values of the area, including that the area had been part of the general thoroughfare between Mount Ainslie, Mount Pleasant and the Molonglo River.²³ The HIA noted an area of archaeological potential which had been previously identified in Kings Park (1.8 kilometres east of the current study area) and that a ceremonial site had been noted in the vicinity of the Molonglo River at the base of Mount Pleasant. Based on these results, GML found that there was evidence of the landscape used by Aboriginal people in the past, but that landscape modification to the road and city corridor would have destroyed most if not all Aboriginal sites in the study area.²⁴

Consultation was undertaken with the four RAOs for the Capital Metro ACT Light Rail—Russell Extension Project in April 2015.²⁵ There was a general agreement that the road corridors along which the proposed Russell extension was aligned would have been subject to significant disturbance in the past and that previous studies in the area had not yielded any meaningful results.

The Lake Burley Griffin Heritage Assessment prepared by GML in 2010 (GML 2010), included a review of previous archaeological research and consultation (April–May 2006) with the RAOs.²⁶ The GML 2010 report reviewed the findings of the HP Moss collection of Aboriginal stone tools, which were collected by Moss in Canberra during 1929 and the 1930s, concentrating on areas under threat of immediate

development. Around Old Canberra Hospital (now within the ANU), Moss collected 30 artefacts and a similar number of debitage fragments. He also documented numerous artefacts along the Acton Peninsula.

Similarly, an Indigenous heritage values study for the ANU Campus conducted by GML Heritage in 2011²⁷ included a background summary of historical collections of artefacts in the near area, including those by Moss (noted above), plus records from Kinsela (who collected artefacts in the area around the current National Sound and Film Archive building, including a large grinding stone and two pounding stones). One of these sites was collected from a location adjacent to Sullivan's River, and the other from south of the current National Sound and Film Archive building.

RPS has prepared several assessments for the Canberra Light Rail Stage 2 (City to Woden) project. These have included a high-level constraints analysis report in 2017,²⁸ a preliminary environmental assessment report also in 2017,²⁹ and an Aboriginal heritage desktop study.³⁰ These studies included the Commonwealth Avenue Bridge. Results from those assessments included the following recorded Aboriginal cultural sites and values in the vicinity of the Commonwealth Avenue Bridge:

- Capitol Hill (about 1–1.5 kilometres south of the current study area), which is recorded through oral history as the location of a Woman's area. This cultural information was provided by Ngunawal man Don Bell (now deceased) to local Historian Ann Gugler in 2009.³¹ The hill is also recorded as part of a wider cultural landscape which also includes Black Mountain and Mount Ainslie and is situated on a traditional pathway through the landscape. A number of Aboriginal archaeological artefacts, including scrapers, points and an axe head were found during the construction of the Parliament House in this area.³²
- Molonglo River Landscape, which is now inundated with Lake Burley Griffin, was identified as being of cultural significance and likely to contain Aboriginal archaeological sites.
- Aboriginal Tent Embassy (less than 1 kilometre southeast of the current study area) is an Aboriginal heritage site and included on the CHL as part of the Parliament House Vista. The site has been a meeting ground and area used for protesting since 1972. The site has drawn international attention to issues of Aboriginal land rights and the genocidal treatment of Aboriginal nations and peoples. The Aboriginal Tent Embassy is symbolic of the past and ongoing struggle for sovereignty. Several artefacts have also been identified nearby during the construction of Parliament House and lawns.³³

The RPS desktop study included a predictive model for Aboriginal heritage sites which stated that archaeological resources may include evidence of campsites near historical watercourses in areas which have had minimal disturbance.³⁴

Although not directly related to the heritage values of Commonwealth Avenue Bridge itself, it is of note that the bridge spans a remnant landform, the Molonglo River main channel, which other than inundation, is likely to be relatively undisturbed and to contain some archaeological evidence of the prior Aboriginal occupation, albeit submerged. Archaeological evidence that may have existed further back from the river channel will have been substantially disturbed by the formation of the lake edges and the construction of the Commonwealth Avenue Bridge abutments and associated landforms.

While the landscape surrounding the study area has been substantially modified over time, prior to the development of Canberra, the hill on the landscape now known as City Hill is likely to have been an ideal camping zone, in close proximity to a permanent water source, the Molonglo River, and with an elevated,

well-drained position. The general lower slopes of the banks of the Molonglo River would also have been in regular use for resource procurement. However, the substantial development of the Canberra city area, City Hill, Commonwealth Avenue Bridge and the reformation of West Basin will have all but destroyed those sites, save for those submerged near the Molonglo River channel.

4.3 Aboriginal Community Consultation

To assess Indigenous heritage values of Commonwealth Avenue Bridge, consultation was undertaken with the four recognised RAOs in the ACT to afford them an opportunity to participate in the assessment and management of their cultural heritage.

Given land in the ACT is potentially subject to both ACT and Commonwealth legislation, Aboriginal community consultation is generally undertaken with reference to both regulatory systems. Consultation was undertaken in line with *Ask First: a guide to respecting Indigenous heritage places and values* (Ask First guidelines), prepared by the Australian Heritage Commission in 2002.

These guidelines generally require that the relevant Traditional Owners and any other Aboriginal people with rights and interests in the area be identified. Identifying these parties is a matter of contacting land councils, local councils, state authorities (such as ACT Heritage) and any other known group or authority who may provide the relevant information.

While the Ask First guidelines do not require a specifically prescriptive process, the identification of the relevant Aboriginal community representative groups for the ACT has been addressed through the formal recognition of four RAOs. The four groups were recognised through Ministerial declaration in 2006 under s14 (8) of the ACT Heritage Act (2004).

4.3.1 Buru Ngunawal Aboriginal Corporation—Wally Bell—18 May 2020

In consultation for this project, Wally Bell noted that the Canberra CBD area, Acton and the Western Basin, Commonwealth Park and all of the surrounding landscape was well-known for having been occupied by Ngunawal people prior to the arrival of colonial settlers. However, it is clear that the current level of urban development has irreversibly altered the landscape such that the original landforms are considerably less legible than in the past.

The formation of the lake, including the West Basin, the approaches to Commonwealth Avenue Bridge, and the landscaping of Commonwealth Park and the Parliamentary Triangle, have altered the legibility of the Molonglo River and its banks—formerly traditional zones of occupation and resource gathering. Overall landform changes to the slopes and surrounds of City Hill have also substantially modified the legibility of the original landscape and will have destroyed any evidence of prior Aboriginal occupation of the area.

Of key importance to this area is the known presence of a number of limestone caves in the lower slopes of Acton Peninsula, now flooded by West Basin. These caves were of cultural significance to the Ngunawal people, and are said to have cultural paintings in them.

The zone of land around City Hill is centrally located in a cultural landscape that includes Black Mountain, Mount Ainslie and Capitol Hill, all of which were significant cultural and navigational markers.

The crossing point over the Molonglo River in the near area was from the end of Acton Peninsula which provided access to the major ceremonial and meeting site at the current Australian Parliament House. It also allowed access to the Ngunawal women's birthing site area now known as Bullan Murra (Women's

Path) at Stirling Ridge, Yarralumla. This area also contains numerous Ngunawal Aboriginal sites and objects including a rare post contact site.

Given that the main local crossing point over the Molonglo River was from the end of Acton Peninsula, Commonwealth Avenue Bridge and its constructed landscape do not mirror or reflect any aspect of the Aboriginal traditional use of the landscape.

Commonwealth Avenue Bridge itself is not a place with any associated Aboriginal heritage values.

4.3.2 Mirrabee—Paul House—11 June 2020

Commonwealth Avenue Bridge is located within part of the broader Kamberri/Ngambri cultural landscape. The traditional occupation of this area by Aboriginal people is attested to in the adaptation of the name Canberra from the word Kamberri which in itself was derived from Ngambri. The use of the name in shown is Surveyor Dickson's maps, and on property such as JJ Moore's Canberry station, which occupied the land now covered by the ANU.

Paul House refers to Jackson-Nakano's research confirming the naming of Canberra—'There is little doubt that Ngambri or Ngambra or similar renditions into English is the original name on which the modern spelling of Canberra is based. It was the name that referred not just to the place but also to the people'.³⁵ Paul House also noted that the Ngambri people and the Pialligo people, both recorded as occupying parts of the Canberra area, were in fact the same people—they were Walgalu speakers. The Ngambri people wish to state that they have not ceded sovereignty or their Native Title rights to the lands of the ACT region.

Cultural values associated with the general area around Commonwealth Avenue Bridge are long-term spiritual values associated with the landscape—Paul stated that 'the spirits are in the land, they were there long before us and will continue to be there long after us'. On that basis, while the landscape values have been substantially impacted by urban development, the presence of Commonwealth Avenue Bridge does not affect the cultural values of the area any more than they have already been affected.

Paul also noted that at Capitol Hill, the construction of both 'Old' Parliament House and 'New' Parliament House have destroyed a traditional women's site. At present, this site is beyond the scope of the study area.

Commonwealth Avenue Bridge itself is not a place with associated Aboriginal heritage values.

4.3.3 King Brown's Tribal Group

The representatives of King Brown's Tribal Group were unable to be contacted for this project consultation.

4.3.4 Ngarigo Currawong Clan

The representatives of Ngarigo Currawong Clan were unable to be contacted for this project consultation.

4.4 Summary

Commonwealth Avenue Bridge is situated between Black Mountain (approximately 2 kilometres to the west), Mount Ainslie (approximately 2.6 kilometres to the northeast) and Capitol Hill (1 kilometre to the south), and spans the Molonglo River. Aboriginal heritage sites have been recorded within the vicinity of these landscape features, as well as at the Australian National University around Sullivan's Creek, on

Acton Ridge and along the banks of the Molonglo River prior to the establishment of Lake Burley Griffin. These landscape features were key focal points of Aboriginal occupation and have previously been identified as significant Aboriginal places. A number of previous studies in the surrounding area have identified areas of archaeological potential associated with these landscape features. These archaeological values occur in relative proximity to the Commonwealth Avenue Bridge, but are not intrinsically part of its history, fabric or construction.

Consultation with the Aboriginal community has confirmed that the general landscape was, and continues to be, of significance to them. The cultural values of the surrounding area have been impacted by past activities but endure beyond the development of Canberra.

Commonwealth Avenue Bridge itself is not of any intrinsic Aboriginal heritage value and does not have any specific association or values for the Aboriginal community.

4.5 Endnotes

- ¹ Wright, WD 1923, Canberra, John Andrew & Co, Sydney, p 58.
- ² Flood J 1990, *The Riches of Ancient Australia*, Queensland University Press, University of Queensland, p 297.
- ³ Shumack, S., 1967, *An Autobiography or Tales and Legends of Canberra Pioneers*, Canberra, ANU Press; Gillespie, LL., 1984, *Aborigines of the Canberra Region*; Gillespie, LL., 1992, *Ginninderra Forerunner to Canberra*; Tindale, NB., 1974, *The Aboriginal Tribes of Australia*, ANU Press, Canberra.
- ⁴ Eades, DK., 1976, 'The Dharawal and Dhurga Languages of the New South Wales South Coast', *Australian Aboriginal Studies Research and Regional Studies*, No. 8, AIAS, Canberra; Matthews, RH., 1900, 'The Gundungurra grammar', in 'The organisation, language, and initiation ceremonies of the Aborigines of the south-east coast of NSW', *Royal Society of NSW Journal and Proceedings*, vol. 34, p.262–281; Matthews, RH., 1901, 'The Gundungurra Language', in *American Philosophical Society Proceedings*, vol. 40, no. 167, p.140–148; and Matthews, RH., 1904, 'The Ngunawal language', in 'The Wiradyuri and other languages of NSW', *Anthropological Institute of Great Britain and Ireland Journal*, vol 33, p.294–299.
- ⁵ Flood, J., 1980, *The Moth Hunters: Aboriginal prehistory of the Australian Alps*, AIAS Press, Canberra; Huys, S., 1993, 'Prehistoric Gungahlin: A model of human occupation', unpublished BA Honours thesis, Department of Archaeology and Anthropology, Australian National University, Canberra.
- ⁶ Jackson-Nakano, A., 2001, *The Kamberri: A History of Aboriginal Families in the ACT and Surrounds* vol. 1, Aboriginal History Monograph 8; Weereewaa History Series pxiv.
- ⁷ Jackson-Nakano, A., 2001, *The Kamberri: A History of Aboriginal Families in the ACT and Surrounds* vol. 1, Aboriginal History Monograph 8; Weereewaa History Series pxiv.
- ⁸ Jackson-Nakano, A., 2001, *The Kamberri: A History of Aboriginal Families in the ACT and Surrounds* vol. 1, Aboriginal History Monograph 8; Weereewaa History Series pxv.
- ⁹ Wally Bell, pers comm, 21 October 2011 and also reiterated in Australian National University, 'Aboriginal and Torres Strait Islander Heritage Trail', <https://services.anu.edu.au/files/guidance/Aboriginal_Heritage_Trail2.pdf>, p 16.
- ¹⁰ Wally Bell, pers comm, 21 October 2011.
- ¹¹ GML Heritage, RMC Duntroon—Heritage Management Plan, Report for Department of Defence, July 2009, p 45.
- ¹² Gammage, B 2011, *The Biggest Estate on Earth: How Aborigines Made Australia*, Allen and Unwin, Crows Nest, p 279.
- ¹³ Bluett, WP 1954, 'The aborigines of the Canberra District at the arrival of the white man', A paper read to the Canberra & District Historical Society, 29 May 1954. Note that the latter groups descendants favour the term 'Kamberri' as their identifying title. The name Ngunnawal is now that most often used to refer to the Aboriginal people of the Canberra district.
- ¹⁴ Bluett, WP 1954, 'The aborigines of the Canberra District at the arrival of the white man', A paper read to the Canberra & District Historical Society, 29 May 1954 and also Gammage, B 2011, *The Biggest Estate on Earth: How Aborigines Made Australia*, Allen and Unwin, Crows Nest, p 279.
- ¹⁵ Flood, J., 1980, *The Moth Hunters: Aboriginal prehistory of the Australian Alps*, AIAS Press, Canberra; Huys, S., 1993, 'Prehistoric Gungahlin: A model of human occupation', unpublished BA Honours thesis, Department of Archaeology and Anthropology, Australian National University, Canberra.
- ¹⁶ Shumack, S., 1967, *An Autobiography or Tales and Legends of Canberra Pioneers*, Canberra, ANU Press; Gillespie, LL., 1984, *Aborigines of the Canberra Region*; Gillespie, LL., 1992, *Ginninderra Forerunner to Canberra*.

- 17 Officer, KLC., 1989, 'Namadgi Pictures: The Aboriginal rock art sites within the Namadgi National Park, ACT', report to ACT Administration, Heritage Unit, and the ACT Parks and Conservation Service.
- 18 Flood, J., 1980, *The Moth Hunters: Aboriginal prehistory of the Australian Alps*, AIAS Press, Canberra; Butlin, N., 1983, *Our Original Aggression: Aboriginal populations of southeastern Australia 1788–1850*, Allen & Unwin, Sydney.
- 19 Officer, KLC., 1989, 'Namadgi Pictures: The Aboriginal rock art sites within the Namadgi National Park, ACT', report to ACT Administration, Heritage Unit, and the ACT Parks and Conservation Service.
- 20 Schumack, JE. and Schumack, S., 1967, *An Autobiography, or Tales and Legends of Canberra Pioneers*, ANU Press, Canberra.
- 21 *Goulburn Herald*, 9 November 1872.
- 22 GML Heritage 2015, *Capital Metro, ACT Light Rail-Russell Extension-Heritage Impact Assessment*, report prepared for Parsons Brinckerhoff on behalf of Capital Metro Agency.
- 23 GML Heritage 2015, *Capital Metro, ACT Light Rail-Russell Extension-Heritage Impact Assessment*, report prepared for Parsons Brinckerhoff on behalf of Capital Metro Agency.
- 24 GML Heritage 2015, *Capital Metro, ACT Light Rail-Russell Extension-Heritage Impact Assessment*, report prepared for Parsons Brinckerhoff on behalf of Capital Metro Agency.
- 25 GML Heritage 2015, *Capital Metro, ACT Light Rail-Russell Extension-Heritage Impact Assessment*, report prepared for Parsons Brinckerhoff on behalf of Capital Metro Agency.
- 26 GML Heritage 2010, *Lake Burley Griffin Heritage Assessment*, report prepared for the National Capital Authority.
- 27 GML Heritage 2011 *ANU Master Plan 2030 – Indigenous Heritage Assessment*. report prepared for GHD Pty Ltd on behalf of the ANU.
- 28 RPS 2017, *Canberra Light Rail Stage 2: Environmental Constraints Analysis Report*, report prepared for Transport Canberra and City Services.
- 29 RPS 2017, *Canberra Light Rail Stage 2: Preliminary Environmental Assessment*, report to Transport Canberra and City Services.
- 30 RPS 2018, *Canberra Light Rail Stage 2 Environmental Aboriginal Heritage Study*, report prepared for Transport Canberra and City Services, p 25.
- 31 RPS 2018, *Canberra Light Rail Stage 2 Environmental Aboriginal Heritage Study*, report prepared for Transport Canberra and City Services, p 25.
- 32 Australian Heritage Database, Place ID 18843 'Aboriginal Embassy Site, King George Tce, Parkes, ACT, Australia', viewed 30 July 2020 <http://www.environment.gov.au/cgi-bin/ahdb/search.pl?mode=place_detail;search=place_name%3Dtent%2520embassy%3Bkeyword_PD%3Don%3Bkeyword_SS%3Don%3Bkeyword_PH%3Don%3Blatitude_1dir%3DS%3Blongitude_1dir%3DE%3Blongitude_2dir%3DE%3Blatitude_2dir%3DS%3Bin_region%3Dpart;place_id=18843>.
- 33 RPS 2018, *Canberra Light Rail Stage 2 Environmental Aboriginal Heritage Study*, report prepared for Transport Canberra and City Services, p 25.
- 34 RPS 2018, *Canberra Light Rail Stage 2 Environmental Aboriginal Heritage Study*, report prepared for Transport Canberra and City Services, p 26.
- 35 Jackson-Nakano, A 2005, *Ngambri Ancestral Names for Geographical Places and Features in the Australian Capital Territory and Surrounds*, Ann Jackson-Nakano and Associates, Canberra, p 27.

5.0 Assessment of Heritage Values

This section assesses the Commonwealth Avenue Bridge against the Commonwealth Heritage criteria of the EPBC Regulations to determine if the bridge meets the threshold for nomination and inclusion in the CHL.

GML assessed the bridge against criteria (e) aesthetic characteristics and (g) social significance as a separate project in May 2020, as a pre-cursor to this report. This previous assessment has been reproduced below with the full GML 2020 report available in Appendix A.

A comparative analysis of Commonwealth Avenue Bridge with Kings Avenue Bridge and other G. Maunsell and Partners designed bridges within Australia is provided in Appendix C and has been used to establish the rarity and representativeness of Commonwealth Avenue Bridge under criteria (b) and (d). Assessment Methodology

5.1.1 The EPBC Act and Regulations

This heritage assessment has been prepared in accordance with the EPBC Act and Regulations. Section 10.03A of the EPBC Regulations provides nine Commonwealth Heritage criteria for identifying and assessing the Commonwealth Heritage values of a place (see Section 5.3).

Section 528 of the EPBC Act defines the ‘heritage value’ of a place as including the place’s natural and cultural environment, having aesthetic, historic, scientific or social significance, or other significance, for current and future generations of Australians. Cultural value can equate to Indigenous and/or non-Indigenous (‘historic’) heritage value.

Heritage values can be embodied in physical and intangible ‘attributes’, such as the location, function, form, fabric, characteristics and associations with a place. Associations, or non-physical values or attributes, can relate to the use, access, traditions, cultural practices, knowledge or sensory and experiential responses that the place evokes.

5.2 Heritage Assessment of Commonwealth Avenue Bridge

Table 5.1 Assessment of the Commonwealth Avenue Bridge against Commonwealth Heritage Criteria.

Commonwealth Heritage Criteria	Assessment Against the Criteria
Criterion (a): Historic Processes	<i>The place has significant heritage value because of the place’s importance in the course, or pattern, of Australia’s natural or cultural history.</i>
Assessment	Commonwealth Avenue Bridge is historically significant for its development by the National Capital Development Commission (NCDC)—an agency established by the Australian Government to revise the building of Canberra based on the Griffin Plan of 1918 and 1925. Commonwealth Avenue Bridge, together with Kings Avenue Bridge, represent a significant part of Canberra’s planning history, landscape design and development. Commonwealth Avenue Bridge, as the most prominent physically and ceremonially of the two bridges, was designed to have outstanding quality, which directly responded to the functional need and aesthetic suitability that exactly suited its designed landscape setting of the then new lake (for the Lake Burley Griffin Scheme) and Canberra’s natural environment. The bridges complete two sides of the National Triangle and are integral to the NCDC’s design of the Lake Burley Griffin Scheme, which, when implemented, unified northern and southern Canberra. The Scheme was the NCDC’s first major engineering and urban planning achievement in the development of the capital

Commonwealth Heritage Criteria	Assessment Against the Criteria
	city; achieved with prominent firms G. Maunsell and Partners and W. Holford and Partners. The completion of the Scheme, the bridges and the lake is also significant as it represents a major historical and physical change for Canberra—the replacement of earlier rural-style timber bridges over the Molonglo River and flood plain transformed the area, formalising the road layout to more fittingly express the symbolic and ceremonial importance of the national capital. With the opening of Parliament House on Capitol Hill in 1988, Commonwealth Avenue Bridge has become more important as a major approach to the Parliament of Australia. The bridge, and Commonwealth Avenue, are part of the road network that is symbolic of democracy and the connection between the people and the government. Commonwealth Avenue Bridge has historic engineering significance within Australia: • as an early example of prestressed concrete to create a post tensioned superstructure in Australian history; • as the second post-tensioned bridge to be completed in the nation after The Narrows Bridge in Perth—it employs external post-tensioning cables as distinct from internal pre-stressing membranes within the precast concrete beams (as with the Tasman Bridge, Hobart, and Kings Avenue Bridge, Canberra); • as the first prestressed concrete bridge to employ multi-webbed precast box segments, which increased the complexity (compared with 'I' sections in The Narrows and square box sections in the Gladesville Bridge, Sydney) but reduced the amount of concrete and associated cost, and allowed improved appearance and finish; and • an early prestressed concrete bridge to employ digital computing for stress analysis and design. (Note: the Gladesville Bridge was world's first). Commonwealth Avenue Bridge meets criterion (a).
Statement of Heritage Value	Commonwealth Avenue Bridge is historically significant for its development by the NCDC as part of the Lake Burley Griffin Scheme and represents a significant part of Canberra's planning history, landscape design and development. Historically, Commonwealth Avenue Bridge is significant for its design and engineering significance within Australia.
Attributes	Attributes under this criterion include: • the bridge's location and symbolic function in the national capital and the Central National Area; and • the concrete bridge construction.
Criterion (b): Rarity	<i>The place has significant heritage value because of the place's possession of uncommon, rare or endangered aspects of Australia's natural or cultural history.</i>
Assessment	Commonwealth Avenue Bridge is a rare example in Australia of a precast, post-tensioned, concrete bridge, embodying multi-webbed box segments. It was the first in Australia to depart from the simple form of 'I' section or square box segment, resulting in an aesthetically sleek and 'modern' appearance when viewed from any direction. The bridge is rare for its design to have a symbolic pride of place in the national capital as part of the Lake Burley Griffin Scheme. The Scheme was the NCDC's first major engineering and urban planning achievement in the development of the capital city. It is also a rare example of bridge lighting, of the time, that was integrated into the handrail and parapet, illuminating the roadway and walkways, and enabling the bridge elevation to be viewed from a distance. The lighting design enhances that of the lighting prototyped in Kings Avenue Bridge, the first use of such integrated lighting in Australia. Commonwealth Avenue Bridge meets criterion (b).
Statement of Heritage Value	Commonwealth Avenue Bridge is a rare example in Australia of a precast, post-tensioned, concrete bridge, embodying multi-web box segments. The bridge is rare for its design to have a symbolic pride of place in the national capital as part of the Lake Burley Griffin Scheme and for the integration of lighting within the handrail and parapet of the bridge in terms of bridge design within Australia.

Commonwealth Heritage Criteria	Assessment Against the Criteria
Attributes	Attributes of the bridge under this criterion include: - the precast post-tensioned structure; - complex multi-webbed box segments; - aesthetically and architecturally sleek lines, as seen from different viewing points; and - pioneering lighting integrated into the bridge design.
Criterion (c): Research Potential	<i>The place has significant heritage value because of the place's importance to yield information that will contribute to an understanding of Australia's natural or cultural history.</i>
Assessment	Commonwealth Avenue Bridge has heritage value for the advancement of structural engineering and bridge construction in Australia. It represents a turning point in terms of materials used for major urban bridges—from steel to prestressed concrete. It also provides an understanding of the early use of digital computing in structural analysis and bridge design. Commonwealth Avenue Bridge meets criterion (c).
Statement of Heritage Value	Commonwealth Avenue Bridge demonstrated the advancement of structural engineering and bridge construction in Australia, particularly in the shift in material from steel to prestressed concrete in major bridge construction, and in the early use of digital computing in the design and structural analysis of its post tensioned concrete superstructure.
Attributes	Attributes under this criterion include: - the whole bridge; and - the bridge in its wider landscape setting.
Criterion (d): Characteristic	<i>The place has significant heritage value because of the place's importance in demonstrating the principal characteristics of:</i> <i>i. a class of Australia's natural or cultural places; or</i> <i>ii. a class of Australia's natural or cultural environments.</i>
Assessment	The Commonwealth Avenue Bridge is an important early example of a pioneering design to achieve the principal characteristics for a modern, technical engineering solution, with an aesthetically appropriate and elegant long-spanned bridge in Australia. Historically, the design of the bridge is representative of the post-World War II period of modernisation and optimism, and of the NCDC striving toward innovation to reflect Australia's aspiration to have a truly contemporary 'international-style' capital city. The bridge is also an early example of the development of segmented and prestressed concrete bridges in Australia. It was the second in Canberra and the third in Australia to be completed, all of which were designed by the same firm of consulting engineers, G. Maunsell and Partners. Together with the Narrows Bridge in Perth, Commonwealth Avenue Bridge is an excellent example of an early class of modern prestressed concrete bridge that is characterised by long slender spans, and which is 'smooth-lined' and 'uncluttered' in design. This is a departure from the earlier style of major bridges, such as Sydney Harbour and Storey Bridges, which were of open steel lattice form. In comparing the bridge with the Kings Avenue Bridge, Commonwealth Avenue Bridge is: - of greater prominence through its location on Commonwealth Avenue, which is the intended ceremonial approach to the Parliamentary Zone/National Triangle; - more impressive in form and features, as befitting its ceremonial role (which is also reflected in its name); and - of a greater level of technical complexity and degree of detailing and finish. Commonwealth Avenue Bridge meets criterion (d).
Statement of Heritage Value	Commonwealth Avenue Bridge is representative of early development of segmented and prestressed concrete bridges in Australia, and of a class of design in modern bridges characterised by long slender spans, and a 'smooth-lined' and 'uncluttered' approach.

Commonwealth Heritage Criteria	Assessment Against the Criteria
Attributes	Attributes under this criterion include: - the whole bridge, for its segmented and prestressed concrete construction; and - the bridge, in conjunction with Kings Avenue Bridge, in its wider landscape setting.
Criterion (e): Aesthetic	<i>The place has significant heritage value because of the place's importance in exhibiting particular aesthetic characteristics values by a community or cultural group.</i>
Assessment	Commonwealth Avenue Bridge has significant heritage value to the Canberra community for its aesthetic characteristics. The aesthetic characteristics of Commonwealth Avenue Bridge were an integral part of the NCDC's brief achieved by the engineers, G. Maunsell and Partners and the designers, W. Holford and Partners. They achieved a 'well-proportioned bridge, of unusual interest, not unworthy of the position for which it is intended' and 'the feature of the landscape that has had the most influence on the design of the bridge is the lowness of the relief in relation to surface distance.' The elegant and simple design of the Commonwealth Avenue Bridge is appreciated by the Canberra community both, as a feature in its own right, and in relation to the broader designed landscape setting of Lake Burley Griffin and the Central National Area. The characteristics held by the community confirm the distinctive qualities and architectural design, comprising a low-profile and streamlined concrete form which complements, rather than dominates, the designed surrounding landscape setting. Commonwealth Avenue Bridge is: - a key element within Canberra's design and planning, making reference to the Griffin Plan and providing clear definition of the National Triangle through its symmetry with Kings Avenue Bridge; - visually distinctive and possesses iconic qualities because of its design, form and setting, which contributes to the aesthetic qualities of the Central National Area that are unique to Canberra; and - provides a great vantage point to appreciate the lake, special events and other elements of Canberra's urban landscape. Views to the bridge, both during the day and at night, are widely enjoyed from key locations, including lookouts, around Canberra. The bridge possesses evocative qualities that provoke strong emotional responses, such as optimism, tranquillity, familiarity and delight by the local community. The bridge is widely recognised for its design excellence—its formal elegance and dramatic nature are widely represented and appreciated by the community through photography. Commonwealth Avenue Bridge meets criterion (e).
Statement of Heritage Value	Aesthetically, Commonwealth Avenue Bridge is highly valued by the Canberra community for its distinctive qualities and architectural design which complements the designed surrounding landscape setting. The elegant and simple design of the bridge is appreciated both as a feature in its own right and as part of the broader designed landscape of the Central Canberra. Commonwealth Avenue Bridge is also valued as a key element in Canberra's design and planning and its visually distinctive and iconic qualities. The views to and from the bridge, both during the day and night, are widely enjoyed and valued by the Canberra community.
Attributes	Attributes of the bridge under this criterion include: - simple, unadorned, and streamlined form, low-profile design, concrete materials and light colour; - vertical pylons defining the 'ends/entry'; - aluminium railings with integrated strip lighting for night-time illumination; - location and alignment—defining one arm of the National Triangle and providing symmetry with Kings Avenue Bridge; - pedestrian/bicycle accessibility; - openness around the bridge; - views to and from Commonwealth Avenue Bridge; and - context and visual setting of Lake Burley Griffin, national institutions, lakeside parklands and distant hills/mountains.

Commonwealth Heritage Criteria	Assessment Against the Criteria
Criterion (f): Creative or Technical Achievement	<i>The place has significant heritage value because of the place's importance in demonstrating a high degree of creative or technical achievement at a particular period.</i>
Assessment	Commonwealth Avenue Bridge demonstrates a high degree of creative and technical achievement in Canberra's building and development by the NCDC in the 1960s, and more generally in Australia's progress in the post–World War II period of innovation and optimism. Commonwealth Avenue Bridge was the first prestressed concrete bridge to employ multi-webbed precast box segments, which increased the complexity (compared with 'I' sections in The Narrows and square box sections in the Gladesville Bridge, Sydney) but reduced the amount of concrete and associated cost, and allowed improved appearance and finish. The bridge is an early example of the use of computers in the design and structural analysis of its post-tensioned concrete superstructure. Commonwealth Avenue Bridge meets criterion (f).
Statement of Heritage Value	Commonwealth Avenue Bridge demonstrates a high degree of creative and technical achievement in Canberra's building and development by the NCDC in the 1960s, and more generally in Australia's progress in the Post World War II period. It was the first prestressed concrete bridge to employ multi-webbed precast box segments and is a very early example of the use of digital computers in bridge design and to analyse, and compute the structure and stress, influencing the physical design.
Attributes	Attributes of the bridge under this criterion include: the whole bridge, particularly multi-webbed precast box segments..
Criterion (g): Social Values	<i>The place has significant heritage value because of the place's strong or special association with a particular community or cultural group for social, cultural or spiritual reasons.</i>
Assessment	Commonwealth Avenue Bridge is valued by the Canberra community as: - an important landmark in Canberra; - an accessible public space that supports movement around the city for work, recreation and leisure activities; - a place of personal memory and experience that provides a sense of connection with the past and is part of a shared sense of community identity; - a public place that connects the community to memories of important times of joy, contentment, sadness and grief; - a physical and symbolic marker within the city because it evokes a sense of permanence and reliability for the Canberra community; - it provides an experiential connection to the natural environment; and - a symbolic and physical link between the civic and governmental areas of Canberra, recognised as an important element in the ceremonial route to Parliament House and more generally seen as symbolic of democracy and the connection between the people and the government. The value of the Commonwealth Avenue Bridge extends beyond utility and function for physical connection and transport across the lake. The bridge is appreciated by the Canberra community for its continuing contribution to the development of a strong sense of familiarity, social connection and enduring attachment. The bridge helps bring the community together through private and public experiences, including recreational activities, events and protests. The bridge is of <u>contemporary</u> Indigenous/Aboriginal cultural heritage significance (rather than part of a traditional cultural heritage value) as it is a key part of the National Sorry Day march route from Commonwealth Park to the Aboriginal Tent Embassy. The walk is regularly attended by thousands of Canberrans in support of the Aboriginal community. Commonwealth Avenue Bridge meets criterion (g).

Commonwealth Heritage Criteria	Assessment Against the Criteria
Statement of Heritage Value	Commonwealth Avenue Bridge is valued by the Canberra community as a key element within Canberra's designed landscape and planning, that supports movement around the city and brings the community together through public and private experiences. Commonwealth Avenue Bridge is an important landmark within Canberra and is a key part of the National Sorry Day march route.
Attributes	Attributes of bridge under this criterion include: • social and cultural association for a substantial part of the Canberra community; • public accessibility (pedestrian and bicycle) and function; • location and alignment in the Central National Area of Canberra's designed landscape; • design of Commonwealth Avenue Bridge, including all components which make up its form, scale, materials and colours; • visual setting comprising Lake Burley Griffin, national institutions, surrounding lakeside parklands, and hills/mountains; and • regular route for National Sorry Day march.
Criterion (h): Significant People	<i>The place has significant heritage value because of the place's special association with the life or works, or group of persons, of importance in Australia's natural or cultural history.</i>
Assessment	Commonwealth Avenue Bridge is associated with the National Capital Development Commission (NCDC), which was established by the Australian Government to revise and implement the planning of Canberra, based on the Griffin Plan of 1918 and 1925. It is associated with well-known international and national identities from the engineering and architecture profession from the time of its construction, including: • the engineering design firm G. Maunsell and Partners, founded by British engineer Guy Maunsell; • the construction firm M. R. Hornibrook Pty Ltd, an Australian company, founded by Manuel Richard Hornibrook; and • W. Holford and Partners; an architectural firm, founded by Sir William Holford, an advisor to the NCDC. Commonwealth Avenue Bridge meets criterion (h).
Statement of Heritage Value	Commonwealth Avenue Bridge is important for its association with the NCDC plus well-known international and national identities from the engineering and architecture profession of the time, including the engineering design firm G. Maunsell and Partners, the architectural firm W. Holford and Partners, and Australian construction firm, M.R Hornibrook Pty Ltd.
Attributes	The attributes under this criterion include: • the Commonwealth Avenue Bridge in its context of the Central National Area and broader National Land road network in Canberra.
Criterion (i): Indigenous Tradition	<i>The place has significant heritage value because of the place's importance as part of Indigenous tradition.</i>
Assessment	Consultation undertaken with RAO's confirms that Commonwealth Avenue Bridge is not a culturally significant place, or of value as part of Indigenous/Aboriginal tradition. Commonwealth Avenue Bridge does not meet criterion (i).
Statement of Heritage Value	Commonwealth Avenue Bridge is not a culturally significant place, or of value as part of Indigenous/Aboriginal tradition.
Attributes	—

5.3 Summary Statement of Significance

Commonwealth Avenue Bridge is a place of Commonwealth Heritage value.

The assessment in Section 5.3 determines that Commonwealth Avenue Bridge meets criteria (a) historic processes, (b) rarity, (c) research potential, (d) characteristic, (e) aesthetic, (f) creative or technical achievement, (g) social and (h) significant people, and is eligible for nomination and inclusion in the CHL. In meeting eight of the nine criteria, the bridge is an individual element of heritage significance. It is also an integral component of the Central National Area and National Land Roads of Canberra.

Commonwealth Avenue Bridge is historically significant for its development by the NCDC as part of the Lake Burley Griffin Scheme and represents a significant part of Canberra's planning history, landscape design and development.

The bridge is representative of early development of major segmented and prestressed concrete bridges in Australia, and of a class of design in modern bridges characterised by long slender spans, and a 'smooth-lined' and 'uncluttered' approach.

Commonwealth Avenue Bridge is a rare example in Australia of a precast, post-tensioned, concrete bridge, embodying multi-web box segments. The bridge is rare for its design to have a symbolic pride of place in the national capital as part of the Lake Burley Griffin Scheme and for the integration of lighting within the handrail and parapet of the bridge in terms of bridge design within Australia.

Commonwealth Avenue Bridge has heritage value as an example of the advancement of structural engineering and bridge construction in Australia, particularly in the shift in material from steel to prestressed concrete in major bridge construction, and in the early use of digital computing in the design and structural analysis of its post tensioned concrete superstructure.

Aesthetically, Commonwealth Avenue Bridge is highly valued by the Canberra community for its distinctive qualities and architectural design which complements the surrounding landscape setting of the designed lake and central area of Canberra. The elegant and simple design of the bridge is appreciated both as a feature in its own right and as part of the broader designed landscape of the Central Canberra. Commonwealth Avenue Bridge is also valued as a key element in Canberra's design and planning and its visually distinctive and iconic qualities. The views to and from the bridge, both during the day and night, are widely enjoyed and valued by the Canberra community.

Commonwealth Avenue Bridge demonstrates a high degree of creative and technical achievement in Canberra's building and development by the NCDC in the 1960s, and more generally in Australia's progress in the Post World War II period of innovation and optimism. It was the first prestressed concrete bridge to employ multi-webbed precast box segments and is a very early example of the use of digital computers in bridge design and to analyse, and compute the structure and stress, influencing the physical design.

Commonwealth Avenue Bridge is valued by the Canberra community as a key element within Canberra's designed landscape and planning, that supports movement around the city and brings the community together through public and private experiences. Commonwealth Avenue Bridge is an important landmark within Canberra and is a key part of the National Sorry Day march route.

Commonwealth Avenue Bridge is important for its association with the NCDC, and well-known international and national identities from the engineering and architecture profession of the time,

including the engineering design firm G. Maunsell and Partners, the architectural firm W. Holford and Partners, and Australian construction firm, M.R Hornibrook Pty Ltd.

Commonwealth Avenue Bridge does not have Indigenous or natural heritage values.

Table 5.2 Summary of Heritage values assessment against CHL criteria.

Criterion	Meets CHL Threshold
(a): Historic Processes	☒
(b): Rarity	☒
(c): Research Potential	☒
(d): Characteristic	☒
(e): Aesthetic (community-held)	☒
(f): Creative or Technical Achievement	☒
(g): Social value (community-held)	☒
(h): Associations: Significant People	☒
(i): Indigenous Tradition	☐

6.0 Next Steps

6.1 Recommendations

This report establishes that Commonwealth Avenue Bridge has Commonwealth Heritage value, both as an individual element, and for its contribution to Canberra's Central National Area and Lake Burley Griffin. The bridge is eligible for nomination to the CHL by the NCA.

As managers, the NCA is responsible for the conservation, protection, future change and interpretation of the identified heritage values of the bridge in accordance with the EPBC Act and its regulations.

The following points are provided as preliminary recommendations for the management of the bridge's identified heritage values.

- Consider preparing a nomination of Commonwealth Avenue Bridge to the CHL—if deemed appropriate by the NCA.
- Conserve and manage the heritage values of Commonwealth Avenue Bridge in accordance with the EPBC Act, the National Capital Plan and best-practice heritage management.
- Ensure that future change, or any works associated with Commonwealth Avenue Bridge, which may have, or are likely to have, a significant heritage impact are planned in accordance with the EPBC Act and the NCA's internal self-assessment processes. The NCA's internal self-assessment processes are the steps that the NCA undertake to determine whether or not a proposed action is likely to have a significant impact on the environment (which includes the heritage values of a place).

7.0 Appendices

Appendix A

Commonwealth Avenue Bridge—Community Engagement and Heritage Assessment, Aesthetic and Social Values report prepared by GML Heritage for Major Projects Canberra and National Capital Authority, May 2020

Appendix B

Additional Technical Information and Images

Appendix C

Modern Bridges: Comparative Analysis

Appendix A

Commonwealth Avenue Bridge—Community Engagement and Heritage Assessment, Aesthetic and Social Values report prepared by GML Heritage for Major Projects Canberra and National Capital Authority, May 2020

Commonwealth Avenue Bridge—Community Engagement and Heritage Assessment

Aesthetic and Social Values

Report prepared for Major Projects Canberra and National Capital Authority

May 2020



Sydney Office Level 6, 372 Elizabeth Street Surry Hills NSW Australia 2010 T +61 2 9319 4811

Canberra Office 2A Mugga Way Red Hill ACT Australia 2603 T +61 2 6273 7540

GML Heritage Pty Ltd ABN 60 001 179 362

www.gml.com.au

Report Register

The following report register documents the development and issue of the report entitled Commonwealth Avenue Bridge—Community Engagement and Heritage Assessment (Aesthetic and Social Values), undertaken by GML Heritage Pty Ltd in accordance with its quality management system.

Job No.	Issue No.	Notes/Description	Issue Date
18-0678B	1	Draft Report	26 February 2020
18-0678B	2	Final Report	5 May 2020

Quality Assurance

GML Heritage Pty Ltd operates under a quality management system which has been certified as complying with the Australian/New Zealand Standard for quality management systems AS/NZS ISO 9001:2016.

The report has been reviewed and approved for issue in accordance with the GML quality assurance policy and procedures.

Copyright

Historical sources and reference material used in the preparation of this report are acknowledged and referenced at the end of each section and/or in figure captions. Reasonable effort has been made to identify, contact, acknowledge and obtain permission to use material from the relevant copyright owners.

Unless otherwise specified or agreed, copyright in this report vests in GML Heritage Pty Ltd ('GML') and in the owners of any pre-existing historic source or reference material.

Moral Rights

GML asserts its Moral Rights in this work, unless otherwise acknowledged, in accordance with the (Commonwealth) *Copyright (Moral Rights) Amendment Act 2000*. GML's moral rights include the attribution of authorship, the right not to have the work falsely attributed and the right to integrity of authorship.

Right to Use

GML grants to the client for this project (and the client's successors in title) an irrevocable royalty-free right to reproduce or use the material from this report, except where such use infringes the copyright and/or Moral Rights of GML or third parties.

Cover Image: Commonwealth Avenue Bridge. (Source: GML Heritage)

Contents	Page
1.0 Introduction	1
1.1 Project Background	1
1.2 Site Identification	2
1.3 Understanding Aesthetic and Social Value	2
1.3.1 <i>What is Aesthetic Value?</i>	2
1.3.2 <i>What is Social Value?</i>	3
1.4 Methodology	3
1.4.1 <i>Approach</i>	3
1.4.2 <i>Defining Community and Cultural Groups</i>	4
1.4.3 <i>Engagement Methods</i>	5
1.4.4 <i>References</i>	6
1.5 Limitations	7
1.6 Authorship and Acknowledgements	7
1.7 Endnotes	7
2.0 Evidence of Aesthetic and Social Values	8
2.1 Introduction	8
2.2 Previous Assessments and Studies	8
2.2.1 <i>Commonwealth Avenue Bridge Initial Heritage Report 2019</i>	8
2.2.2 <i>Lake Burley Griffin</i>	8
2.2.3 <i>Certain Roads on National Land Heritage Assessment 2014</i>	10
2.2.4 <i>Parliament House Vista Management Plan 2010</i>	10
2.2.5 <i>Canberra the Planned National Capital</i>	11
2.3 Online Presence—Taking Snapshots	11
2.3.1 <i>Method</i>	11
2.3.2 <i>Discussion of Results</i>	12
2.3.3 <i>Analysis Summary</i>	18
2.4 Tourism Materials	18
2.4.1 <i>Method</i>	18
2.4.2 <i>Discussion of Results</i>	19
2.4.3 <i>Analysis Summary</i>	20
2.5 Online Survey	21
2.5.1 <i>Method</i>	21
2.5.2 <i>Discussion of Results</i>	21
2.5.3 <i>Analysis Summary</i>	30
2.6 Focus Groups	31
2.6.1 <i>Method</i>	31
2.6.2 <i>Discussion of Results</i>	32
2.6.3 <i>Analysis Summary</i>	34
2.7 Targeted Interviews	35
2.7.1 <i>Method</i>	35
2.7.2 <i>Discussion of Results</i>	35
2.7.3 <i>Analysis Summary</i>	38
2.8 Conclusion	38
2.9 Endnotes	38

3.0 Community Perceptions, Meanings and Associations	40
3.1 Introduction	40
3.2 Identifying Community	40
3.3 Identifying Themes	41
3.3.1 <i>Everyday Life in Canberra</i>	41
3.3.2 <i>Architectural Expression</i>	42
3.3.3 <i>Views and the Canberra Landscape</i>	44
3.3.4 <i>A Place of History and Memories</i>	45
3.3.5 <i>A Canberra Landmark</i>	46
3.3.6 <i>Connecting Canberra</i>	48
3.4 Conclusion	49
4.0 Heritage Assessment against CHL Criteria.....	50
4.1 Introduction	50
4.2 Methodology	50
4.2.1 <i>Statutory Framework—EPBC Act</i>	50
4.2.2 <i>Significance Indicators and Thresholds</i>	50
4.2.3 <i>Aesthetic Value</i>	51
4.2.4 <i>Social Value</i>	51
4.3 Assessment of Aesthetic Value	52
4.3.1 <i>Criterion (e) Aesthetic Characteristics</i>	52
4.4 Assessment of Social Value	53
4.4.1 <i>Criterion (g) Social Value</i>	53
4.5 Conclusion	54
4.6 Endnotes	54
5.0 Conclusions and Recommendations.....	55
5.1 Statements of Heritage Value	55
5.1.1 <i>Aesthetic Values</i>	55
5.1.2 <i>Social Values</i>	55
5.1.3 <i>Attributes</i>	56
5.2 Recommendations/Next Steps	57
6.0 Appendices	59
Appendix A	
<i>Online Survey Distribution Summary</i>	
Appendix B	
<i>Online Survey Results</i>	
Appendix C	
<i>Focus Group Workshop Summary</i>	

Executive Summary

Project Background

Commonwealth Avenue Bridge is an integral component of the Central National Area of Canberra. Currently the bridge is not a listed heritage place, although it is included within, or adjacent to, several listed or nominated heritage places, including Lake Burley Griffin. This report assesses the heritage value of the bridge as held by the community under Commonwealth Heritage criteria (e) aesthetic characteristics and (g) social value.

GML Heritage Pty Ltd (GML) has been engaged by the ACT Government/Major Projects Canberra and the National Capital Authority (NCA) to undertake an assessment of 'community-held aesthetic and social values' of Commonwealth Avenue Bridge. The purpose of this assessment is to gain an understanding of any community-based values associated with Commonwealth Avenue Bridge, and determine if they meet the threshold for Commonwealth Heritage Listing under the *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act) and the Environment Protection and Biodiversity Conservation Regulations (EPBC Regulations).

A number of methods, including a review of previous heritage assessments, searching online visual representations and tourism materials, and conducting an online survey, focus group workshops and targeted interviews, has been used to gather data and develop an understanding of community-held aesthetic and social values. Through analysis of this data a series of themes have been distilled (refer to Section 3.0), and an assessment of the identified community-held aesthetic and social values against the relevant Commonwealth Heritage criteria is undertaken. A statement of significance and attributes for each criterion is provided in Section 4.0 of this report.

Key Findings

The heritage assessment concludes that Commonwealth Avenue Bridge possesses cultural heritage values which meet the threshold for Commonwealth Heritage Listing under both criteria (e) aesthetic characteristics and (g) social value, as held by the Canberra community.

Separate to this heritage assessment, and as forecast in the peer review of the 2019 'Commonwealth Avenue Bridge Initial Heritage Report', a standalone and comprehensive heritage assessment against all nine Commonwealth Heritage criteria should be prepared for Commonwealth Avenue Bridge. A standalone heritage assessment would draw on the work in this report, and additional research for the assessment against the remaining seven heritage criteria. It would provide the owners, managers and relevant stakeholders with the opportunity to agree and approve the heritage values of the bridge, to help inform ongoing and future management decisions.

1.0 Introduction

1.1 Project Background

The ACT Government/Major Projects Canberra and the National Capital Authority (NCA) have engaged GML Heritage Pty Ltd (GML) to undertake an assessment of 'community-held aesthetic and social values' of Commonwealth Avenue Bridge, Canberra. The purpose of this assessment is to gain an understanding of any community-based values and undertake an assessment of criteria (e) aesthetic characteristics and (g) social value, in accordance with the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act) and the Environment Protection and Biodiversity Conservation Regulations (EPBC Regulations).

Commonwealth Avenue Bridge is not currently individually included in the Commonwealth or National Heritage List (CHL/NHL); however, it is an integral component of the Central National Area¹ and is included within, or adjacent to, several listed or nominated heritage places, including:

- Lake Burley Griffin and Adjacent Lands/Lake Burley Griffin and Lakeshore Parklands (nominated CHL/NHL);
- National Land Roads (nominated CHL);
- Parliament House Vista (listed CHL); and
- Canberra the Planned National Capital (nominated NHL).

Although no 'listed' heritage values apply, Commonwealth Avenue Bridge is a contributory element/attribute of these listed or nominated heritage places and, as such, has 'identified heritage values'. 'Identified heritage values' are equally significant and are subject to the same EPBC Act regulations as if the values were listed. Note that the precautionary principle needs to be considered when undertaking an action.²

A peer review, by GML for Major Projects Canberra, of the 'Commonwealth Avenue Bridge Initial Heritage Report', prepared by Duncan Marshall for lahznimmo Architects in 2019, indicates that a comprehensive and standalone heritage assessment of the bridge is required.

This report investigates only part of a standalone heritage assessment of the bridge—that is the nature and scope of aesthetic and social values held by communities that have an association with Commonwealth Avenue Bridge. It brings together data gathered through a combination of techniques, including a review of previous heritage assessments, online visual representations and tourism materials, an online survey, focus group workshops and targeted interviews, in order to assess the values against Commonwealth Heritage criteria (e) and (g).

The threshold for Commonwealth heritage values is that 'a place must have **'significant'** heritage value'.³ There are no significance 'indicators' or guidelines for either aesthetic or social value under the Commonwealth Heritage criteria. To assist in this assessment, 'indicators' which are currently used for identifying aesthetic and social heritage significance in the Australian Capital Territory (ACT) (*Heritage Assessment Policy*, 2015) and Queensland (*Assessing Cultural Heritage Significance*, 2013) have been adapted. The current ACT and QLD guidelines have been drawn upon as they are the most relevant and provide the most comprehensive assessment methodology out of all heritage guidelines currently available.

It should be noted that in 2009 the Australian Heritage Council prepared *Guidelines for the Assessment of Places for the National Heritage List*.⁴ The NHL criteria require that 'outstanding heritage value to the nation' be established, which is a much higher threshold than that required for the CHL.

Identifying heritage values and the aspects of the place that embody these heritage values ('attributes') is intended to provide guidance for future conservation and management of these values and inform a broader heritage assessment of Commonwealth Avenue Bridge against all nine Commonwealth Heritage criteria.

1.2 Site Identification

The study area comprises Commonwealth Avenue Bridge which crosses Lake Burley Griffin, from City West through to the Parliamentary Zone, in Canberra.



Figure 1.1 Aerial showing the location of Commonwealth Avenue Bridge (the study area). (Source: Nearmap with GML overlay, 2019)

1.3 Understanding Aesthetic and Social Value

1.3.1 What is Aesthetic Value?

*e) aesthetic characteristics (community-held value): The place has significant heritage values because of the place's importance in exhibiting particular aesthetic characteristics valued by a community or cultural group.*⁵

Aesthetic value is the emotional response by individuals to a place, and the natural or cultural elements within it.⁶ While visual elements such as outstanding landforms or compositional qualities are often preferred in understanding aesthetic values, non-visual attributes (eg sound, smell or particular understandings about the place) which evoke a response, feeling or sense of place can also be valued aesthetic characteristics.

Emotional response to place can be either positive or negative, although the former is more commonly documented. Examples of responses which indicate aesthetic value might include awe, inspiration,

sense of peace, mystery or fear. Evidence of aesthetic response involves in-depth exploration of people's expressions of value and understanding about the place, including through art, poetry, photography and literature.

Cultural features or landscapes, and natural features of landscapes with evocative qualities, symbolic or other associated meanings, that are recognised and regarded as outstanding by community groups might also provide examples of valued aesthetic qualities.

This assessment of aesthetic values of Commonwealth Avenue Bridge has considered the following contexts for appreciating the bridge's aesthetic qualities:

- being physically on the bridge;
- transient viewing of the bridge as setting, feature or backdrop (eg lake, roads, from the air); and
- expression in images, publications or other sources.

1.3.2 What is Social Value?

g) social value: The place has significant heritage value because of the place's strong or special association with a particular community or cultural group for social, cultural or spiritual reasons.⁷

Assessing social value involves identifying and engaging with communities and groups of people to understand their social, spiritual or cultural associations with a place, and to appreciate its significance to them. It also involves understanding if significance resides in the fabric of the place, or in other aspects such as its use, accessibility or aesthetic appreciation.

Social value is seen as a value held by today's community. While historical research may be able to demonstrate considerable longevity and continuity of association, this is not enough to demonstrate social value. Recognising social value is based on acknowledging that places may have an importance to people with direct experience and knowledge of a place, and that social significance transcends utilitarian values.

1.4 Methodology

1.4.1 Approach

In order to identify and understand the community-held aesthetic and social values of Commonwealth Avenue Bridge, the following tasks were undertaken:

- identification of communities and cultural groups that may have or are likely to have a connection to Commonwealth Avenue Bridge (refer to Section 1.4.2 below);
- development and implementation of appropriate methods to engage with the identified communities and cultural groups in order to collect evidence on the nature, extent and duration of their associations with Commonwealth Avenue Bridge (refer to Section 1.4.3);
- analysis of data gathered on values and the tangible and intangible attributes that embody any identified values; and
- assessment of identified aesthetic and social values against the Commonwealth Heritage criteria (e) and (g).

1.4.2 Defining Community and Cultural Groups

The criterion refers to ‘community or cultural group’. In this report, the term ‘community’ is used as shorthand to include ‘cultural group’. We have adopted a broad definition of communities and cultural groups as those that can be defined by shared culture, beliefs, ethnicity, activity or experience.

Central to assessing social and community aesthetic values is identifying the communities who hold the values. The approach adopted was to identify a wide range of people likely to have experience of, or association with, Commonwealth Avenue Bridge, either through their past involvement in the bridge’s design and construction; in its day-to-day management; regular use of the bridge/lake as local Canberra residents; and special interest in the bridge because of their knowledge of and involvement in professions such as design and heritage.

The views of the broader Australian community were also sought; with an interest in people’s experiences of Commonwealth Avenue Bridges as a visitor to Canberra, and their appreciation of its cultural meanings as a part of Canberra and the national capital gained via visual, text or web-based sources. Images seen prior to visiting a place, through tourism materials, television or other media, are likely to shape visitors’ expectations of the place. In particular, tourism images provide an ‘expert opinion’ of places that will have a strong aesthetic appeal to the wider community and that will attract visitors to the locality.

The following communities were identified as potentially holding significant aesthetic and social values for Commonwealth Avenue Bridge, or information pertaining to the identification of such values. These ‘target communities’ were as follows:

- **Creators and carers of the bridge**—people with a direct association with Commonwealth Avenue Bridge, particularly its planning, design, engineering, construction, and/or day-to-day maintenance/management from 1960s to the present.
- **Organisations representing Bridge and Lake Burley Griffin users**—members of community groups who utilise the bridge and lake for recreational activities such as rowing, running, cycling and walking groups.
- **Art/photography groups**—members of community groups who interact with and portray the bridge through artistic expression.
- **Design, history or heritage interest groups**—those with a professional interest in the bridge in terms of its design, history or heritage values, for example engineers, architects, planners, Walter Burley Griffin experts and enthusiasts (note that herein professionals will be treated as members of a broader community, and not as representing the views of a professional organisation).
- **Canberra residents**—Canberra residents for whom the bridge forms the backdrop to their daily lives, particularly those who live and work close to the lake and those that use the bridge regularly.
- **Visitors/tourists**—visitors to Canberra for business, holidays, events, or visiting friends or relatives.
- **Broader Australian community**—people not living in Canberra and who therefore are unlikely to have direct associations with the bridge, but who may see the bridge through print and web-based tourism material, user-generated content/photography on social media and/or image-sharing platforms (such as Instagram and Flickr) or television shows.

1.4.3 Engagement Methods

The methods used to understand community-held aesthetic and social values can be generally described as ethnographic research, that is qualitative social research that seeks to understand a 'community' (or society/culture); in this instance, the research is seeking to understand associations and meanings that may be embodied in the place. For example:⁸

- understanding the history of the place and its cultural and community setting (through research and interviews);
- listening to community members (through interviews, structured surveys, workshops and focus groups);
- talking to key informants: interviews with people with special knowledge about the place and associated communities (ie researchers, technical experts, commentators and observers); and
- observation (through participant observation, behavioural mapping [who uses a place and how]); analysis of community 'expressions' (eg local and public art; imagery and events).

The following methods were designed to identify and understand community associations with Commonwealth Avenue Bridge, and whether these associations may give rise to significant social and aesthetic values for these communities:

- **Secondary sources**—examination of previous studies and heritage listings to identify information relevant to understanding associated communities and their social and aesthetic values.
- **Review of online visual representation**—investigation of online imagery of Commonwealth Avenue Bridge to assess its presence and portrayal, particularly with a focus on photographic expression (ie user-generated content/photography on social media and/or image-sharing platforms such as Instagram and Flickr).
- **Review and analysis of tourism material**—print and web-based tourism material was analysed to examine how Commonwealth Avenue Bridge is portrayed and how these representations may indicate broader Australian community perceptions of the bridge.
- **Online survey**—a survey including closed and open-ended questions related to associations and values of the bridge. Promotion was undertaken to ensure relevant community groups, local Canberra people and broader Australian communities, were aware of its existence and encouraged to participate.
- **Focus groups**—facilitated small group discussions were held with members from some of the targeted community groups, including recreational users of the bridge (walkers, cyclists, photographers), and design, history and heritage interest groups (noting they were invited as individuals with a professional/personal role in design/history or heritage and not explicitly to express the views of their organisation).
- **Interviews**—face-to-face interviews undertaken with some of the creators of Commonwealth Avenue Bridge, and technical experts in the industry (ie bridge engineers).

By using multiple data sources, information can be compared and contrasted, enabling a richer understanding to emerge. In addition, the use of multiple data sources in combination increases the reliability of the data. It does not offer a statistically validated sample. Iteration, that is the testing of

preliminary ideas through continuing 'rounds' of research, is also valuable in increasing the reliability of the results.⁹

The approach to each of the engagement methods outlined above and an analysis of the data is explained further in Section 2.0 of this report.

1.4.4 References

This report has been informed by information contained within and review of the following relevant documentation, legislation and guidelines:

- Duncan Marshall, *Commonwealth Avenue Bridge Initial Heritage Report*, prepared for lahznimmo Architects, 2019;
- Duncan Marshall et al, *Commonwealth Heritage Assessment for Certain Roads of National Land in Central Canberra*, prepared for the National Capital Authority, 2014;
- Godden Mackay Logan (now GML Heritage), *Lake Burley Griffin and Adjacent Lands Heritage Management Plan*, prepared for National Capital Authority, 2008;
- Godden Mackay Logan (now GML Heritage), *Lake Burley Griffin Heritage Assessment*, prepared for the National Capital Authority, 2010;
- The Institution of Engineers, Australia (Canberra Division), *Nomination for National Engineering Landmark—Lake Burley Griffin Scheme in Canberra ACT*, 2001;
- Duncan Marshall et al, *Parliament House Vista Area Heritage Management Plan*, prepared for the National Capital Authority, 2010;
- Australian Government/Department of the Environment, *Draft Canberra the Planned National Capital: National Heritage Place, EPBC Act Referral Guidelines*, 2012;
- ACT Government/ Environment and Sustainable Development Directorate, *Heritage Assessment Policy*, 2018;
- State of Queensland/Department of Environment and Heritage Protection, *Assessing Cultural Heritage Significance: Using the cultural heritage criteria*, 2013;
- Australian Heritage Council, *Guidelines for the Assessment of places for the National Heritage List*, 2009;
- *Environmental Protection and Biodiversity Conservation Act 1999* (Cwlth) (EPBC Act), its regulations and guidelines; and
- the *Australia ICOMOS Burra Charter, 2013* (Burra Charter)—the Burra Charter and the associated series of Practice Notes provide a best practice standard for managing cultural heritage places in Australia.

References and footnotes have been included where relevant.

1.5 Limitations

The information obtained through the online survey, focus groups and targeted interviews does not claim to be exhaustive, but rather has been considered as a sample of the views and social and aesthetic values held by individuals and associated communities relevant to Commonwealth Avenue Bridge.

The project was undertaken within a relatively short timeframe and therefore there were some limitations in the availability of participants to attend the focus group workshops. Three were originally intended, but due to limited numbers of attendees available in December 2019, only two workshops were held.

No new primary historical research was undertaken for this project; the primary areas of new research were into online and literary sources as potential evidence of aesthetic appreciation, and through conducting the online survey of community-held values.

The social values assessment methodology sought to determine the values of Commonwealth Avenue Bridge to both the local Canberra and broader Australian communities. The values of Commonwealth Avenue Bridge to non-ACT-residing Australians were sought through targeted email promotion of the online survey, analysis of tourism imagery and a review of other secondary sources.

Limitations on promotion and therefore the breadth of data available for consideration, however, meant that the values of few 'non-Canberrans' were sampled in this study. The results therefore do not indicate strong social or aesthetic values held for communities outside of Canberra. However, the assessment process did not provide sufficient data to conclude that such values to the broader Australian community do not exist.

1.6 Authorship and Acknowledgements

This report has been prepared by a GML project team, which included special advisers Chris Johnston and Dr Stephen Brown, who assisted with developing and facilitating the engagement opportunities and analysis.

GML gratefully acknowledges the assistance of ACT Government/Major Projects Canberra and the NCA in the preparation of this report.

1.7 Endnotes

- ¹ Definition of Central National Area as specified by the National Capital Plan.
- ² Part 16(2) of the EPBC Act states: The precautionary principle is that lack of full scientific certainty should not be used as a reason for postponing a measure to prevent degradation of the environment where there are threats of serious or irreversible environmental damage.
- ³ <http://www.environment.gov.au/heritage/about/commonwealth-heritage/commonwealth-heritage-list-criteria>
- ⁴ Australian Heritage Council, Guidelines for the assessment of places for the National Heritage List, 2009.
- ⁵ Section 10.03A, EPBC Regulations 2003.
- ⁶ Ramsay & Paraskevopoulos, 1993.
- ⁷ Section 10.03A, EPBC Regulations 2003.
- ⁸ Godden Mackay Logan, Weston Park—Conservation Management Plan, report prepared for Territory and Municipal Services, ACT Government, July 2011. Appendix C.
- ⁹ Godden Mackay Logan, Weston Park—Conservation Management Plan, report prepared for Territory and Municipal Services, ACT Government, July 2011. Appendix C.

2.0 Evidence of Aesthetic and Social Values

2.1 Introduction

This section provides a summary of the data gathered through the variety of engagement method techniques outlined in Section 1.0 of this report.

2.2 Previous Assessments and Studies

As mentioned in Section 1.0, Commonwealth Avenue Bridge is not individually recognised for its heritage values through formal listing, but it does fall within other nominated and listed heritage places. A summary of previous assessments and studies where the bridge has been assessed for its aesthetic and social values (including as part of a wider contextual area) are discussed below.

2.2.1 Commonwealth Avenue Bridge Initial Heritage Report 2019

A preliminary statement of heritage values for the bridge was prepared by Duncan Marshall for Lahznimmo Architects in 2019 in 'Commonwealth Avenue Bridge Initial Heritage Report to Inform the Design Team'. The report noted that there was no current evidence to suggest that Commonwealth Avenue Bridge has sufficient values to meet criterion (e) or (g) as an individual place, but that it has the potential to meet the threshold for listing as part of its wider context.

The following statements against the criteria were provided:

Aesthetic—Criterion (e)

The Commonwealth Avenue Bridge is an important element in the context of the landscapes of the lake and Parliament House Vista. It features in prominent views which are widely appreciated by the Canberra community and visitors to the city.

In these wider contexts, the bridge is of Commonwealth Heritage value and possibly even National Heritage value.

Social—Criterion (g)

As part of the lake, Parliament House Vista or a larger area of Canberra as the national capital, the Commonwealth Avenue Bridge is an element contributing to potential Commonwealth Heritage and National Heritage social values related to the Canberra and Australian communities.¹

A peer review of the Initial Heritage Report was undertaken as part of this project which noted that community testing of aesthetic and social values (against criteria e and g) was not undertaken, and that a detailed understanding and analysis of the heritage values against all nine criteria was recommended.

2.2.2 Lake Burley Griffin

Lake Burley Griffin Heritage Assessment and Heritage Management Plan 2010

The Lake Burley Griffin Heritage Assessment and Heritage Management Plan (HMP), 'Volume 4: Dams and Bridges', prepared by GML for the NCA in 2010, identified that Commonwealth Avenue Bridge was found to 'contribute' to the assessment of the lake against criteria (a), (b), (c), (e), (f), (g) and (h) for Commonwealth Heritage values and criteria (e) and (f).²

The following statements against the criteria were provided:³

Aesthetic—Criterion (e)

Lake Burley Griffin meets the threshold for Commonwealth and National Heritage value under this criterion. Lake Burley Griffin most clearly meets the threshold for National Heritage value as a component of the Griffin plan for Canberra and its subsequent realisation in central Canberra's designed landscapes, in particular the Land and Water Axes. However, Lake Burley Griffin is considered to have outstanding heritage value to the nation in its own right as a designed landscape with outstanding aesthetic qualities.

Social—Criterion (g)

The Lake Burley Griffin Study Area meets the threshold for Commonwealth Heritage value under this criterion. Survey results indicate that the place is of Very High significance for the local Canberra community. Further, the analysis suggests that Lake Burley Griffin may be found to have outstanding heritage value to the nation under this criterion if it is considered not as an isolated element, as required by the terms of reference for this assessment, but as an integral component of the Griffin plan for Canberra and its subsequent realisation in central Canberra's designed landscape.

Attributes of Commonwealth Avenue Bridge were also noted and included the following:⁴

The elegant, designed form of the bridge, including its slim octagonal piers, spaced to provide views to West Basin, aluminium railings with strip lighting, the white colour of the precast concrete and the Waterloo Bridge stones.

National Engineering Landmark

In 2001, the Lake Burley Griffin Scheme including Scrivener Dam and the bridges at Commonwealth Avenue and Kings Avenue, was granted a National Engineering Landmark award by Engineers Australia (formerly the Institution of Engineers, Australia). The nomination report makes the following comments in its assessment of heritage significance for the overall 'scheme':

- *the scheme is a unique example of engineering and associated technology being used to create a major project whose principal objectives are aesthetics. Up-to-date technology and engineering science including hydraulic modelling, environmental analyses and contemporary practices on concrete design and construction were used extensively in the implementation phase. The completed project brings into focus the natural beauty of distant mountains and adjacent hillsides and visually unites them with a create setting for public institutions, complemented by low profile bridges.*
- *social—the scheme's completion gave a focus for social, recreation and tourist activities in Canberra – the water and surface and public areas of the foreshores have encouraged water sports, cycling and walking, and provide community gathering places for public occasions, and the foreshores and easy access to public buildings present clear identification of Canberra as a national city.*

The accompanying plaque also notes:

Elegant bridges at Commonwealth and Kings Avenues focus on Parliament House and unite the city around the 634 hectare lake which provides an outstanding setting for national institutions and public use.

The supporting documentation accompanying the nomination includes a report titled 'Bridges in the Canberra Central Lake Area – Design', prepared by engineers EM Birkett and GN Fernie in the *Journal of The Institution of Engineers, Australia*, Vol 36, July–August 1964, which provides a more detailed discussion on the technical engineering and architectural design treatments of the bridge. This report, which was presented at a conference in Canberra in 1964, also states:

To assist further in this conception of uniting the setting, the bridges at Commonwealth and Kings Avenues have both been developed as twin bridges in alignment with the existing dual road-ways and their broad median strips. Arising from this arrangement is the added advantage that the consequent space between the bridges permits the addition of further roadway capacity or some other form of transport if the future so demands.

2.2.3 Certain Roads on National Land Heritage Assessment 2014

The 'Certain Roads on National Land in Central Canberra Heritage Assessment Report' prepared by Duncan Marshall et al for the NCA in 2014 assesses the potential Commonwealth Heritage values of a number of roads on National Land in Central Canberra, including Commonwealth Avenue.

The report found that Commonwealth and Kings Avenues are 'likely to have Commonwealth Heritage value' under criteria (a), (b), (c), (d), (f) and (h). Both Commonwealth Avenue Bridge and Kings Avenue Bridge were discussed as potentially having significance in relation to criterion (d) and criterion (f). The report notes that 'no social value research has been undertaken, including related to aesthetics for all of the roads assessed'.⁵

The following statements against the criteria were provided:

Aesthetic—Criterion (e)

There is no evidence of value under this criterion.

Social—Criterion (g)

Not researched.

2.2.4 Parliament House Vista Management Plan 2010

The 'Parliament House Vista Heritage Management Plan' prepared for the NCA identifies that the vista has aesthetic and social values. Although formally outside of the boundaries of the vista, Commonwealth and Kings Avenue Bridges are important framing elements, expressing the geometry of the planning, and part of the modern urban design linked to the landscape. In relation to aesthetic and social values the following is stated:

Aesthetic—Criterion (e)

The Parliament House Vista is of significant heritage value to the Canberra community for its aesthetic qualities. It evokes an emotional response from the community for whom it is a place of dramatic and powerful views, such as the large scale and sweeping views along the Land Axis to the terminal features, and also a place of reflection and contemplation. They value the juxtaposition of bush with the formality of the built environment. The aesthetic values specific to the design and setting of the Parliament House Vista are also recognised, along with the integration of the architectural elements into the overall Griffins' design.

The Canberra community and, in particular, the veterans/family of veterans among them, value the visual link between the Parliament House and the Australian War Memorial which represents the democratic values of the Australian nation and the sacrifices made to uphold them.

The Parliament House Vista is of outstanding value to the nation because of its aesthetic values to Australians. It is the most highly recognised part of Canberra for Australians – evoking Canberra and its important meanings and associations. Its aesthetic values as a symbolic and powerful landscape are clearly evidenced in the high recognition of the Parliament House Vista. The aesthetic characteristics of the Parliament House Vista are strongly connected to its symbolic meanings, and are highly recognised and valued by Australians.

Social—Criterion (g)

The Parliament House Vista has significant social heritage value for both the Canberra and Australian communities.

The Parliament House Vista is of social significance to the Canberra community as a place which represents and embodies the ideals of Australian values and nationhood. The Canberra community values the Parliament House Vista as an icon and landmark and as the heart of the city.

The Parliament House Vista is a place which the Canberra community values as an important element in the continuum of both local and national history. This sense of history and of place engenders feelings of belonging and pride and the Canberra community feels it holds the layers of values and stories, as embodied in the area, in trust for the nation.

The Parliament House Vista is valued highly for its accessibility, as a gathering and meeting place, and as a beautiful place in which to be. The Canberra community has a deep attachment to the idea that the Parliament House Vista is a place for all Australians.

The Parliament House Vista is an iconic image of Canberra which represents the city to the nation and, potentially, internationally. For those Australians who have visited Canberra, the Parliament House Vista is the central iconic image.

2.2.5 Canberra the Planned National Capital

The Central National Area of Canberra, including early garden suburb parks and road layout, inner hills and town centres such as Woden and Tuggeranong, fall within the national nominated area of Canberra the Planned National Capital.

Although not explicitly named in the National Heritage values statement for Canberra the Planned National Capital, as presented within *the Draft National Heritage place EPBC Act Referral guidelines* prepared by the Department of the Environment 2012, Commonwealth Avenue Bridge is an integral feature of the Central National Area.

The following statements against the criteria were provided:

Aesthetic—Criterion (e)

Canberra has outstanding values to the nation because of the place's importance in exhibiting an ensemble of designed urban landscapes and settings that display the national capital and project its status, function and significance as the national capital. These features are values highly by the Canberra and Australian communities for their aesthetic appeal.

Social—Criterion (g)

Canberra the Planned National Capital has outstanding heritage values to the nation because of its special association with Australians as the nation's capital and seat of the federal democracy. Canberra also has a special association for Indigenous Australians as the place significant progress has been made towards Indigenous rights and reconciliation.

2.3 Online Presence—Taking Snapshots

2.3.1 Method

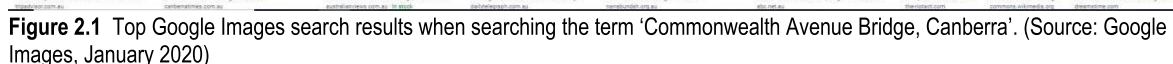
Searches of imagery of Commonwealth Avenue Bridge were undertaken to assess its presence and portrayal in online and digital media. This review sought evidence as to whether the bridge was a subject of photographic/artistic expression. The type and number of sources found were analysed in terms of the importance of the place to the local Canberra community as an aesthetic resource of potential heritage value.

The analysis is not intended to be a comprehensive review of all images of Commonwealth Avenue Bridge; however, it is indicative of the bridge's representation in mainstream digital platforms for media sharing. For each of these platforms, the analysis considered three key questions:

- ### 2.3.2 Discussion of Results

Photo Sharing

A search of Google images using the term 'Commonwealth Avenue Bridge, Canberra' resulted in the following collection of images as the top 45 results:



Of these images, some were links to news articles (eg from *Canberra Times*, *ABC*, *Riot Act*, *Daily Telegraph*) with others being links to photographic galleries (eg Alamy, Flickr, Pinterest, Wikimedia, and professional photographers' sites).

The images showed a range of views of Commonwealth Avenue Bridge, with the view between the spans toward Parliament House (also referred to as the 'void') being the predominant view used by photographers for artistic expression. The following table summarises the first 96 Google images in terms of how they portrayed the bridge.

Table 2.1 Summary of Google Images Showing Commonwealth Avenue Bridge.

What Do the Google Images Show?	Number	% of Images
Void	36	37.5%
Roadway	7	7.29%
Elevation / Oblique Side View	35	36.46%
Underneath	4	4.44%
Views from	5	5.21%
Aerial	6	6.25%
Other (including not depicting the bridge)	3	3.13%
TOTAL	96	100%

Flickr

A search of photo sharing community Flickr using the same terminology, 'Commonwealth Avenue Bridge, Canberra', resulted in 633 items, with the following collection of images as the top 50 results.

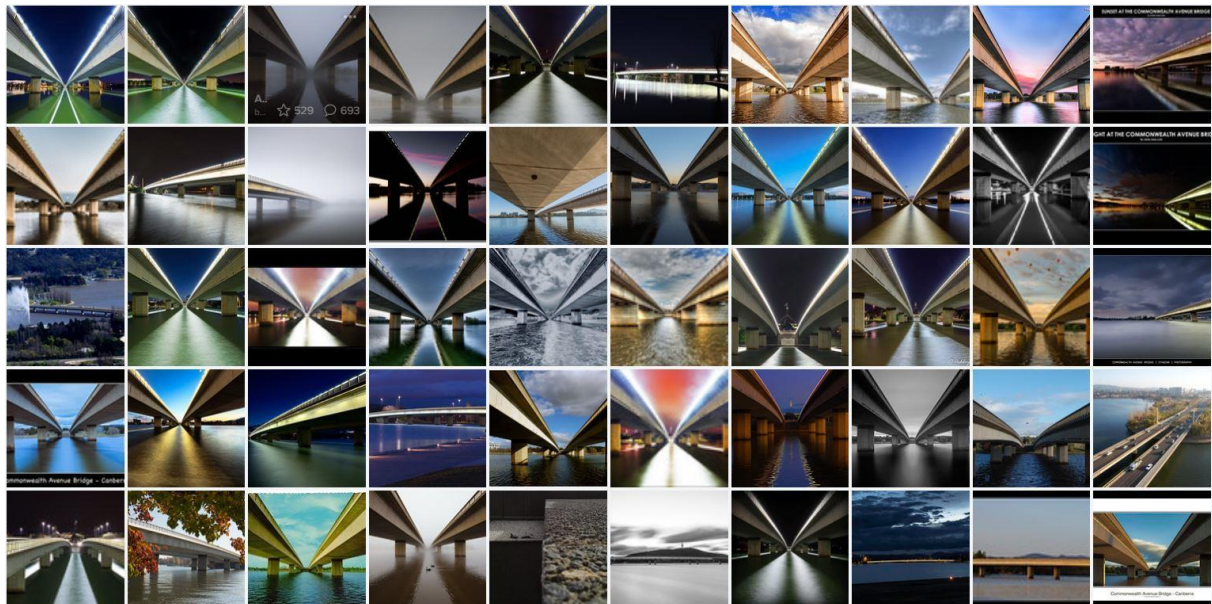


Figure 2.2 Top Flickr image results when searching the term 'Commonwealth Avenue Bridge, Canberra'. (Source: Flickr, January 2020)

The majority of the Flickr images which show views of Commonwealth Avenue Bridge depict the 'void' view (between the spans toward Parliament House). Other views are oblique views from areas of the foreshore looking toward the bridge, with a few showing views from the bridge out over the lake. Many

of the images were taken at dusk or night time to showcase the bridge's lighting, particularly in the void and elevation photographs.

Approximately 220 of the total number of images were taken by a single photographer and depict a protest which occurred in September 2019 for climate change; however, the bridge is not clearly featured in most of these photographs.

It is relevant to note that when undertaking a similar search of Flickr for Kings Avenue Bridge, only 121 results appear, with many not depicting the bridge itself, but instead nearby landmarks including the Carillon. While the 'void' view between the spans of Kings Avenue is also highly prominent, Commonwealth Avenue Bridge is a longer bridge and gives a better perspective shot than Kings Avenue Bridge, as noted by one photographer.

The following table summarises the first 100 Flickr images in terms of how they portrayed Commonwealth Avenue Bridge:

Table 2.2 Summary of Flickr Images Showing Commonwealth Avenue Bridge.

What Do the Flickr Images Show?	Number	% of Images
Void	53	53%
Roadway	1	1%
Elevation / Oblique Side View	32	32%
Underneath	4	4%
Views from	3	3%
Aerial	2	2%
Other (including not depicting the bridge)	5	5%
TOTAL	100	100%

Instagram

A search of Instagram using the #commonwealthavenuebridge⁶ hashtag resulted in 252 posts, with the following collection of images provided as the 'top' nine results:

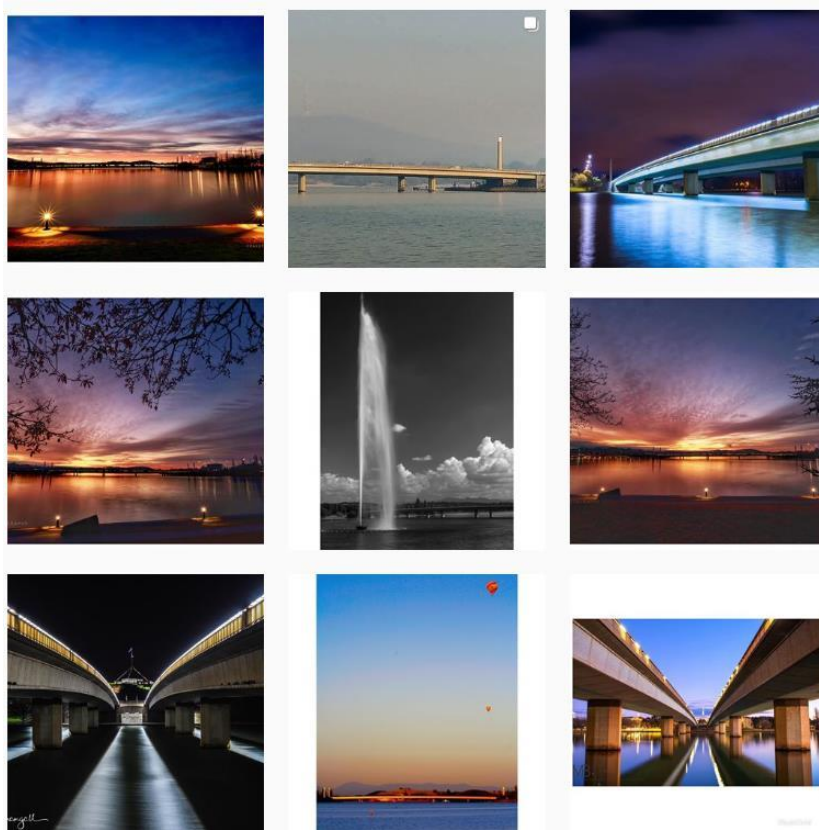


Figure 2.3 Top nine Instagram image results when searching the term #commonwealthavenuebridge. (Source: Instagram, January 2020)

The following collection of images were provided as the next 54 'most recent' results:

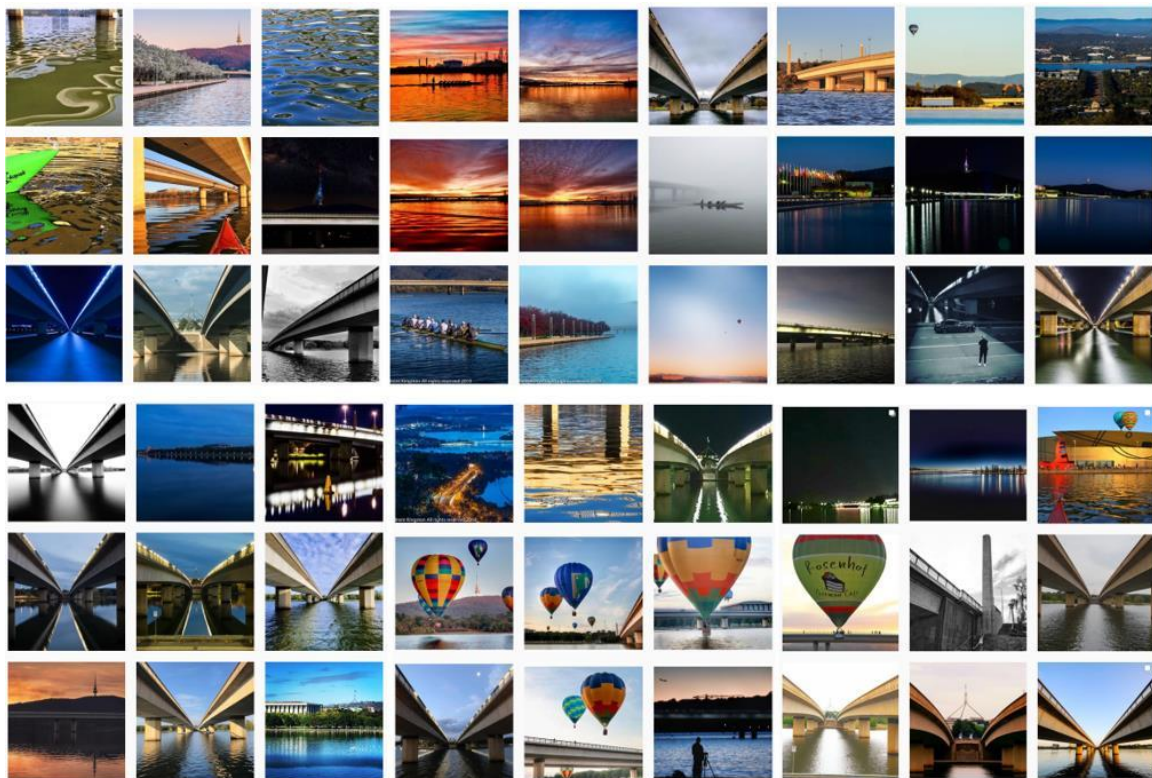


Figure 2.4 Top Instagram image results when searching the term #commonwealthavenuebridge. (Source: Instagram, January 2020)

The Instagram images included a greater variety of views of Commonwealth Avenue Bridge than Google or Flickr, with not all images depicting the bridge as the main subject matter. As well as the key 'void' and elevation views, it appeared often simply as a secondary feature in the landscape or in the background of photographs of the lake, of recreational activities occurring on the lake, of surrounding buildings and landmarks, and of events such as balloon festivals. A number of the photographs were taken by a single photographer of the reflection of the bridge and lake water. In some cases, a 'series' of images was grouped together (indicated by a small white box in the top right corner) and therefore the main image may not depict the bridge, but it was included in the series.

A similar search of Instagram images of Kings Avenue Bridge resulted in 227 photographs, with a similar variety of imagery including the void, elevations, water reflections and general scenic shots.

The following table summarises the first 117 Instagram images, and how the Commonwealth Avenue Bridge is portrayed:

Table 2.3 Summary of Instagram Images Showing Commonwealth Avenue Bridge.

What Do the Instagram Images Show?	Number	% of Images
Void	26	22.22%
Roadway	1	0.85%
Elevation	58	49.57%
Underneath	2	1.71%
Views from	2	1.71%
Aerial	2	1.71%
Other (including not depicting the bridge)	26	22.22%
TOTAL	117	100%

Trove

A search of the National Library of Australia Trove 'Pictures, Photos, Objects'⁷ collection using the term 'Commonwealth Avenue Bridge, Canberra' resulted in 203 items relating to the bridge.

Some images were inaccurately labelled, that is, 'Commonwealth Avenue Bridge' was included as a keyword in the description but the image did not actually feature the bridge, and in other cases Trove only provided captions with the image unavailable online. A small number of images depicted previous iterations of Commonwealth Avenue Bridge, prior to the construction of the current bridge. It is relevant to note that Trove cross-references other online image sources, including Flickr, and therefore some of the images are duplicates of those discussed above.

Of the images of the current Commonwealth Avenue Bridge, many were historic photographs including some taken during its construction. Other images included events which took place on the bridge, such as protests and marches, and general views of the lake or central Canberra which included the bridge. A sample of images is not included as the format of Trove does not allow for easy copying of thumbnails.

Websites

The ACT Community Directory homepage⁸ currently alternates between three background images, of which two depict views of Commonwealth Avenue Bridge by photographer Martin Ollman. The following images show the two depictions of Commonwealth Avenue Bridge, with one being the 'void' view.

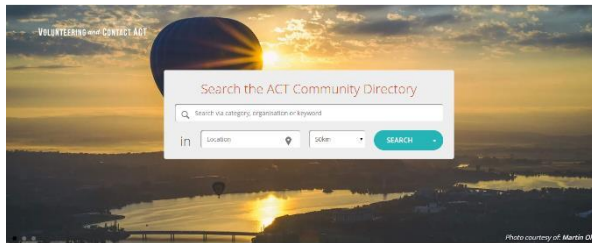


Figure 2.5 ACT Community Directory homepage background image. (Source: ACT Community Directory, January 2020)

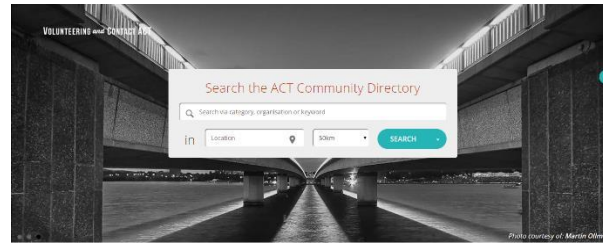


Figure 2.6 ACT Community Directory homepage background image showing void view. (Source: ACT Community Directory, January 2020)

The NCA includes a series of 'banner' images on its main website homepage⁹ which are regularly updated to coincide with events, news and key web-links. In October 2019, one of the images included Lake Burley Griffin for its 55th Birthday with Commonwealth Avenue Bridge in the background, and in January 2020 two of the five images featured Lake Burley Griffin with Commonwealth Avenue Bridge. Multiple pages within the NCA website also use an oblique elevation of the bridge with hot air balloons as the main banner. A selection of these images is provided below.

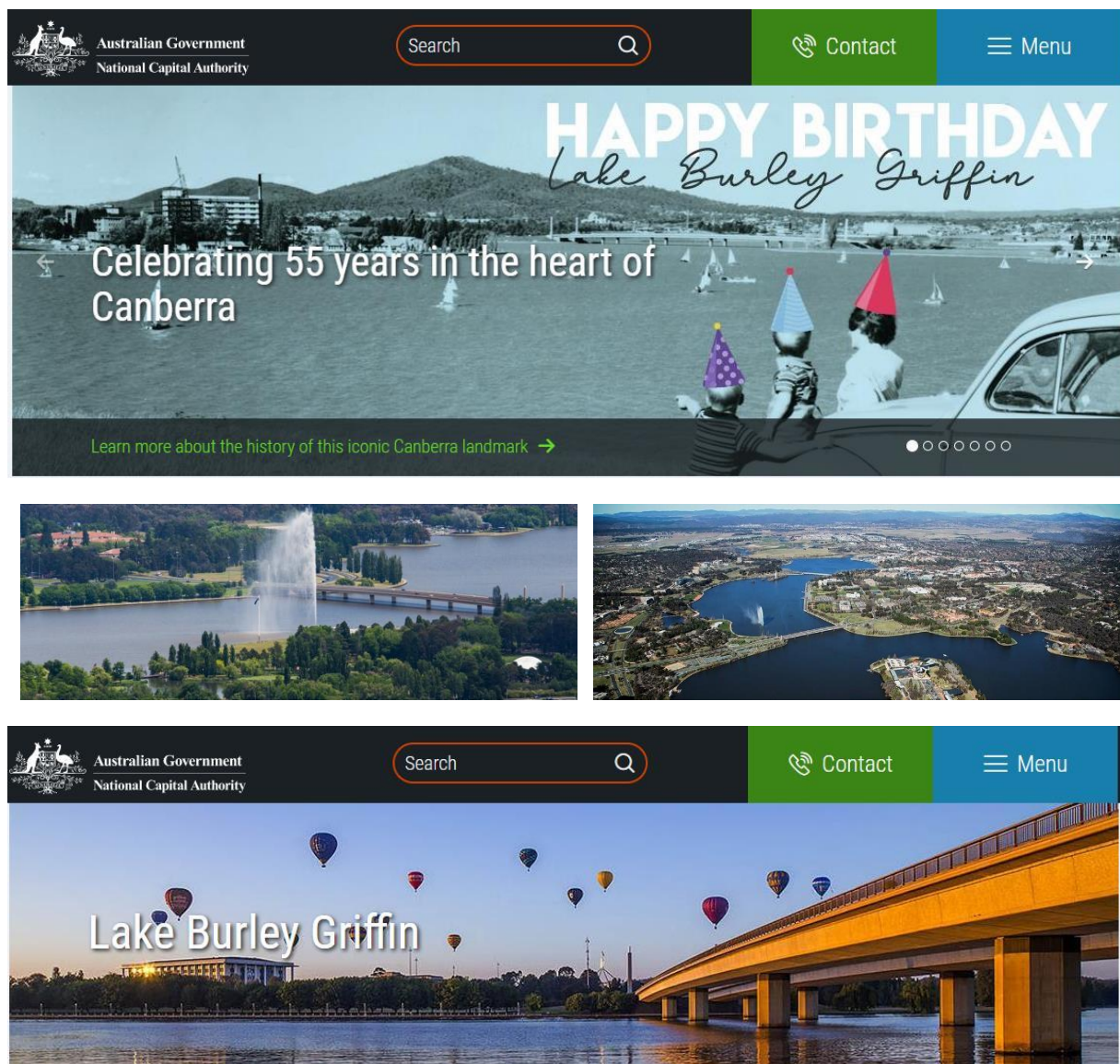


Figure 2.7 Selection of banner images from NCA homepage. (Source: NCA, October 2019–January 2020)

Television

Commonwealth Avenue Bridge featured in recent television series filmed in Canberra, including *Secret City*, *The Code*, and *Total Control*. The opening scenes of *Secret City* feature the bridge as a prominent element involving a character jumping from the bridge to the lake, and the opening shot of Canberra in the first episode of *The Code* shows an aerial view of a car crossing Commonwealth Avenue Bridge towards Parliament House. All three shows include general views of Canberra, the lake, and the bridge throughout the series in aerial imagery, transition scenes, and as backgrounds when characters are travelling around the city.

2.3.3 Analysis Summary

The results of the analysis indicate that:

- Commonwealth Avenue Bridge is extensively depicted in imagery online in several media platforms (current as of 2020);
- The bridge is a feature in its own right and as part of the broader central Canberra landscape setting in the media.
- The Central National Area of Canberra and particularly Lake Burley Griffin is regularly photographed and used to symbolise Canberra as the nation's capital.
- The bridge is visible in many images, without necessarily being the key subject matter, particularly in aerial photographs, demonstrating its contribution to the formality of Canberra landscape and planning.
- Photographs predominantly illustrate the bridge as an architectural object/place showing more dramatic, scenic landscape imagery, which emphasises the formal and symbolic nature of the structure.
- There is a strong appreciation of the Commonwealth Avenue Bridge by the photographic community who communicate their artistic expressions online, particularly through Flickr, with a strong focus on the void view.
- Photographs of the bridge do not typically depict people, with only a few images representing recreational activities (rowing/kayaking, ballooning) that were occurring in the vicinity.
- Elevation images of the bridge and those which 'showcase' the lighting of the handrails are also popular images of the bridge.

2.4 Tourism Materials

2.4.1 Method

A variety of tourism materials were sampled to examine how the Commonwealth Avenue Bridge is represented to Canberra visitors. Tourism images provide an 'expert opinion' of places that may have a strong aesthetic appeal to the wider community and attract people to visit that locality. Such materials may also be designed to have a particular cultural resonance with selected audiences. Images seen prior to visiting are likely to shape visitors' expectations of the place. The review provides an understanding of how the place is portrayed to the general public in terms of offering an experience or as a destination.

The analysis does not claim to be a comprehensive assessment of all tourism materials but rather a brief look at selected representations of Commonwealth Avenue Bridge (images and text) contained in general tourism materials including brochures, tour guides, postcards, and online tourism sites.

The material reviewed included freely available printed material sourced from the National Capital Exhibition (operated by the NCA), and the Visitor Information Centre (operated by the ACT Government)—both are co-located at Regatta Point beside Lake Burley Griffin—as well as text and images from the NCA and Visit Canberra websites. The printed material from the National Capital Exhibition and the Visitor Information Centre was generally also available for free download from the corresponding websites.

2.4.2 Discussion of Results

Commonwealth Avenue Bridge is not included as an individual destination on the 'Attractions and Memorials' page of the NCA website;¹⁰ however, it is a key feature in the main banner image for this page, which is used across several pages of the website (as mentioned above—refer to Figure 2.7). The bridge also appears in the background or in photos on pages for other attractions including Captain Cook Memorial, Australians of the Year Walk, and Stirling Park.

The Lake Burley Griffin Self-Guided Walking Tour¹¹ (available for download and as a hardcopy brochure) is the only tour guide sampled which includes Commonwealth Avenue Bridge as a 'destination'—at Stop 33 on the tour:

Opened in November 1963, before the lake was filled, sewer mains were cleverly incorporated into the superstructure and the south-east decorative pylon is actually a vent. When London's Waterloo Bridge was demolished in 1936, some of the large, flat stones from it were donated to the Australian Government. These are now displayed under the bridge, on the northern shore.¹²

Visit Canberra Website

The main page of the Visit Canberra website¹³ features a short 'Welcome to Canberra' film, where a brief glimpse of the elevation of Commonwealth Avenue Bridge is visible in the background in the last shot as part of the Lake Burley Griffin landscape.

Similar to the image on the NCA website, the bridge is not included as an individual destination on the 'Attractions' page of the website, but appears very briefly in photos for other attractions including the Captain Cook Memorial, Australians of the Year Walk, and Lake Burley Griffin.

The Lake Burley Griffin Cycling Loops Tour¹⁴ (available for download and as a hardcopy brochure) does not identify Commonwealth Avenue Bridge as an attraction/landmark but does include it as part of the Western and Central Loop routes.

The Canberra Visitor Guide 2019 (available for download and as a hardcopy magazine) does not include Commonwealth Avenue Bridge as an attraction in the itinerary for exploring the 'Lakeside & Barton' Precinct of Canberra, but it is briefly visible in two images in the magazine, as part of the Lake Burley Griffin landscape.

Brochures and Guided Tours

In addition to the tours discussed above, the following brochures and guided tours were analysed for their representation of Commonwealth Avenue Bridge.

The Canberra Tracks brochure (produced by the ACT Government) includes ‘a series of self-drive routes that lead to many of Canberra’s historic places’. This brochure does not include Commonwealth Avenue Bridge as a destination, but it is briefly visible in two images of the broader Canberra and Lake Burley Griffin landscape when viewed from Mount Ainslie and Mount Pleasant lookouts.

The ACT Engineering Heritage Tour¹⁵ (produced by the ACT Government, in association with Engineers Australia and Canberra Tracks) does not individually include Commonwealth Avenue Bridge as a tour stop. The route begins at the National Capital Exhibition Centre, with the brochure briefly describing the engineering achievement of Lake Burley Griffin and locating the Engineers Australia plaque commemorating the heritage significance of the lake.

Canberra Guided Tours offers a paid guided tour called the Highlights of Canberra Tour.¹⁶ While it offers an itinerary around Lake Burley Griffin and the Parliamentary Zone, it does not feature Commonwealth Avenue Bridge specifically as a stop. A photograph of the void view between the spans of the bridge is included on the website.

Canberra Secrets (based on the book by Margaret Wade) offers tours including a Canberra Highlights Tour¹⁷ described as ‘Showcasing Canberra’s attractions and the city sites – and you’ll discover the “secrets” and quirky stories that unlock Canberra’s heart and soul. Canberra’s highest-rated guided tour.’ It does not feature Commonwealth Avenue Bridge specifically as a stop but does note that the tours are tailored to suit the interests of participants.

HerCanberra features an article of ‘15 of the Best Canberra Walks’¹⁸ which included the Bridge to Bridge – Lake Burley Griffin walk, described as:

the quintessential Canberra walk, and on any given morning, lunchtime, evening (or any time on the weekend), you’ll see hordes of walkers, runners, cyclists, skaters and even segway riders making their way from Bridge to Bridge.

2.4.3 Analysis Summary

The results of the analysis indicate that:

- Commonwealth Avenue Bridge is not generally marketed as a key attraction or destination for visitors to Canberra in online and printed tourism material. The bridge is predominantly portrayed in conjunction with imagery of Lake Burley Griffin, which is commonly used as a background to tourism activities in Canberra.
- Lake Burley Griffin and its associated features, including the bridges, National Carillon, Captain Cook Memorial Jet, foreshore areas and surrounding national institutions, were heavily featured in imagery and material aimed toward tourists. The lake is a landmark in itself—symbolic of the nation’s capital—and the bridge is a subsidiary but key component of experiencing the lake and its surrounds.
- Of the sampled tours and brochures, only the NCA’s self-guided tour of the lake, and the HerCanberra article, promoted the bridge as a stop or specific feature to be experienced. On other tour itineraries, it simply served as a route for travelling around the city and lake.

2.5 Online Survey

2.5.1 Method

The online survey was designed and promoted to capture the views of a broader geographic spread of people with potential special associations or interest in Commonwealth Avenue Bridge.

The survey comprised a series of questions (refer to Appendix B) designed to identify and understand the nature of respondents' associations with the Bridge, and the frequency and length of these associations. The survey offered the opportunity for respondents to explain why the bridge was important to them, what qualities the bridge held, what aspects they valued and why, through a series of structured and unstructured responses. The survey also allowed respondents to highlight their thoughts and feelings about the bridge, offer memories and recollections, as well as describe or submit an image of any favourite views. Through the survey, we wanted to understand the evocative response, feelings or sense of place the community held, contributing to the understanding of the bridge's social and aesthetic characteristics.

The survey was open for a period of four weeks, and was promoted through the NCA and ACT Government websites and social media platforms, as well as by contacting a number of organisations for distribution through their networks, including Australia ICOMOS, Australian Institute of Architects, National Trust (ACT), and Engineering Australia as well as to local institutions, recreational user groups, resident associations and individual members of the Canberra community. A full list of the organisations/individuals contacted is provided at Appendix A.

A flyer was developed to assist with promotion of the survey; it was handed out to pedestrians using the bridge (during one weekday lunchtime period) and offered to the public at the National Capital Exhibition and Visitor Information Centre at Regatta Point.

2.5.2 Discussion of Results

In total, 567 responses were received, with 519 (92%) respondents answering all mandatory questions (Q1–15), and the remaining 48 (9%) respondents dropping out after answering only a few questions. The analysed results are based on the 519 completed responses. Note that in the summaries below, the total number of responses may be greater than 519 where the question allowed for multiple answers.

A detailed summary of the survey results is provided at Appendix B.

Who Responded?

Questions 1 to 3 were demographic questions and confirm the distribution of the survey and establish the 'community' who have been involved in this assessment. Of the 519 respondents, 88% live in the ACT, with the remaining 12% living in the Canberra region (4%), elsewhere in Australia (8%), or overseas (one response). The highest number of responses were from those living in Canberra Central with 41% of the total responses. The age of respondents was relatively evenly spread with the majority of respondents aged between 25–74 years, with the least represented age bracket being 12–17 years. The same was the case for gender with females and males making up 47% and 51%, respectively.

Table 2.4 Associated Communities.

Answer Choices	Responses	
Canberra Central	41.04%	213
Belconnen	14.26%	74

Answer Choices	Responses	
Elsewhere in the Australian Capital Territory	10.02%	52
Woden Valley	9.63%	50
Tuggeranong	8.48%	44
Elsewhere in Australia	7.90%	41
Weston Creek	4.43%	23
Canberra Region (eg Queanbeyan, Murrumbateman)	4.05%	21
Overseas	0.19%	1
Total Answered		519

Nature of Association

Respondents were asked to describe their **primary/main** association with Commonwealth Avenue Bridge. They were only allowed to select one option. Respondents' primary association was travel (77%), followed by undertaking the Bridge to Bridge circuit (10%). The remaining associations provided accounted for 3% or less of the total number of respondents.

Table 2.5 Primary/Main Association with Commonwealth Avenue Bridge.

Answer Choices	Responses	
I use Commonwealth Avenue Bridge to travel around Canberra	77.26%	401
I am a member of a recreational group that uses the bridge and/or Lake Burley Griffin	3.66%	19
I do/or did the Bridge to Bridge circuit around Lake Burley Griffin	9.63%	50
I was involved in the design or construction of Commonwealth Avenue Bridge	0.19%	1
I am/or was involved in the management and/or maintenance of Commonwealth Avenue Bridge	0.39%	2
I use Commonwealth Avenue Bridge as a subject for photography or other artistic endeavours	1.93%	10
I am/or was a visitor to Canberra and travelled over Commonwealth Avenue Bridge	2.31%	12
I am/or was a visitor to Canberra and visited Commonwealth Avenue Bridge	0.96%	5
I use the bridge as a viewing platform (eg to view the water jet, Parliament House, Balloon Aloft, boating events)	0.77%	4
I have a strong interest in bridges and their design/engineering	2.70%	14
I do not use or have any association with Commonwealth Avenue Bridge	0.19%	1
Total Answered		519

Respondents were able to select **additional associations** they had with the bridge, with the Bridge to Bridge circuit of the lake being the highest response with 47%, followed by using the bridge to travel around Canberra with 39% of responses, and using the bridge as a viewing platform with 28% of the responses.

Forty-five respondents (9%) chose 'Other' and were asked to specify their association. Ten respondents identified that they had an early association with the bridge, witnessing its construction and/or opening, 13 respondents identified that they have a strong interest in the history and/or heritage of Canberra, and eight identified that the bridge formed a backdrop to their daily life.

Just over half of the respondents (52%) identified having an association with Commonwealth Avenue Bridge of 31 years or longer. Respondents having an association of between 11–30 years was lower (31%), while the remaining respondents (17%) said they have been using and/or visiting the bridge for 10 years or less.

Table 2.6 Length of Association.

Answer Choices	Responses	
0–10 years	17.18%	89
11–30 years	31.27%	162
31 years and over	51.54%	267
Total Answered		518

In terms of frequency, 75% of respondents said that they had used and/or visited Commonwealth Avenue Bridge on either a weekly or daily basis during the past 12-month period. Car was identified as the most popular method of using and/or visiting the bridge, with 64% of respondents selecting this response. Bike was the second most popular method with 19% of respondents selecting this response.

Respondents were asked to identify if they were a member of a design, history or heritage interest group, such as Australia ICOMOS, Lake Burley Griffin Guardians etc; 71% of respondents identified that they were not a member. The National Trust of Australia was the most widely represented organisation, accounting for 12% of respondents.

Values

Question 10 posed a series of statements about Commonwealth Avenue Bridge and respondents were offered six possible responses: strongly disagree, disagree, neither agree nor disagree, agree, strongly agree or no opinion/don't know. These included a range of positive and neutral statements that sought to understand the usefulness of the bridge, its potential social connections and aesthetic qualities.

Ranked by the combined percentage of 'strongly agree' and 'agree' responses, the five most strongly held values are:

- Commonwealth Avenue Bridge is part of my transport route (82%);
- Commonwealth Avenue Bridge is a key part of Canberra's design and planning (82%);
- Commonwealth Avenue Bridge offers a great vantage point to appreciate the lake, special events and other elements of Canberra's urban landscape (81%);
- Commonwealth Avenue Bridge is important for undertaking recreation and leisure activities (79%); and
- Commonwealth Avenue Bridge has many attractive, interesting and surprising views (78%).

Interestingly, the usefulness of the bridge, its contribution to Canberra's design and planning and use as a vantage point were all equally and highly supported.

Five of the 10 values statements were selected and analysed in terms of length of association, membership and the six most popular primary/main associations (as answered in Question 4). Three 'positive' values statements were selected and included: 'Commonwealth Avenue Bridge is an important

landmark', 'Commonwealth Avenue Bridge has many attractive, interesting and surprising views' and 'Commonwealth Avenue Bridge is a symbol of Canberra'. Two neutral statements, including 'Commonwealth Avenue Bridge is no different to any other bridge' and 'Commonwealth Avenue Bridge is outdated', were also selected for analysis.

The analysis is shown in Table 2.7, with the following main information disseminated from that data:

- Respondents with an association of 31 years or more were generally consistent in their response on the five values statements, with the majority agreeing with the positive values statements or disagreeing with the negative/neutral statements. In contrast, respondents with a shorter period of association demonstrated more ambiguity with a high proportion selecting 'neither agree nor disagree'. This suggests that people who have had a longer association with the bridge feel more strongly about it.
- Respondents who did not identify as a member of a professional heritage/design organisation were generally consistent in their responses, with the majority agreeing with the positive values statements and disagreeing with the neutral statements.
- Respondents who identified 'travel around Canberra' as their primary/main association were generally consistent in their responses, with the majority agreeing that the bridge is an important Canberra landmark, has many attractive, interesting and surprising views and is a symbol of Canberra. This suggests that the value of the bridge for those respondents who primarily use the bridge as a utilitarian object extends well beyond utility value.
- Of the respondents who identified that they had done or do the 'Bridge to Bridge circuit' as their primary/main association with Commonwealth Avenue Bridge, 74% 'agreed' or 'strongly agreed' that Commonwealth Avenue Bridge has many attractive, interesting and surprising views. Over 50% also 'agreed' or 'strongly agreed' that the bridge is an important Canberra landmark and is a symbol of Canberra. Over 50% of respondents 'disagreed' or 'strongly disagreed' that the bridge is no different to any other bridge and outdated.
- Respondents who identified being a 'member of a recreational group' as their primary/main association with Commonwealth Avenue Bridge were generally consistent in their answers to the five values statements, with the majority agreeing with the positive values statements or disagreeing with the neutral statements.
- Of the respondents who identified that they 'have a strong interest in bridges and their design/engineering' as their primary/main association, 100% 'strongly disagreed' or 'disagreed' that Commonwealth Avenue Bridge is no different to any other bridge. Further, 71% 'strongly disagreed' that the bridge is outdated and 79% 'strongly agreed' that the bridge has many attractive, interesting and surprising views.
- Respondents who identified their primary/main association with Commonwealth Avenue Bridge is as a 'visitor to Canberra and travelled over' the bridge were more inconsistent in their responses with a higher proportion of respondents answering with 'neither agree nor disagree' or 'no opinion/I don't know'.
- Of the respondents who identified that they use Commonwealth Avenue Bridge 'as a subject for photography or other artistic endeavours' as their primary/main association, 100% 'strongly agreed' that Commonwealth Avenue Bridge is a landmark. They were generally consistent in their

answers to the four other values statements, with the majority agreeing with the positive values statements or disagreeing with the neutral statements.

Table 2.7 Analysis of Value Statements (Orange Headings) By Length of Association, Membership and Primary/Main Association.

Analysis	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	No opinion/ Don't know	Total
Commonwealth Avenue Bridge is an important Canberra landmark							
Length of association							
0–10 years	7 7.87%	9 10.11%	18 20.22%	34 38.2%	20 22.00%	1 1.12%	89 100%
11–30 years	12 7.4%	20 12.35%	21 12.96%	46 28.39%	60 37.00%	3 1.85%	162 100%
31 years and over	7 2.62%	16 5.99%	26 9.74%	54 20.22%	159 59.55%	5 1.87%	267 100%
Membership							
Non-members	21 5.69%	37 10.03%	52 14.09%	114 30.89%	141 38.21%	4 1.08%	369 100%
Question 4: Primary/Main Association with Commonwealth Avenue Bridge							
Travel	19 4.74%	38 9.48%	56 13.97%	104 25.94%	180 44.89%	4 1.00%	401 100%
Bridge to Bridge	4 8.00%	3 6.00%	5 10.00%	17 34.00%	20 40.00%	1 2.00%	50 100%
Member of recreational group	2 10.53%	2 10.53%	1 5.26%	5 26.32%	8 42.11%	1 5.26%	19 100%
Strong interest in bridge design/engineering	0 0.00%	1 7.14%	0 0.00%	2 14.29%	9 64.29%	2 14.29%	14 100%
I am/or was a visitor and travelled over bridge	1 8.33%	1 8.33%	2 16.67%	4 33.33%	3 25.00%	1 8.33%	12 100%
Photographic/artistic endeavours	0 0.00%	0 0.00%	0 0.00%	0 0.00%	10 100%	0 0.00%	10 100%
Commonwealth Avenue Bridge is no different to any other bridge							
Length of association							
0–10 years	10 11.24%	29 32.58%	19 21.35%	19 21.35%	10 11.24%	2 2.25%	89 100%
11–30 years	36 24.07%	47 29.01%	19 11.73%	39 24.07%	19 11.73%	2 1.23%	162 100%
31 years and over	88 32.96%	87 32.58%	45 16.85%	28 10.49%	17 6.37%	2 0.75%	267 100%

Analysis	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	No opinion/ Don't know	Total
Membership							
Non-members	70 18.97%	107 29%	68 18.43%	77 20.87%	42 11.38%	5 1.36%	369 100%

Question 4: Primary/Main Association with Commonwealth Avenue Bridge

Travel	102 25.44%	123 30.67%	62 15.46%	71 17.71%	40 9.98%	3 0.75%	401 100%
Bridge to Bridge	9 18.00%	17 34.00%	9 18.00%	9 18.00%	5 10.00%	1 2.00%	50 100%
Member of recreational group	5 26.32%	5 26.32%	5 26.32%	3 15.79%	1 5.26%	0 0.00%	19 100%
Strong interest in bridge design/engineering	8 57.14%	5 35.71%	0 0.00%	0 0.00%	0 0.00%	1 7.14%	14 100%
I am/or was a visitor and travelled over bridge	2 16.67%	4 33.33%	5 41.67%	0 0.00%	0 0.00%	1 8.33%	12 100%
Photographic/artistic endeavours	3 30.00%	5 50.00%	1 10.00%	1 10.00%	0 0.00%	0 0.00%	10 100%

Commonwealth Avenue Bridge has many attractive, interesting and surprising views

Length of association

0–10 years	1 1.12%	1 1.12%	17 19.10%	42 47.19%	24 26.97%	4 4.49%	89 100%
11–30 years	4 2.47%	9 5.56%	23 14.20%	77 47.53%	46 28.40%	3 1.85%	162 100%
31 years and over	2 0.75%	5 1.87%	43 16.10%	73 27.34%	140 52.43%	4 1.50%	267 100%

Membership

Non-members	6 1.63%	13 3.52%	71 19.24%	160 43.36%	115 31.17%	4 1.08%	369 100%
-------------	------------	-------------	--------------	---------------	---------------	------------	-------------

Question 4: Primary/Main Association with Commonwealth Avenue Bridge

Travel	5 1.25%	10 2.49%	69 17.21%	156 38.90%	154 38.40%	7 1.75%	401 100%
Bridge to Bridge	2 4.00%	4 8.00%	7 14.00%	17 34.00%	20 40.00%	0 0.00%	50 100%
Member of recreational group	0 0.00%	0 0.00%	2 10.53%	10 52.63%	6 31.58%	1 5.26%	19 100%
Strong interest in bridge design/engineering	0 0.00%	0 0.00%	2 14.29%	0 0.00%	11 78.57%	1 7.14%	14 100%
I am/or was a visitor and travelled over bridge	0 0.00%	1 8.33%	2 16.67%	6 50.00%	1 8.33%	2 16.67%	12 100%

Analysis	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	No opinion/ Don't know	Total
Photographic/artistic endeavours	0 0.00%	0 0.00%	0 0.00%	2 20.00%	8 80.00%	0 0.00%	10 100%

Commonwealth Avenue Bridge is a symbol of Canberra

Length of association

0–10 years	6 6.74%	20 22.47%	24 26.97%	21 23.60%	15 16.85%	3 3.37%	89 100%
11–30 years	17 10.49%	21 12.96%	28 17.28%	42 25.93%	49 30.25%	5 3.09%	162 100%
31 years and over	12 4.49%	22 8.24%	41 15.36%	55 20.60%	133 49.81%	4 1.50%	267 100%

Membership

Non-members	31 8.40%	50 13.55%	73 19.78%	88 23.85%	119 32.25%	8 2.17%	369 100%
-------------	-------------	--------------	--------------	--------------	---------------	------------	-------------

Question 4: Primary/Main Association with Commonwealth Avenue Bridge

Travel	28 6.98%	55 13.72%	76 18.95%	91 22.69%	145 36.16%	6 1.50%	401 100%
Bridge to Bridge	6 12.00%	2 4.00%	8 16.00%	16 32.00%	17 34.00%	1 2.00%	50 100%
Member of recreational group	0 0.00%	3 15.79%	4 21.05%	4 21.05%	7 36.84%	1 5.26%	19 100%
Strong interest in bridge design/engineering	0 0.00%	1 7.14%	2 14.29%	0 0.00%	9 64.29%	2 14.29%	14 100%
I am/or was a visitor and travelled over bridge	1 8.33%	2 16.67%	3 25.00%	0 0.00%	4 33.33%	2 16.67%	12 100%
Photographic/artistic endeavours	0 0.00%	0 0.00%	0 0.00%	3 30.00%	7 70.00%	0 0.00%	10 100%

Commonwealth Avenue Bridge is outdated

Length of association

0–10 years	11 12.36%	23 25.84%	26 29.21%	11 12.36%	16 17.98%	2 2.25%	89 100%
11–30 years	43 26.54%	32 19.75%	34 20.99%	27 16.67%	21 12.96%	5 3.09%	162 100%
31 years and over	140 52.43%	45 16.85%	38 14.23%	26 9.74%	15 5.61%	3 1.12%	267 100%

Membership

Non-members	102 27.64%	70 18.97%	88 23.85%	56 15.18%	45 12.20%	8 2.17%	369 100%
-------------	---------------	--------------	--------------	--------------	--------------	------------	-------------

Analysis	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	No opinion/ Don't know	Total
Question 4: Primary/Main Association with Commonwealth Avenue Bridge							
Travel	141 35.16%	74 18.45%	78 19.45%	55 13.72%	48 11.97%	5 1.25%	401 100%
Bridge to Bridge	17 34.00%	11 22.00%	11 22.00%	6 12.00%	4 8.00%	1 2.00%	50 100%
Member of recreational group	8 42.11%	5 26.32%	4 21.05%	2 10.53%	0 0.00%	0 0.00%	19 100%
Strong interest in bridge design/engineering	10 71.43%	1 7.14%	2 14.29%	0 0.00%	0 0.00%	1 7.14%	14 100%
I am/or was a visitor and travelled over bridge	3 25.00%	5 41.67%	1 8.33%	0 0.00%	0 0.00%	3 25.00%	12 100%
Photographic/artistic endeavours	8 80.00%	1 10.00%	1 10.00%	0 0.00%	0 0.00%	0 0.00%	10 100%

The next question asked respondents to identify what 'aspects or qualities' of Commonwealth Avenue Bridge they like, with respondents allowed to select more than one response. The most popular choice was 'Connection to Lake Burley Griffin' (72%), with 'Views to and from the bridge' and 'Symmetry with Kings Avenue Bridge' the second and third most popular choices. New aspects and/or qualities provided by respondents under 'Other' included: bike access; links north and south Canberra; important element of route to Parliament House; functionality; duality; lighting; uniqueness; sense of space; elegant, modern and simple design; visually obtrusive; personal memories and experiences.

Table 2.8 Aspects or Qualities of Commonwealth Avenue Bridge.

Answer Choices	Responses	
Connection to Lake Burley Griffin	72.25%	375
Views to and from the bridge	69.75%	362
Symmetry with Kings Avenue Bridge	67.05%	348
Pedestrian access	65.70%	341
Architectural design	45.47%	236
Engineering	26.20%	136
Waterloo Bridge stones	21.19%	110
Other (please specify)	16.18%	84
There are no aspects or qualities of the bridge that I like	4.43%	23
Total Answered		519

Respondents were asked to select from a list of words/phrases that apply to Commonwealth Avenue Bridge. The most popular choice was 'Functional' (83%), with 'Elegant' and 'Symbolic' the second and third most popular choices. The least popular answers were 'Spiritual' and 'Unattractive'. Additional words or phrases provided by respondents under 'Other' included: crowded and outdated; missed

opportunity; suitable; graceful; simple; spacious; restrained; historic and part of Canberra; beautiful; familiar and links the people to the National Parliament.

Table 2.9 Words or Phrases that Apply to Commonwealth Avenue Bridge.

Answer Choices	Responses	
Functional	81.70%	424
Elegant	45.86%	238
Symbolic	38.73%	201
Iconic	35.84%	186
Enduring	35.07%	182
Utilitarian	30.06%	156
Innovative	13.68%	71
Grand	11.18%	58
Boring	9.63%	50
Other (please specify)	8.86%	46
Unattractive	7.71%	40
Spiritual	4.24%	22
Total Answered		519

To try and better understand any potential social values, respondents were asked to select which of three statements best applies to their feelings about Commonwealth Avenue Bridge. Respondents were only able to select one statement. A total of 76% of respondents answered that they feel '**some connection**' or '**a deep sense of ownership and/or responsibility**' towards Commonwealth Avenue Bridge', with 24% answering that they feel '**no connection**'.

Respondents were also asked to identify if they have a favourite view of Commonwealth Avenue Bridge, with the majority of respondents (61%) answering 'no'. Based on previous responses, in particular to questions 10 and 12, this response suggests that although views are considered to be an important element of the bridge the majority of respondents do not necessarily have a 'favourite' view of the bridge.

Those who identified that they do have a favourite view were asked to describe this view. Of the 39% who answered 'yes', favourite views were more likely to be views looking toward the bridge (61%) as compared to views from the bridge (48%). The void view, looking from beneath the bridge north or south through the spaces was mentioned on 43 occasions (21%) in respondent's description of their favourite view, with elevation views (looking from the east or west toward the bridge) mentioned 55 times (27%).

Respondents who had identified that Commonwealth Avenue Bridge has been the subject of photography or other artistic endeavours were invited to upload an image. Thirteen images were submitted, with views both to and from the bridge represented.

Respondents were given the opportunity through a series of three open-ended responses to describe in their own words additional information that would contribute to understanding the potential aesthetic and social values.

To the question 'Why is Commonwealth Avenue Bridge important to you', respondents offered a wide range of reasons, which have been analysed and encompassed the following main ideas (in no particular order):

- Function and amenity—Commonwealth Avenue Bridge forms an essential element of the respondent's physical movement around Canberra for both work and recreation;
- Views and the wider Canberra landscape—Commonwealth Avenue Bridge offers a vantage point from which to view the surrounding Canberra landscape and is integral to views of Lake Burley Griffin;
- Design and planning—elegant and simple were words commonly used to describe Commonwealth Avenue Bridge, with respondents also expressing appreciation of its symmetry and subtle design that ensures it does not dominate the landscape;
- Place-making and sense of identity—Commonwealth Avenue Bridge forms an integral aspect of Canberra's history and the personal history of many respondents, with many expressing that the bridge contributes strongly to what makes Canberra uniquely Canberra;
- Symbolic link—Commonwealth Avenue Bridge is an important connecting element between north and south Canberra, to Lake Burley Griffin and between the city and Parliament House; and
- Landmark qualities—Commonwealth Avenue Bridge was described as iconic and memorable.

Respondents were asked to describe any 'events, stories or memories' they have of Commonwealth Avenue Bridge. Respondents offered a range of experiences which related to the following (in no particular order): recreation and leisure; public events; driving; accidents/incidents; wind; nature; Captain Cook Memorial Jet; and time with friends and family.

The final question asked for any additional comments, with many responses making reference to the current ACT Light Rail City to Woden project and expressing their views on what they would like to see occur. In terms of understanding the aesthetic and social values of Commonwealth Avenue Bridge, the responses to this question did not add significantly to the data.

2.5.3 Analysis Summary

Overall, the results from the online survey suggest:

- There is a high level of interest in Commonwealth Avenue Bridge and its future as indicated by the high survey response rate.
- There is a strong appreciation of Commonwealth Avenue Bridge for its use and accessibility as part of Canberra's road infrastructure and for undertaking recreation and leisure activities, at a personal level and for larger scale events.
- Although the majority of the respondents identified 'travel around Canberra' as their primary/main association with Commonwealth Avenue Bridge, respondents overwhelmingly identified aesthetic and social qualities of the bridge as being important to them, indicating that Commonwealth Avenue Bridge's values extend beyond its utility value.
- The majority of respondents, regardless of primary association or professional membership affiliation, demonstrated that they value Commonwealth Avenue Bridge beyond its utility value.

- Respondents who have a longer association within Commonwealth Avenue Bridge (31 years or more) generally feel more strongly about the bridge compared with respondents with a shorter association.
- A strong appreciation for the relationship between Commonwealth Avenue Bridge and the wider landscape is evident, particularly as a great vantage point to appreciate the lake, special events and other elements of Canberra's urban landscape.
- A wide range of the views to and from the bridge are considered significant, with a strong appreciation for views towards the bridge, including views of the bridge in elevation and void views.
- Respondents demonstrated a strong attachment to Commonwealth Avenue Bridge as it represents aspects of Canberra's past and contributes to a sense of identity.
- There is broad recognition of the contribution that Commonwealth Avenue Bridge makes to Canberra's design and planning, with particular appreciation of its elegant, simple and subtle design and the symmetry with Kings Avenue Bridge.
- There is a strong appreciation for its landmark qualities and symbolic meanings such as an important linking element between north and south, to the lake and to Parliament House.

2.6 Focus Groups

2.6.1 Method

Focus groups were held with invited members of the community to provide an opportunity for further in-depth discussions about Commonwealth Avenue Bridge. The focus groups comprised small, facilitated discussions to assist in understanding the views of local Canberra people who have direct and potentially long-standing, continuing or special associations with the bridge.

- **Focus Group 1:** Heritage practitioners, professionals, and heritage-related interest groups. This group comprised 10 participants with interests linked to a range of community and heritage organisations, including National Trust of Australia, Australian Institute of Architects, Lake Burley Griffin Guardians, Engineers Australia/Engineering Heritage Australia, Walter Burley Griffin Society, ICOMOS, and Australian Museums and Galleries Association. All participants were current residents of Canberra.
- **Focus Group 2:** Recreational users, photographers, and others. This group comprised seven participants. It included people with connections to the bridge, some as users of the place and its surroundings for recreational activities and/or for photographic and/or other artistic endeavours, as well as an association through being residents of Canberra.

Invitations were sent to over 90 people, with participants sourced through local design, history or heritage interest groups and from survey respondents who indicated they would be interested in being involved in further discussions about the bridge.

As mentioned in Section 1.0, limitations on the availability of participants reduced the number of workshops originally intended to be held; however, those who attended provided valuable inputs and insight. While the numbers were small, the range in individual perspectives, ages, and gender were

broad. There was a lack of cultural diversity and there was no Aboriginal representation amongst the participants.

2.6.2 Discussion of Results

The two workshops are discussed below as a combined summary, as the groups revealed a similar range of responses. Not unexpectedly, Focus Group 1 members used the technical language associated with heritage practice more than did Focus Group 2, but both groups expressed a range of emotional, experiential, and associational responses to Commonwealth Avenue Bridge, as well as recognising diverse functional uses and symbolic associations.

A detailed summary of the two focus groups is provided at Appendix C.

Participants were asked to introduce themselves and expand on their association with the bridge, including the nature and length of the connection. As a group they were asked to provide key words or short phrases which sum up their response to Commonwealth Avenue Bridge, what they love most about the bridge, what imagery/feelings/memories it evokes, and to discuss favourite views.

Length of Association

The length of association with the bridge (by residence in Canberra) was mixed across the participants and groups, with some having lived here continuously for long periods (including their whole lives) while others having lived intermittently in Canberra over a long period. Most participants in Group 1 were long-time residents of Canberra, while Group 2 participants varied.

Key Aspects and Qualities

When asked to provide a 'word or short phrase to sum up your response to the bridge', the participants provided a wide range of descriptive words and key associations, which have been grouped and encompass the following (in no particular order):

- Aesthetic terms: elegant, graceful, icon, beauty, symmetry, unimposing, unobtrusive.
- Function, access, major arterial/transport link.
- Griffin Plan, Parliamentary/National Triangle, geometry.
- Architectural expression, dual arches, modernist, mid-century streamlined.
- Symmetry, pairing, twinning (including balance with Kings Avenue Bridge).
- Symbolism: democracy, union, 'Commonwealth'.
- Individual and collective memory, personal experiences, events, recollection.
- Landscape setting, Modernist landscape of Lake Burley Griffin.
- Recreation (cycling, walking, jogging, sailing, photography).
- Place-making, sense of identity, knowing 'I'm home'.
- Linkages, unity, north-south, inclusivity (unifies parts of Lake Burley Griffin, brings people together).

- Historic associations, early Canberra.
- Views.

Feelings and Memories

The participants were asked 'What do you most love about Commonwealth Avenue Bridge? What image comes to mind? What feelings and memories does it evoke?', resulting in many emotional associations and individual and personal memories of events. Important views were identified by some participants at this point but are included in the relevant discussion below.

The responses included:

- Emotional associations: exhilaration, anticipation, frustration, freedom.
- Sensory experience linked to architecture, seasons, weather, views, recreational activities.
- Travelling, sense of movement, looking toward a destination, arrival to nation's capital.
- Respect, appreciation of architects and engineers.
- Sense of community, camaraderie, unity, social (events, protests).
- Personal memories, events (Floriade, Skyfire), attending protests, demonstrations.
- Views to/from the bridge.
- Events, ceremony, processional route, dignitaries, comparison to Kings Avenue Bridge.
- Film, television, and literature references.
- Historical connections, opening, links to UK with Waterloo Stones.
- Negatives: can be very windy (for cyclists especially), narrow bike path shared with pedestrians including tourists, temporary rails on west side, uneven surface materials.

Views

The participants were asked to identify their favourite view of Commonwealth Avenue Bridge, with a wide range of responses identifying a number of views both to and from the bridge as being significant. The responses included (grouped where related):

- Views from the bridge to surrounding landscape features (including near and far distances): to the lake, Captain Cook Memorial Jet, Brindabella Ranges.
- Views to the bridge from lookouts and vantage points including Mount Ainslie (highlighting the plan for Canberra, and significance of the bridge as part of the triangle), Black Mountain, Capital Hill, Regatta Point, City Hill.
- Night-time views of the bridge, noted for the bridge's integrated lighting.
- Open views through and under the bridge, visibility.
- The void view between the spans at water level.

- Views from the National Museum of Australia (NMA) offered a 'fantastic view' of the bridge however not looking toward the NMA.
- Westerly views from Henry Rolland Park, and glimpses from Parkes Way.
- Views are 'tied to the technical achievement of the bridge, its uniformity, colour and tone control through the use of concrete'.
- The bridge as part of the landscape aesthetic, integrated into the views, part of a panorama.
- Views looking out from the centre/highest part of the bridge, toward landmarks, surrounding institutions, witnessing changing seasons, trees.
- The different types of views as experienced while driving, cycling and walking.

2.6.3 Analysis Summary

The results of the analysis indicate:

- Differing degrees of visceral and sensory responses to Commonwealth Avenue Bridge.
- An appreciation of the technical, architectural and design qualities of Commonwealth Avenue Bridge, both in its own right and in relation to its landscape setting—through its symmetry, scale, form, materials, and its sympathetic connection with the Griffin Plan, the Canberra 'triangle', and its relationship to and integration with Lake Burley Griffin.
- An emotional response which extends beyond the utility and function of the bridge, as demonstrated through participants' feelings, memories and associations.
- An overwhelming positive outlook towards the bridge, though there are some criticisms (eg intermittent congestion of walkways for pedestrians and cyclists; visual intrusion of the NMA).
- A wide range of the views to and from the bridge are considered significant, with one participant noting 'there is not any view to be disliked', and another stating 'maintaining the vistas of the bridge is essential'.
- Strong support for the assertion that Commonwealth Avenue Bridge has aesthetic value on the basis of: aesthetic distinctiveness, landmark and iconic qualities, artistic excellence, and evocative and symbolic qualities. In addition, the bridge is notable for its intactness and well-maintained condition.
- Commonwealth Avenue Bridge has a high degree of social value to the Canberra community arising from length of association (1963 to the current day) and the demonstrated widespread extent, degree and diversity of community association. Those associations are connected with the bridge's functional uses (transport and recreation), and symbolic meanings.

2.7 Targeted Interviews

2.7.1 Method

Targeted face-to-face interviews were conducted with people who had a direct association with Commonwealth Avenue Bridge through their experience in its construction or through technical skills/interests. These participants contribute to the community group ‘creators and carers’.

All three are members of Engineers Australia/Engineering Heritage Australia and have a close association with the bridge, either through direct involvement in its original design and construction, or have a strong interest in bridge engineering and design.

Interviews were conducted with the following three participants as a joint discussion:

- Keith Baker—Engineer with post-graduate qualifications in cultural heritage management, former employee of Commonwealth Department of Works, author of *A Century of Canberra Engineering*, recipient of the John Monash Medal (2016) for ‘outstanding contribution in raising awareness and conservation of the ACT’s heritage, and providing national leadership in the promotion of engineering heritage’ and instrumental in preparing the Lake Burley Griffin National Engineering Landmark nomination.
- Graeme Kelleher, OA—Engineer and former employee of Commonwealth Department of Works, resident engineer for the Commonwealth Avenue Bridge and based on site during its construction, as well as Googong and Corin Dams, recipient of the Monash Medal (1987), and a Churchill Fellow.
- Frank Wilkinson—Engineer and former employee of Commonwealth Department of Works (after the construction of bridge), chief engineer of maritime work, and head of civil engineering for the Commonwealth, with qualifications in concrete structures and coastal engineering.

2.7.2 Discussion of Results

The discussion was facilitated to further draw on the views and experiences of the engineers who may have a different appreciation of Commonwealth Avenue Bridge, compared to other ‘target’ communities. All three participants undertook the online survey prior, and questions were asked to expand on what they considered to be important aspects of the bridge.

Engineering Achievement

The engineering achievement of the bridge was discussed, outlining its technical and architectural qualities, including its construction methods, being designed well ahead of its time, and intended to last a long time. These attributes focused more on technical/creative achievement values (CHL criterion f) than aesthetic or social values, but relate strongly to the skills and experience of the participants.

Key points raised included:

- The bridge demonstrates the engineering and architectural design and innovation of the time, and is a very good example. It was thought to be the ‘longest continuously pre-stressed concrete box girder bridge in the world,’¹⁹ noting that:

normally long concrete structures you’re trying to keep the concrete in compression, and they kept it in compression because of the post tensioning but there are other and cheaper ways of doing that sort of thing now. So it’s a very good example of the design at that stage.

- The original design intent of the bridge allowed for future expansion to accommodate increased traffic/transport (ie through an additional central bridge span).
- It is important to understand the bridge 'as constructed', not just its original design intent. It is recommended that an engineering study of the existing bridge be prepared, which would also inform creative/technical criteria as part of any future broader heritage assessment.
- Changes were made during the construction, including to address technical, safety and loading issues, with modifications to the construction method, installation of guardrails etc. No changes were considered to diminish the value of the bridge.
- Strongly against any proposal for complete demolition/replacement of the bridge. This was considered unnecessary, difficult (from an engineering perspective), costly, and wasteful.
- Architectural features including that the bridge carries sewerage, storm water and fresh water, and how they were designed to be integrated and not visible, was considered an important 'architectural social feature'.

Key Aspects and Qualities

When asked about the aesthetic qualities of the bridge, the participants noted key architectural features, as well as making comparisons with Kings Avenue Bridge.

Key points raised:

- The bridge has aesthetic values, with significant aspects and qualities including:
 - [the bridge] 'being part of the whole of the lake, and the surroundings for it... it's an integral part of the aesthetics of the whole and I think we saw at the nomination of the lake that the bridge, and the lake, tied two sides of Canberra together so I guess that's more, not so much an aesthetic is maybe an intangible but it's just it's, I find it a beautiful, attractive bridge';
 - 'it's designed to be compatible with the topography, so that it looks like it doesn't show up laterally, and that it blends into the surrounding landscape';
 - the vertical elements, such as the pylons (which are also functional), and the connection with the Captain Cook Memorial Jet. The vertical components were considered to 'add to the sense of it being a very significant bridge, more so than the Kings Avenue Bridge because it has those vertical elements as well';
 - it did not dominate the landscape and allowed the views through the bridge to the surroundings; and
 - architectural features such as its profile, use of materials, colour of the concrete, integrated lighting in the handrails.
- To understand which components of Commonwealth Avenue Bridge are significant, a discussion was held about a potential new or additional bridge, and the elements which should be designed to be sympathetic. This included the low-profile design, and the piers being the same shape and design. It could be in a new material (ie not concrete) but should have the same profile. The continued ability to appreciate the existing bridge was a key concern.

- Commonwealth Avenue Bridge was considered more iconic and more architecturally significant than Kings Avenue Bridge, and aesthetically is more visually appealing and dominant than Kings Avenue Bridge. 'Kings Avenue Bridge is much simpler with pre-cast beams etc. but it doesn't have the architectural attraction, in my view, that Commonwealth Avenue Bridge has.'
- The relationship to Kings Avenue Bridge was important—that they are significant together, and when viewed from a distance they 'define the Parliamentary Triangle', so that 'if you had a different sort of bridge there, you wouldn't get that effect of defining the triangle much in any way. If you had a suspension bridge there for example, there wouldn't be that apparent symmetry.'

Views

Questions were asked to understand if any views were considered important and why or why not.

Key points raised included:

- The 'void' view between the spans, from the lower level looking south through to Parliament House, was not considered highly significant. It was noted that the 'general public wouldn't see that view' and is 'seen very rarely by people'. It was noted that images of the view are frequently seen on TV and in books, including Keith Baker's book. Keith Baker stated that he had received reactions to the image in the book as being 'boring now' and 'over used'.
- Views toward the bridge were considered more important, as the views out from the bridge don't change. The views would be the same regardless of the bridge or its design. It was also noted that when driving across the bridge, the restricted laneways and need to concentrate on driving limit the ability to enjoy views out.
- View of the profile when looking toward the bridge from the lake.
- View from the north looking along the bridge toward Parliament House is a key view, as well as the view from Black Mountain.
- Piers constructed to support any new bridge (if proposed) were acknowledged as being additional visible structures when observing the bridge in elevation; however, they were not considered to adversely affect the views through/underneath. It was important that any new piers be the same shape, design and colour as existing, and in the same locations, to ensure the profile is retained and avoid it appearing a 'mess' underneath.

Memories and Thoughts

Additional commentary from the participants included discussion of the bridge's utility/amenity as well as significant memories or events they associated with the bridge.

Key points raised included:

- The bridge is a central feature of physical communication across Canberra, an important travel link from north to south.
- The bridge has value in its amenity and function as a bridge and is really important to the Canberra community. The nature of the north/south divide was raised: 'Some of my friends on the north side think that crossing the bridge to the south side is just going to another country.'
- Personal memories such as walking across the bridge on the first 'Sorry Day' (and the freezing weather); the nearby Birdman event at Regatta Point; and working on its construction, including

inspecting the repair of the ceiling of the wells on the sewerage pipeline when no other workers would do it.

- Prime Minister Robert Menzies' quote that the bridge is the 'finest building in the capital' at its official opening.

2.7.3 Analysis Summary

The results of the analysis indicate:

- a strong appreciation of Commonwealth Avenue Bridge for its technical, engineering and architectural design, and for its innovative construction methods for the time;
- a strong appreciation of the bridge for its aesthetic values, through its low profile and compatibility with the topography, so that it appears as an integral part of the surrounding landscape without dominating it;
- an appreciation of key attributes and qualities including integrated elements (services, lighting), and its architectural features such as its vertical elements, low-profile design, use of materials, colour of the concrete etc;
- the significant views are those looking toward the bridge, particularly the profile in elevation, and looking south along the bridge toward Parliament House;
- that Commonwealth Avenue Bridge is more iconic and more architecturally significant than Kings Avenue Bridge; however, the association between the two is important, and the balance and symmetry of the two bridges defining the edge of the Parliamentary Triangle is significant; and
- a demonstrated attachment to the bridge, with strong opinions against any proposed demolition (particularly to accommodate light rail), noting that a new bridge could be sympathetically designed down the centre of the spans, as originally intended in the design.

2.8 Conclusion

This section provides the data gathered through a combination of engagement methods, including review of previous heritage assessments, online visual representations, and tourism materials, an online survey, focus group workshops and targeted interviews. It also provides an analysis and summary of the data.

In Section 3.0 of this report, further analysis of this data is undertaken with the primary thoughts and ideas expressed about Commonwealth Avenue Bridge presented as a series of themes.

2.9 Endnotes

- ¹ Marshall, D, Commonwealth Avenue Bridge Initial Heritage Report to Inform The Design Team, prepared for Lahznimmo Architects, 2019, pp 4–5.
- ² Godden Mackay Logan, Lake Burley Griffin and Adjacent Lands—Heritage Management Plan, vol. 4, report prepared for National Capital Authority, May 2010, p 3.
- ³ Godden Mackay Logan, Lake Burley Griffin—Heritage Assessment, report prepared for the National Capital Authority, May 2010, pp 180–185.
- ⁴ Godden Mackay Logan, Lake Burley Griffin and Adjacent Lands Volume 4—Heritage Management Plan, report prepared for National Capital Authority, May 2010, p31.
- ⁵ Marshall, D et al, 'Certain Roads on National Land in Central Canberra Heritage Assessment Report', prepared for the NCA, 2014, p 2.

- ⁶ Note that adding the search term 'Canberra' did not change the results. 40 images also used the search term/hashtag '#commonwealthavebridge'; however most were duplicates, as multiple hashtags can be used.
- ⁷ Trove, search results for 'Commonwealth Avenue Bridge Canberra', viewed 21 January 2020 <<https://trove.nla.gov.au/picture/result?q=commonwealth+avenue+bridge+canberra&s=0>>.
- ⁸ My Community Directory, viewed 21 January 2020 <<https://vc-act.mycommunitydirectory.com.au/>>.
- ⁹ Australian Government, National Capital Authority website, viewed 21 January 2020 <<https://www.nca.gov.au/>>.
- ¹⁰ National Capital Authority, 'Attractions and memorials', viewed 21 January 2020 <<https://www.nca.gov.au/attractions-and-memorials>>.
- ¹¹ National Capital Authority, 'Lake Burley Griffin Self-Guided Walking Tour', viewed 21 January 2020 <<https://www.nca.gov.au/lake-burley-griffin-self-guided-walking-tour>>.
- ¹² <https://www.nca.gov.au/lake-burley-griffin-self-guided-walking-tour>, accessed January 2020.
- ¹³ Visit Canberra website, viewed 21 January 2020 <<https://visitcanberra.com.au/>>.
- ¹⁴ Visit Canberra, 'Lake Burley Griffin – Cycling Map', viewed 21 January 2020 <<https://visitcanberra.com.au/publications-apps-and-maps/lake-burley-griffin-cycling-map>>.
- ¹⁵ ACT Engineering Heritage Tour brochure, viewed 21 January 2020 <<https://www.engineersaustralia.org.au/sites/default/files/2019-06/North-ACT-Engineering-Heritage-Tour-Brochure.pdf>>.
- ¹⁶ Canberra Guided Tour, 'Highlights of Canberra', viewed 21 January 2020 <<https://www.canberraguidedtours.com.au/tours/highlights-of-canberra/>>.
- ¹⁷ Canberra Secrets, 'Highlights Tour', viewed 21 January 2020 <<https://canberrasecrets.com.au/highlights-tour/>>.
- ¹⁸ Her Canberra, '15 of the best Canberra walks', viewed 21 January 2020 <<https://hercanberra.com.au/cpcity/best-canberra-walks-2/>>.
- ¹⁹ This has not been verified, but it appears other continuously pre-stressed concrete box girder bridges have been constructed since.

3.0 Community Perceptions, Meanings and Associations

3.1 Introduction

This section of the report summarises the primary thoughts and ideas expressed about Commonwealth Avenue Bridge as demonstrated by an analysis of the data gathered from the investigations undertaken (refer to Section 2.0). These thoughts and ideas are presented as a series of themes.

Quotes used throughout (shown italicised) have been drawn from the responses provided in the online survey, focus group workshops and targeted interviews to demonstrate each theme.

3.2 Identifying Community

Central to assessing social and community-held aesthetic values is defining the communities who hold the values. As stated in Section 1.4.2 of this report, a broad definition of communities and cultural groups has been adopted—those that can be defined by shared culture, beliefs, ethnicity, activity or experience.

A number of ‘target’ communities were initially identified as those most likely to have associations with Commonwealth Avenue Bridge. These included: creators and carers of the bridge; organisations representing bridge and Lake Burley Griffin users; art/photography groups; design, history or heritage interest groups; Canberra residents; visitors/tourists; and the broader Australian community.

The investigations demonstrated that none of the smaller ‘target’ communities fulfilled this definition, with many not recognised as a defined community or cultural group. Therefore, the description of the associated communities was revised to the following two communities:

- the Australian community; and
- the Canberra community.

The study methodology sought to determine the value of Commonwealth Avenue Bridge to both the local Canberra and broader Australian communities; however, few ‘non-Canberrans’ were sampled in this study. Of the online survey respondents, only 8% lived outside of the ACT and the Canberra region (eg Queanbeyan, Murrumbateman).

Those who participated in the online survey, focus groups and targeted interviews were largely local Canberra residents. Of the online survey respondents, 92% lived within the ACT and the Canberra region. This group represented a range of ages and was also relatively evenly spread in terms of gender. The participants of both the focus group and targeted interviews also all identified as being local Canberra residents and reflected a spread of ages and gender.

As the purpose of this study is for the assessment of Commonwealth Heritage values—a local level threshold rather than national—the subsequent discussion and analysis is limited to the local/regional Canberra community and the community-held aesthetic and social values that emerged from the investigations.

3.3 Identifying Themes

The following themes have been identified from analysis of the data collected through the investigations (refer to Section 2.0 of this report) of the community-held aesthetic and social values of Commonwealth Avenue Bridge.

- **Everyday life in Canberra**—Commonwealth Avenue Bridge forms an essential piece of infrastructure that facilitates and supports movement around Canberra for work, recreation and leisure activities.
- **Architectural expression**—Commonwealth Avenue Bridge is appreciated for its architectural, technical and design qualities.
- **Views and the Canberra landscape**—Commonwealth Avenue Bridge is appreciated for its contribution to the Canberra landscape and its ability to provide a visual and symbolic connection to the wider Canberra landscape.
- **A place of history and memories**—Commonwealth Avenue Bridge forms an integral aspect of Canberra's history and the Canberra community's sense of identity.
- **A Canberra landmark**—Commonwealth Avenue Bridge is recognised as a distinctive landmark that contributes strongly to what makes Canberra uniquely Canberra.
- **Connecting Canberra**—Commonwealth Avenue Bridge is recognised as a physical and symbolic link which connects important aspects of Canberra and its community.

3.3.1 Everyday Life in Canberra

For the Canberra community, Commonwealth Avenue Bridge represents a valued element of infrastructure that facilitates and supports movement around Canberra for work, recreation and leisure activities.

- *Much of my exercise centres around this area on a weekend. I see all types out walking, running, cycling in a harmonious manner.*
- *I ride to work. I use the bridge to get across the lake. It connects to the wider cycling network. The active travel connections are the most important to me.*
- *Serves a good function for travelling over and around the lake.*
- *It is an essential part of the Canberra spine (north- south). It is an efficient and well designed distributor for road vehicles (Cars, Busses, trucks and Bicycles).*

The utility value of Commonwealth Avenue Bridge is widely and strongly demonstrated. Many responses identify words/phrases like 'functional', 'pedestrian access', 'suitable', 'shortest route', 'major arterial/transport link', 'ease of commute to work' and 'cycling access' in discussion around key aspects and qualities of Commonwealth Avenue Bridge.

Other responses note that the bridge was 'outdated' and 'crowded', particularly in relation to accommodating shared pedestrian and bike access.

- *Outdated, and unsuitable for the volume of pedestrians and cyclists.*
- *The shared pedestrian/bike access is very unsafe. I avoid this bridge where possible.*

- *Outdated. Not functional to active travel.*
- *It is actually very tricky to ride or walk across as it is very busy and there's lots of cyclists and pedestrians using the bridge.*

Overwhelmingly the responses identify aesthetic and social qualities such as views, connection to the past, aesthetic attributes and sensory qualities of the bridge as being important to them, indicating that the value of Commonwealth Avenue Bridge extends beyond its amenity.

- *The bridge has connected me to family and friends for many years. It, however, is not just a road over water, but a viewpoint for the lake and surrounds, particularly looking across to mountains.*
- *It not only works, it's beautiful too.*
- *It's an important part of Canberra's infrastructure. I've lived here all my life. There has always been a Commonwealth Bridge. I loved the old wooden bridge that used to cross the Molonglo River before the Lake.*
- *Apart from being a vital part of the road network, it forms part of a delightful walk (bridge to bridge) and is very elegant in design.*

Strong disagreement with the statement 'Commonwealth Avenue Bridge is no different to any other bridge' and a high level of interest in Commonwealth Avenue Bridge and its future, as indicated by the high survey response rate demonstrates and supports the idea that the value of Commonwealth Avenue Bridge extends beyond simply its utility.

3.3.2 Architectural Expression

An appreciation of Commonwealth Avenue Bridge for its architectural, technical, and design qualities by the Canberra community is expressed. This appreciation is for the bridge in its own right and in relation to its landscape setting.

Aesthetic terms such as 'elegant', 'beautiful', 'understated', 'simple' and 'graceful' are widely used in descriptions of Commonwealth Avenue Bridge.

- *It is a beautiful bridge, simply and elegantly designed.*
- *It is simple elegant bridge sweeping across the lake.*
- *It is attractive in that it is subtle and clean in design. Not fussy looking.*
- *Deceptively simple.*

Appreciation of the bridge's aesthetic qualities is strongly apparent, although a few responses express a contrary opinion.

- *It's a bridge that is used for crossing the lake. It has charms, but it's not the Harbour Bridge.*
- *Not a great looking bridge and should be an attractive bridge (like a Sydney Harbour Bridge) that is iconic for Canberra. A cement block is not iconic for Canberra.*
- *While it is located on the lake, which is a scenic part of Canberra, there is nothing special about the bridge itself.*
- *Needs to be totally re-built to something iconic (and not boring).*

An appreciation for the compatibility of the bridge's design with the surrounding topography and landscape, in terms of its low-profile, simple and streamlined appearance and use of concrete, is highlighted in a number of responses.

- *Commonwealth Avenue bridge is of a beautiful modernist design and sits lightly on the landscape leading up to Parliament House.*
- *It is an elegantly designed structure with a suitably low profile in the monumental vista along the three Basins of Lake Burley Griffin.*
- *The Bridge fits perfectly in the landscape setting and the simplicity of the design is enduring. It speaks of Canberra's modernity, as a designed city in the landscape.*
- *I appreciate the elegant design which has achieved a bridge appropriate functionally and aesthetically to its setting.*

The importance of the symmetry between Commonwealth Avenue Bridge and Kings Avenue Bridge is also demonstrated.

- *Balances Kings Avenue Bridge, they are a harmonious whole together.*
- *I love it's [sic] elegant simplicity that compliments but does not compete with all the landmarks that surround it. I love its symmetry with Kings Bridge. I love the gentle hump as you ride or drive over it.*
- *The bridge and its setting are classic 1960s Canberra architecture representing that phase of its development. Its pairing with Kings Avenue Bridge is vital symmetry.*
- *It is part of Canberra's frame on which the city is build. The symmetry of the bridge is very important to the aesthetics of the lake and surrounds.*

The dual roads of Commonwealth Avenue Bridge and the balance provided by this bifurcation was a key aspect discussed within the focus group workshops, yet was not as prominent within the online survey responses. This aspect of design contributes to the creation of the void view which is discussed further below (refer to Section 3.3.3).

For many people, the design of Commonwealth Avenue Bridge is an expression of a particular period in Canberra's history—its historical development during the 1960s—and associated values.

- *It's an understated, timeless, and competent design from the times when Canberra was being built as a national capital city to embody the same values.*
- *The Bridge represents the new Canberra, ie the expansion that occurred during the 1960s into the Woden Valley and beyond. After the lake filled the bridge replaced the former low-level wooden bridge. Its design and materials were modern, befitting the 'new' part of Canberra, ie beyond the inner south and the Parliamentary Triangle.*
- *Brilliant and enduring engineering/architectural/urban- design expression of its era, and aspirations of national capital making, respectful of Griffin's vision*

The technical design qualities of the bridge, including its innovative construction method and integrated sewerage and lighting systems, are highlighted as important features of the bridge within the targeted interviews. The vertical elements of the bridge, namely the pylons which form part of the integrated sewerage system, are considered by one interviewee to 'add to the sense of it being a very significant bridge, more so than the Kings Avenue Bridge because it has those vertical elements as well'.

There is less emphasis on the importance of the technical design qualities of the bridge in the responses from the online survey and the focus group workshops. A lack of knowledge or awareness within the Canberra community about these engineering aspects may account for this disparity.

3.3.3 Views and the Canberra Landscape

The wide range of views, both to and from Commonwealth Avenue Bridge, are strongly appreciated by the Canberra community. Its ability to provide 360-degree views, make it a great vantage point from which to appreciate the lake, special events and other elements of Canberra's urban landscape, is highly valued.

- *I've watched many events from the bridge, sky fire, balloons, even an exploding hospital*
- *Commonwealth Avenue Bridge is important to me because it links and provides views to and from the many beautiful parkland spaces and national institutions nearby.*
- *It is elegant and gives UNINTERRUPTED views to the lake, National Museum and the Brindabellas.*
- *The bridge to bridge walk is a pleasure and offers terrific views of Canberra's best.*

The aesthetics of the natural environment form an important part of the social connection between the community and Commonwealth Avenue Bridge.

- *Driving across in different times of the year and enjoying the unique real seasons in Canberra.*
- *Beautiful curves, and feeling of being part of the lake when one travels over it.*
- *I've walked the bridge to bridge circuit dozens of times – in snow, sleet, rain, wind and extreme heat. The feeling of exposure and views of the lake, national institutions are always special.*
- *Many happy memories either walking or cycling the bridge-to-bridge route. A great way to clear your head while the scenery and greenery lift your spirits.*
- *The view of the bridge from the old Canberra hospital [now the site of the National Museum on Acton Peninsula] was very serene.*

In some responses, statements indicate that, when driving across the bridge the restricted laneways and the need to concentrate on driving, limit people's ability to enjoy views out, or that the views from the bridge would be the same regardless of the bridge or its design.

Views to the bridge from lookouts and vantage points, both near and far, such as Mount Ainslie, Black Mountain, Capital Hill, Regatta Point, the NMA, Commonwealth Avenue and City Hill are all widely enjoyed.

- *I love walking the lake with my husband, and enjoy the views on our way around.*
- *I enjoy spotting it from any of the surrounding vantage points – Mt Ainslie, Red Hill, Black Mountain, Capital Hill, APH.*
- *From balloon above the lake.*
- *From Acton Peninsula with water jet, Carillion, Nat library, NGA High Court, other large public buildings on banks etc.*

In online imagery (ie user-generated content/photography and/or image-sharing platforms), Commonwealth Avenue Bridge is depicted both as a feature in its own right and as part of the broader central Canberra landscape. These images tend to emphasise the formal and symbolic nature of the structure through the use of more dramatic, scenic landscape imagery.

One view which is prominently depicted through online imagery is the 'void' view—that is, views from underneath the bridge looking between the dual roads/two spans of the bridge. Appreciation of the void view is demonstrated through the online survey and focus group responses.

- *Underneath on the north shore, looking towards new Parliament House, the two arches on either side.*
- *The view in between the spans from ground (lake) level. Many iconic photos use this perspective.*
- *Max Dupain's view from under the Bridge between main spans.*
- *Between the two bridges towards Parliament House.*

In contrast, a strong appreciation for the void view is not expressed by the targeted interviewees. It is acknowledged that this particular view of the bridge is used widely in television and books and, as a result, has become to be considered by some to be 'boring now' and 'over used'. It is also expressed that although the void view is widely portrayed through digital and other media, it is a view that would rarely be seen by the general public using the bridge.

Night-time views of the bridge that showcase the lighting of the bridge, in particular the integrated handrail lighting, are recognised and appreciated in many responses.

- *The view from across West Basin – at sunset and at night time. the light makes the bridge stand out beautifully.*
- *Vista and perspective from the city to the Parliament. And how it changes at night compared to daytime - the blue lighting makes it a 'nightmark' at night as well as being a landmark during the day.*
- *It is very attractive when illuminated.*
- *...views of the bridge at night with the lights.*

3.3.4 A Place of History and Memories

Commonwealth Avenue Bridge forms an integral aspect of Canberra's history and the Canberra community's sense of identity, particularly through its ability to evoke memories. Memories are an important element in the creation of our own personal sense of identity, with shared memories and experiences connecting us to others in the community, and in the development of a shared sense of identity.

- *It's part of my memories of Canberra – my daily bike commute, my lunchtime runs. On the best days, I remember feeling a sense of optimism – a wide sky, the lake and parliament house.*
- *Watching fireworks and fly overs. Driving over it to major events and home. A pathway for major protest activities.*
- *Walking across to the great Canberra 400 listening to the cars.*
- *Driving across it for the first time as a child and it still holds that special place in my heart.*

A strong sense of the familiarity and continuity over time is expressed in many responses.

- *It has been there ever since I have been in Canberra.*
- *It's part of Canberra, it belongs here and hold an important part of Canberra's history in its structure.*
- *A bridge I've known from its birth. Though I haven't lived here for 43 yrs until past 2 years retirement, Commonwealth and Kings Ave bridges are central to this beautiful city. To me crossing the bridge gives a deep sense of connection. Home! The old tree plantings on the southern side have significant historical links too. I grew up with a lot of the influence of Walter Burley Griffins plans for Canberra, do people know this today ?? This*

bridge is a central part of Walter Burley Griffins vision. The Lake is his name sake and vision the bridges and landscape all link together. A significant part of Canberra, its backbone.

- I remember when it wasn't there, just a wooden bridge across the river through a lucerne paddock, I remember watching it be built on the open dry land and then the as the lake filled up, it transformed into something soaring and magnificent. It was magical and it still is.*
- It's a part of Canberra and a part of me. I use it regularly on the bus and the bike. It's beautiful without hogging the limelight from parliament house or the other grand buildings [around] the lake.*
- It's just a bridge, but it could have been so much uglier. This one is pretty! And granddad helped build it. I drive over it twice every weekday, it's important.*

A range of both public and personal memories connecting respondents to important times of joy, contentment, sadness and grief is mentioned in responses.

Regular use of Commonwealth Avenue Bridge, often over a period of 30 years or more, has led to a strong attachment to the place. The survey indicates that people who had a longer association with the bridge feel more strongly about it than those with a shorter association.

3.3.5 A Canberra Landmark

Commonwealth Avenue Bridge is recognised as a distinctive landmark that contributes strongly to a sense of 'what makes Canberra uniquely Canberra'.

The term 'iconic' is used readily in responses from the online survey, focus group workshops and the targeted interviewees, to describe Commonwealth Avenue Bridge, demonstrating that the bridge is viewed as distinctive and an important feature within Canberra's urban landscape.

- It's an icon in Canberra, vastly important infrastructure, great viewing platform and a major feature of the Parliamentary triangle.*
- I think it is an iconic piece of architecture which fits in with other surrounding iconic buildings ie. National Library, Hyatt Hotel etc.*
- I think it is iconic to Canberra.*

Contributing to this theme is that Commonwealth Avenue Bridge is seen as recognisable, memorable and through its architectural design, symbolises aesthetic qualities which are unique to Canberra.

- It's presentation is distinctive of the Canberra style (eg restrained, classic) and it is an iconic part of our city.*
- I love the design of the exposed concrete. It provides a feeling of formal link between Parliament, the lake and the city. It is part of what makes Canberra the place that it is. Formal grandeur vistas centralised around parliament house.*
- Commonwealth Avenue bridge was the first landmark I remember when I moved to Canberra at 16.*
- It is memorable from the very first visit to Canberra how Commonwealth Avenue is straight as an arrow across the lake directing towards Parliament House, and the low profile of the bridge creates a sense of drama to the eyelines such that the path to power is unobstructed.*
- It 'belongs' there, it has a Canberra feel about it, strong, decisive.*
- It seems to me, to be a major and integral part of the overall Canberra design.*

In contrast, a few responses stated that Commonwealth Avenue Bridge is not interesting or iconic.

- *Needs to be totally re-built to something iconic (and not boring).*
- *The bridge is inoffensive and does most of what is required. Although the design is good and simple, it is uninteresting and uninspiring. It will not improve with age.*

The tourism material demonstrates that Commonwealth Avenue Bridge is not generally marketed as a key attraction or destination toward visitors to Canberra. The bridge is prominently portrayed in conjunction with Lake Burley Griffin, but the lake is a landmark in itself—symbolic of the nation’s capital, and the bridge appears as a subsidiary component of experiencing the lake.

The distinctive design and planning of the Central National Area contributes significantly to Canberra’s identity, and Commonwealth Avenue Bridge is recognised and valued as a key element that references the Griffin plan and provides a clear definition of the National Triangle through its symmetry with Kings Avenue Bridge.

- *It is a key part of the Griffin Plan in that it was meant to be subtle enough not to disrupt the views of the bush.*
- *It provides an important connection across one of Canberra’s central axes between Civic and the Parliamentary Triangle. It is a huge transport connection. It also represents an important connection between city and lake.*
- *It is the visual link between the Parliamentary Triangle and the City., Furthermore it is the Completion of the Built form of the Triangle.*
- *An elegant engineering solution that defines an edge of the Parliamentary Triangle.*
- *It creates an elegant balance with Kings Avenue Bridge - reinforcing one of the principal axes of the Parliamentary Triangle, core of our planned Capital City.*
- *Provides a clear definition of the National Triangle (together with Kings Avenue Bridge).*
- *Apart from being a vital link between the city and the south, it forms one arm of the parliamentary triangle. I don’t live in Canberra any more, sadly, but seeing the bridge makes me homesick.*

Commonwealth Avenue Bridge is recognised as a physical reference point within the city for many.

- *I know I am near the middle of our capital city when I drive over it to get to the NLA, the NGA, the Parliament, the Hyatt Hotel and many other places.*
- *It is in the very heart of Canberra from where you see so much of the surrounding encompassing hills.*
- *None in particular but it is part of my mind-map of central Canberra.*

Symbolically Commonwealth Avenue Bridge is seen to form an integral part of the ‘structure’ of Canberra with terms such as ‘backbone’, ‘solid’ and ‘part of DNA’ prevalent in responses. The sense of permanence and reliability that these terms evoke contribute to the social connection between the Canberra community and Commonwealth Avenue Bridge.

- *I watched it being built along with Kings Ave, and the filling of the lake. Together they have provided the structure, connection and fabric which Canberra has grown around, and make it the city it is today. It has and should always be the central family and community, recreational space for residents and visitors to enjoy.*
- *A significant part of Canberra, its backbone.*
- *It is part of Canberra’s frame on which the city is build. The symmetry of the bridge is very important to the aesthetics of the lake and surrounds*

- *Solid, reliable, home, gives views to the Brindabellas and the luminous inland skies, takes you past the water jet and up past the Albert Hall. Part of Canberra's DNA.*

3.3.6 Connecting Canberra

The role of Commonwealth Avenue Bridge as an important link between aspects of Canberra—both physically and symbolically—emerged strongly for the Canberra community.

Appreciation of the physical link between north and south Canberra which Commonwealth Avenue Bridge provides is demonstrated in many responses, as follows:

- *Canberra is defined by its north and south, and the bridge connects the two.*
- *It is important to me because it connects the North and South sides, with fantastic views of Canberra Landmarks.*
- *The bridge ties the essential areas of North and South Canberra together and has a strong role as a community icon. Its simple visual appeal evokes strong aesthetic values.*

The physical link between the civic and governmental areas of Canberra via Commonwealth Avenue Bridge contributes to its symbolic connection.

- *Commonwealth Avenue Bridge connects Canberra's densest concentration of social and economic activity (Civic) with the most important precinct in the nation (Parliament House and the Parliamentary Zone). It is also a key part of Canberra's main north/south inter-town public transport route. In this sense, it has immense functional and symbolic significance for Canberra as both a federal and municipal city.*
- *Its view to Parliament house and the city going either direction adds to its symbolism as a key thoroughfare through the capital.*
- *Its linking of the Parliamentary Triangle area with the business-oriented Civic area is very important – aesthetically, historically and in its practicality.*

Commonwealth Avenue Bridge is recognised as an important element in the ceremonial route to Parliament House and more generally seen as symbolic of democracy and the connection between the people and the government.

- *It's [sic] role in Commonwealth Ave's ceremonial route to Australia's Parliament House.*
- *Links the people to the national parliament.*
- *Part of main processional route to Parliament House, Northbourne Ave, Commonwealth Ave. A key aspect of the Parliamentary Triangle.*
- *It is symbolic of the Federation, it is for the people of Australia and I revere it as a Sydney-sider reverts [sic] the Harbour Bridge.*

Commonwealth Avenue Bridge brings the community together through private and public experiences such as recreational activities, events and protests.

- *The bridge has connected me to family and friends for many years. It, however, is not just a road over water, but a viewpoint for the lake and surrounds, particularly looking across to mountains.*
- *Very often row under it and cycle over it. Very important landmark My link to the city/culture/friends/family from inner south.*
- *The walk across Commonwealth Avenue Bridge on the First Sorry Day.*

- *Walking across it in the company of other like-minded citizens as part of a number of civic demonstrations en route to Parliament House.*
- *I marched across it once in a university protest against the introduction of tertiary fees.*
- *1976 bicycle ride against uranium sit down.*

3.4 Conclusion

This section analyses the data gathered through the investigations described in Section 2.0 of this report and presents it in relation to the themes that have emerged from the analysis.

These themes are 'Everyday life in Canberra', 'Architectural Expression', 'Views and the Canberra Landscape', 'A Place of History and Memories', 'A Canberra Landmark' and 'Connecting Canberra', which conclusively indicate the aesthetic and social meaning and value of Commonwealth Avenue Bridge to the Canberra community.

In Section 4.0 of this report, the community-held aesthetic and social values of Commonwealth Avenue Bridge are assessed in relation to the Commonwealth Heritage criteria (e) aesthetic characteristics and (g) social value, and a statement of significance is presented.

4.0 Heritage Assessment against CHL Criteria

4.1 Introduction

This section provides an assessment of the potential aesthetic and social values against the Commonwealth Heritage criteria of (e) aesthetic characteristics and (g) social value, and identifies attributes, or those aspects of the place that strongly embody the values.

The heritage assessment has been prepared in accordance with the EPBC Act and Regulations.

4.2 Methodology

Assessments of heritage value identify whether a place has heritage significance, establish what the heritage values are, and why the place (or an element of a place) is considered important and valuable to the associated community/ies. Heritage values are embodied in attributes, such as the location, function, form and fabric of a place. Intangible attributes may also be significant, including use, access, traditions, cultural practices, knowledge and the sensory and experiential responses that the place evokes. All attributes need to be considered when assessing a place.

4.2.1 Statutory Framework—EPBC Act

The 2004 amendments to the EPBC Act (Cwlth) established the CHL. The CHL is for those places owned or controlled by the Commonwealth that have been assessed as having significant heritage values against the criteria established under the EPBC Act.

Section 528 of the EPBC Act defines the 'heritage value' of a place as including the place's natural and cultural environment having aesthetic, historic, scientific or social significance, or other significance, for current and future generations of Australians. The EPBC Act covers cultural (Indigenous and non-Indigenous) and natural heritage significance.

The threshold for inclusion on the CHL is that the place meets one or more of the criteria for significant heritage values.

Section 10.03A of the EPBC Regulations define the nine Commonwealth Heritage criteria for evaluating, identifying and assessing the Commonwealth Heritage values of a place.

For the purposes of this study (and meeting the client brief), Commonwealth Avenue Bridge will be assessed against only two of the nine criteria, these being criterion (e) aesthetic characteristics and (g) social value, ie: the focus is on community-held aesthetic and social value.

4.2.2 Significance Indicators and Thresholds

The threshold for Commonwealth heritage values is that 'a place must have **'significant'** heritage value'.¹ There are no significance 'indicators' or guidelines for either aesthetic or social value under the Commonwealth Heritage criteria.

Instead, to assist in this assessment, 'indicators' which are currently used for identifying for aesthetic and social heritage significance in the Australian Capital Territory (ACT) (*Heritage Assessment Policy*, 2015) and Queensland (*Assessing Cultural Heritage Significance*, 2013) have been adapted. These are set out below. The current ACT and QLD guidelines have been drawn upon as they are the most relevant and provide the most comprehensive assessment methodology out of all heritage guidelines currently available.

4.2.3 Aesthetic Value

The Commonwealth Heritage criteria for assessing aesthetic value is:

e) aesthetic characteristics (community-held value): *The place has significant heritage values because of the place's importance in exhibiting particular aesthetic characteristics valued by a community or cultural group.*

The assessment must identify:

- the **particular aesthetic characteristics** exhibited by the place ('particular' means able to be defined or specified);
- that the particular aesthetic characteristics are **valued** by a community or cultural group ('valued' means appreciated, respected, esteemed, treasured etc); and
- the **community or cultural group** that holds that value.

Indicators of Aesthetic Value

To define whether a place exhibits significant aesthetic values, the following indicators will be applied:

- The place contains visual or other qualities (ie sound, smell, touch, feel, sense of place, symbolism) that invite judgement against the ideals of beauty, picturesqueness, evocativeness, expressiveness, grotesqueness, sublimeness and other descriptors of aesthetic principles.
- The place contains evocative qualities that provoke a strong emotional response such as awe, wonder, astonishment, reverence, pleasure, seclusion, peacefulness.
- The place is visually distinctive and possesses landmark or iconic qualities.
- The place is widely recognised as having artistic excellence as demonstrated through representations in art, literature, photography or other creative responses.

Thresholds

Inclusion in the CHL requires that there be 'significant' aesthetic value of a place held by a community or cultural group. No specification is made as to the level of the value—not the size or extent of the community which holds it.

It follows that significance to any one definable community or cultural group will be sufficient to establish heritage value. In particular, the strength and nature of an aesthetic response (ie intactness and integrity) and the extent to which the aesthetic response is special or particular to this place (ie rarity) is most relevant.

4.2.4 Social Value

The Commonwealth Heritage criteria for assessing social value is:

g) social value: *The place has significant heritage value because of the place's strong or special association with a particular community or cultural group for social, cultural or spiritual reasons.*

The assessment must identify:

- that there is a **strong or special association** ('strong or special' means an attachment to the place where important meanings arise from the association that go beyond utility value);

- a **particular community or cultural group** ('particular' means an identifiable); and
- the **social, cultural or spiritual** associations.

Indicators of Social Value

To define whether a place exhibits significant social values, the following indicators will be applied:

- The place is important to the community as a landmark, marker or signature.
- The place is associated with an event/s which has had a profound effect on a community or cultural group.
- The place is a popular meeting or gathering place for ritual, ceremonial, social or cultural (including recreational) interaction.
- The place is readily accessible and regularly used and that provides a particular and valued experience of place that contributes to the community's sense of identity or allows a particular community or group to form a strong or special attachment to the place.
- The place symbolically represents some aspect of the past which contributes to a sense of identity for the community or cultural group.

Thresholds

Inclusion in the CHL requires that there be 'significant' social value held by a community or cultural group. Threshold indicators for the CHL are considered to be where there is an enduring community association (ie length of association), possible with some discontinuity if the association is very long, the place is well known within and across the relevant community, and is highly valued by that community (ie extent and degree).

4.3 Assessment of Aesthetic Value

4.3.1 Criterion (e) Aesthetic Characteristics

The following provides the heritage assessment of Commonwealth Avenue Bridge against criterion (e)—'the place has significant heritage value because of the place's importance in exhibiting particular aesthetic characteristics valued by a community or cultural group'.

Assessment

Commonwealth Avenue Bridge has significant heritage value to the Canberra community for its aesthetic characteristics.

The aesthetic characteristics of Commonwealth Avenue Bridge are defined by its distinctive qualities and architectural design comprising a low-profile and streamlined concrete form which complements, rather than dominates, the designed surrounding landscape setting.

Commonwealth Avenue Bridge is:

- a key element within Canberra's design and planning, making reference to the Griffin Plan and providing clear definition of the National Triangle through its symmetry with Kings Avenue Bridge;

- visually distinctive and possesses iconic qualities because of its design, form and setting, which contributes to the aesthetic qualities of the Central National Area that are unique to Canberra; and
- provides a great vantage point to appreciate the lake, special events and other elements of Canberra's urban landscape. Views to the bridge, both during the day and at night, from key locations, including lookouts, around Canberra are widely enjoyed.

The elegant and simple design of Commonwealth Avenue Bridge is appreciated by the Canberra community both as a feature in its own right, and in relation to the wider designed landscape setting of Lake Burley Griffin. The bridge possesses evocative qualities that provoke strong emotional responses such as optimism, tranquillity, familiarity and delight by the local community.

The bridge is widely recognised for its design excellence—its formal elegance and dramatic nature are widely represented and appreciated by the community through photography.

Summary of Aesthetic Value

Commonwealth Avenue Bridge meets the threshold for Commonwealth Heritage value under criterion (e).

Attributes of Aesthetic Value

The attributes which embody the aesthetic characteristics of Commonwealth Avenue Bridge include:

- simple, unadorned, and streamlined form, low-profile design, concrete materials and light colour;
- vertical pylons defining the 'ends/entry';
- aluminium railings with integrated strip lighting for night-time illumination;
- location and alignment—defining one arm of the National Triangle and providing symmetry with Kings Avenue Bridge;
- pedestrian/bicycle accessibility;
- openness around the bridge;
- views to and from Commonwealth Avenue Bridge; and
- visual setting of the bridge on Lake Burley Griffin with backdrop of national institutions and distant hills/mountains.

4.4 Assessment of Social Value

4.4.1 Criterion (g) Social Value

The following provides the heritage assessment of Commonwealth Avenue Bridge against criterion (g)—'the place has significant heritage value because of the place's strong or special association with a particular community or cultural group for social, cultural or spiritual reasons'.

Assessment

Commonwealth Avenue Bridge is valued by the Canberra community as:

- an important landmark in Canberra;

- an accessible public space that supports movement around the city for work, recreation and leisure activities;
- a place of personal memory and experience that provides a sense of connection with the past and is part of a shared sense of identity by the community;
- a public place that connects the community to memories of important times of joy, contentment, sadness and grief;
- a physical and symbolic marker within the city because it evokes a sense of permanence and reliability for the Canberra community;
- it provides an experiential connection to the natural environment; and
- a symbolic and physical link between the civic and governmental areas of Canberra, recognised as an important element in the ceremonial route to Parliament House and more generally seen as symbolic of democracy and the connection between the people and the government.

The value of the Commonwealth Avenue Bridge extends beyond utility and function for physical connection and transport across the lake. The bridge is appreciated by the Canberra community with its regular and continuing contribution to the development of a strong sense of familiarity, social connection and enduring attachment. The bridge helps bring the community together through private and public experiences, including recreational activities, events and protests.

Summary of Social Value

Commonwealth Avenue Bridge meets the threshold for Commonwealth Heritage value under criterion (g).

Attributes of Social Value

The attributes which embody the social value of Commonwealth Avenue Bridge include its:

- public accessibility (pedestrian and bicycle) and function;
- location and alignment in the Central National Area of Canberra's designed landscape;
- design of Commonwealth Avenue Bridge including all components which make up its form, scale, materials and colours; and
- visual setting on Lake Burley Griffin with national institutions and hills/mountains.

4.5 Conclusion

The heritage assessment concludes that Commonwealth Avenue Bridge meets the threshold for Commonwealth Heritage value under criteria (e) aesthetic characteristics and (g) social value, as held by the Canberra community.

4.6 Endnotes

¹ Australian Government, 'Commonwealth Heritage List Criteria' <<http://www.environment.gov.au/heritage/about/commonwealth-heritage/commonwealth-heritage-list-criteria>>.

5.0 Conclusions and Recommendations

5.1 Statements of Heritage Value

Based on the research and analysis contained in this report, the conclusion is that Commonwealth Avenue Bridge meets the threshold for Commonwealth Heritage values under criteria (e) aesthetic characteristics and (g) social value, as held by the Canberra community.

A summary statement of values for each criterion and a summary of the attributes that embody these values is provided below.

5.1.1 Aesthetic Values

Commonwealth Avenue Bridge has significant heritage value to the Canberra community for its aesthetic characteristics.

The aesthetic characteristics of Commonwealth Avenue Bridge are defined by distinctive qualities and architectural design comprising a low-profile and streamlined concrete form which complements, rather than dominates, the designed surrounding landscape setting.

Commonwealth Avenue Bridge is:

- a key element within Canberra's design and planning, making reference to the Griffin Plan and providing clear definition of the National Triangle through its symmetry with Kings Avenue Bridge;
- visually distinctive and possesses iconic qualities because of its design, form and setting which contributes to the aesthetic qualities of the Central National Area that are unique to Canberra; and
- provides a great vantage point to appreciate the lake, special events and other elements of Canberra's urban landscape. Views to the bridge, both during the day and at night, from key locations, including lookouts, around Canberra are widely enjoyed.

The elegant and simple design of Commonwealth Avenue Bridge is appreciated by the Canberra community both as a feature in its own right, and in relation to the wider designed landscape setting of Lake Burley Griffin. The bridge possesses evocative qualities that provoke strong emotional responses such as optimism, tranquillity, familiarity and delight within the local community.

The bridge is widely recognised for its design excellence—its formal elegance and dramatic nature are widely represented and appreciated by the community through photography.

5.1.2 Social Values

Commonwealth Avenue Bridge is valued by the Canberra community as:

- an important landmark in Canberra;
- an accessible public space that supports movement around the city for work, recreation and leisure activities;
- a place of personal memory and experience that provides a sense of connection with the past and is part of a shared sense of identity by the community;

- a public place that connects the community to memories of important times of joy, contentment, sadness and grief;
- a physical and symbolic marker within the city because it evokes a sense of permanence and reliability for the Canberra community;
- it provides an experiential connection to the natural environment; and
- a symbolic and physical link between the civic and governmental areas of Canberra, recognised as an important element in the ceremonial route to Parliament House and more generally seen as symbolic of democracy and the connection between the people and the government.

The value of the Commonwealth Avenue Bridge extends beyond utility and function for physical connection and transport across the lake. The bridge is appreciated by the Canberra community with its regular and continuing contribution to the development of a strong sense of familiarity, social connection and enduring attachment. The bridge helps bring the community together through private and public experiences, including recreational activities, events and protests.

5.1.3 Attributes

Aesthetic Value

Attributes which embody the aesthetic value of Commonwealth Avenue Bridge include:

- simple, unadorned, and streamlined form, low-profile design, concrete materials and light colour;
- vertical pylons defining the 'ends/entry';
- aluminium railings with integrated strip lighting for night-time illumination;
- location and alignment—defining one arm of the National Triangle and providing symmetry with Kings Avenue Bridge;
- pedestrian/bicycle accessibility;
- openness around the bridge;
- views to and from Commonwealth Avenue Bridge; and
- visual setting of the bridge on Lake Burley Griffin with backdrop of national institutions and distant hills/mountains.

Social Value

Attributes which embody the social value of Commonwealth Avenue Bridge include:

- public accessibility (pedestrian and bicycle) and function;
- location and alignment in the Central National Area of Canberra's designed landscape;
- design of Commonwealth Avenue Bridge including all components which make up its form, scale, materials and colours; and
- visual setting on Lake Burley Griffin with national institutions and hills/mountains.

5.2 Recommendations/Next Steps

As forecast in the peer review of the 2019 'Commonwealth Avenue Bridge Initial Heritage Report', a standalone heritage assessment against all nine Commonwealth Heritage criteria should be prepared for Commonwealth Avenue Bridge.

This would provide a comprehensive assessment of heritage values and attributes against all nine criteria, which has not been undertaken to date. This assessment would enable the owners, managers and relevant stakeholders of the bridge to agree on and approve the heritage values of the bridge within the one unified document.

The information from this assessment of community-held aesthetic and social values should be utilised as well as additional research for the assessment against the remaining seven heritage criteria, to inform the comprehensive, single heritage assessment.

6.0 Appendices

Appendix A

Online Survey Distribution Summary

Appendix B

Online Survey Results

Appendix C

Focus Group Workshop Summary

Appendix A

Online Survey Distribution Summary

Appendix A—Online Survey Distribution Summary

The online survey was promoted through the NCA and ACT Government websites and social media platforms, as well as by contacting organisations for distribution through their networks, local institutions, recreational lake user groups, resident associations and individual members of the Canberra community. A full list of the organisations contacted is provided below. The details of individuals who were contacted have not been provided for privacy reasons.

ORGANISATIONS

- National Trust (ACT)
- Walter Burley Griffin Society
- Engineering Heritage Australia
- Planning Institute of Australia (ACT Branch)
- Canberra and District Historical Society
- Lake Burley Griffin Guardians
- Australian Institute of Architects ACT Chapter
- Canberra Museum and Gallery (CMAG)
- Museum Friends (NMA membership organisation)
- Friends of the National Library of Australia Inc
- Friends of Old Parliament House Rose Gardens
- Consult Australia (ACT)
- DocoMOMO
- Australia ICOMOS
- Australian Institute of Landscape Architects
- Friends of the National Arboretum Canberra
- Friends of the National Gallery of Australia

- National Museum of Australia – Paddle Steamer Operator
- Canberra Modern
- Royal Australian Historical Society
- Australian Museums and Galleries Association (ICOM)
- University of Canberra
- Australian National University—RSHA Centre for Heritage and Museum Studies
- Canberra Photographic Society
- Representative Aboriginal Organisations (RAOs)
- Friends of Manuka Pool and Albert Hall

RESIDENT ASSOCIATIONS

- Yarralumla Residents Association
- Kingston and Barton Residents Groups
- North Canberra Community Council Inc
- Inner South Canberra Community Council

RECREATIONAL LAKE USER GROUPS

- Pedal Power ACT
- Canberra Rowing Club
- Rowing ACT
- ANU Boat Club
- Black Mountain Rowing Club
- Burley Griffin Canoe Club

GML Heritage

- Canberra Fisherman's Club
- Capital Lakes Rowing Club
- Canberra Yacht Club
- Canberra Dragon Boats Association
- Dragons Abreast Australia
- Ice Dragons Paddle Club
- Rowing Australia
- Triathlon ACT
- Traditional Boat Squadron Australia
- Canberra Yacht Club
- YMCA Sailing Club
- Canberra Grammar School – Rowing
- Canberra Girls Grammar School – Rowing
- Canberra Nippers
- Radford Rowers
- Sea Scouts Sailing Club
- Molonglo Catchment Group
- Riversmart

OTHER

- Canberra Secrets
- Seg Glide Ride
- Mulga Bicycle Tours
- Go Boat Tours

Appendix B

Online Survey Results

Appendix B—Online Survey Results

Introduction

As part of the assessment of ‘community-held aesthetic and social values’ of Commonwealth Avenue Bridge, Canberra, an online survey was designed and promoted to capture the views of a broad geographic spread of people with potential special associations or special interests in Commonwealth Avenue Bridge.

The survey was designed by GML Heritage with input from ACT Government/Major Project Canberra using the SurveyMonkey online survey host. It was available online and was opened on 8 November 2019 for four weeks, closing on 6 December 2019. Respondents to the survey were anonymous.

The survey was promoted through the NCA and ACT Government websites and social media platforms, as well as by contacting a number of organisations for distribution through their networks, including Australia ICOMOS, Australian Institute of Architects, National Trust (ACT), Engineering Australia etc, and local institutions and recreational user groups.

A flyer was developed to assist with promotion of the survey; it was handed out to pedestrians using the bridge (during one weekday lunchtime period) and offered to the public at the National Capital Exhibition and Visitor Information Centre at Regatta Point.

The survey contained a range of questions which offered an opportunity for both structured and unstructured responses. Questions 1–10 sought basic information about each respondent and their association/s with Commonwealth Avenue Bridge, including length and frequency of association. Questions 11–15 offered the opportunity for respondents to identify what they value about Commonwealth Avenue Bridge via a series of mandatory and structured responses. Questions 16–18 allowed for open-ended responses providing further opportunity for respondents to highlight their thoughts and feelings about the bridge, offer memories and recollections, as well as indicate any favourite views. The final question provided an opportunity for respondents to leave their contact details if they were interested in being contacted to discuss the heritage values of Commonwealth Avenue Bridge further.

Data Analysis

Who Responded?

In total, 567 responses were received, with 519 (92%) respondents answering all mandatory questions (Q1–15) and the remaining 48 (9%) respondents dropping out after answering only a few questions. The analysed results are based on the 519 completed responses. Note that in the summaries below, the total number of responses may be greater than 519 where the question allowed for multiple answers.

Q1 Where do you live?

Respondents could only select one answer. A total of 519 respondents answered this question.

Answer Choices	Responses	
Canberra Central	41.04%	213
Belconnen	14.26%	74
Woden Valley	9.36%	50

Answer Choices	Responses	
Tuggeranong	8.48%	44
Elsewhere in Australia	7.90%	41
Gungahlin	6.55%	34
Weston Creek	4.43%	23
Canberra Region (eg Queanbeyan, Murrumbateman)	4.05%	21
Molonglo Valley	1.73%	9
Elsewhere in ACT	0.96%	5
Jerrabomberra	0.77%	4
Overseas	0.19%	1
Total Respondents: 519		

Q2 What is your age?

Respondents could only select one answer. A total of 519 respondents answered this question.

Answer Choices	Responses	
12–17	0.77%	4
18–24	3.47%	18
25–34	13.87%	72
35–44	16.38%	85
45–54	16.96%	88
55–64	20.62%	107
65–74	16.38%	85
75+	9.83%	51
Prefer not to say	1.73%	9
Total Respondents: 519		

Q3 Which gender do you identify with?

Respondents could only select one answer. A total of 519 respondents answered this question.

Answer Choices	Responses	
Male	51.06%	265
Female	46.82%	243
Prefer not to say	1.35%	7
Other	0.77%	4
Total Respondents: 519		

Nature of Association

Q4 Which best describes your primary/main association with Commonwealth Avenue Bridge?

Respondents could only select one answer. A total of 519 respondents answered this question.

Answer Choices	Responses	
I use Commonwealth Avenue Bridge to travel around Canberra	77.26%	401
I do/or did the Bridge to Bridge circuit around Lake Burley Griffin	9.63%	50
I am a member of a recreational group that uses the bridge and/or Lake Burley Griffin	3.66%	19
I have a strong interest in bridges and their design/engineering	2.70%	14
I am/or was a visitor to Canberra and travelled over Commonwealth Avenue Bridge	2.31%	12
I use Commonwealth Avenue Bridge as a subject for photography or other artistic endeavours	1.93%	10
I am/or was a visitor to Canberra and visited Commonwealth Avenue Bridge	0.96%	5
I use the bridge as a viewing platform (eg to view the water jet, Parliament House, Balloon Aloft, boating events)	0.77%	4
I am/or was involved in the management and/or maintenance of Commonwealth Avenue Bridge	0.39%	2
I was involved in the design or construction of Commonwealth Avenue Bridge	0.19%	1
I do not use or have any association with Commonwealth Avenue Bridge	0.19%	1
Total Respondents: 519		

One respondent identified that they 'did not use or have any association with Commonwealth Avenue Bridge'. By selecting this response, they were automatically skipped forward to Q9 which sought to identify their source of knowledge or impressions of Commonwealth Avenue Bridge. Refer to Q9 below. As a result, the total number of respondents for Q5–Q8 dropped to a total of 518 respondents.

Q5 Please select any additional important associations with Commonwealth Avenue Bridge.

This question provided respondents with the opportunity to identify any other additional associations that were relevant and also provided an 'Other' option. Respondents were allowed to select multiple answers, therefore the total number of responses is greater than the number of respondents. A total of 518 respondents answered this question.

Answer Choices	Responses	
I do/or did the Bridge to Bridge circuit around Lake Burley Griffin	46.53%	241
I use Commonwealth Avenue Bridge to travel around Canberra	39.38%	204
I use the bridge as a viewing platform (eg to view the water jet, Parliament House, Balloon Aloft, boating events)	27.99%	145
I use Commonwealth Avenue Bridge as a subject for photography or other artistic endeavours	14.48%	75
I am a member of a recreational group that uses the bridge and/or Lake Burley Griffin	13.13%	68
I have a strong interest in bridges and their design/engineering	12.55%	65
I do not have any additional associations with Commonwealth Avenue Bridge	10.62%	55
Other (please specify)	8.69%	45
I am/or was a visitor to Canberra and travelled over Commonwealth Avenue Bridge	6.95%	36

GML Heritage

Answer Choices	Responses	
I am/or was a visitor to Canberra and visited Commonwealth Avenue Bridge	3.86%	20
I am/or was involved in the management and/or maintenance of Commonwealth Avenue Bridge	0.97%	5
I was involved in the design or construction of Commonwealth Avenue Bridge	0.39%	2
Total Respondents: 518		

A total of 45 respondents selected 'Other' and were asked to specify in an open-ended response any associations which may not have been listed. These open-ended responses to the question have been clustered using the dominant idea in the answer:

Association	Responses	
Present at construction and/or opening of the bridge	22.22%	10
Interest in the history and or heritage of Canberra	28.89%	13
Forms backdrop to my daily life	17.78%	8
Memories or event	2.22%	1
Family connection	2.22%	1
Appreciate the design and architecture of the bridge	6.67%	3
Interest in Canberra's infrastructure	4.44%	2
Cycling	6.67%	3
Not an association/irrelevant	8.89%	4
Total Respondents: 45		

Q6 How long have you been using or visiting Commonwealth Avenue Bridge?

Respondents could only select one answer. A total of 518 respondents answered this question.

Answer Choices	Responses	
Less than 12 months	1.35%	7
1–10 years	15.83%	82
11–20 years	15.64%	81
21–30 years	18.73%	81
31–40 years	18.73%	97
41–50 years	14.48%	75
51 plus years	18.34%	95
Total Respondents: 518 (as one respondent identified that they 'did not use or have any association with Commonwealth Avenue Bridge'; they were skipped forward to later questions)		

Q7 How frequently in the past 12 months did you use or visit Commonwealth Avenue Bridge?

Respondents could only select one answer. A total of 518 respondents answered this question.

Answer Choices	Responses	
Weekly	47.30%	245
Daily	27.41%	142
Monthly	13.13%	68
A few times	10.23%	53
Once	1.35%	7
Not at all	0.58%	3
Total Respondents: 518		

Q8 How do you use or visit Commonwealth Avenue Bridge?

Respondents were asked to select the statement that best applied to them. Respondents could only select one answer. A total of 518 respondents answered this question.

Answer Choices	Responses	
I mainly use and/or visit Commonwealth Avenue Bridge by car	63.90%	331
I mainly use and/or visit Commonwealth Avenue Bridge by bike	19.11%	99
I mainly use and/or visit Commonwealth Avenue Bridge by bus	8.11%	42
I mainly use and/or visit Commonwealth Avenue Bridge by foot	7.92%	41
I mainly use and/or visit Commonwealth Avenue Bridge by another method (please specify)	0.97%	5
Total Respondents: 518		

The five respondents who selected 'Other' made the following comments:

Method	Responses	
Motorbike	40%	2
Boat	20%	1
Mixture of methods	40%	2
Total Respondents: 5		

Q9 If you have not used or visited Commonwealth Avenue Bridge, what is the source of your knowledge?

One respondent answered this question. As discussed above in Q4, only one respondent selected that they 'did not use or have any association with Commonwealth Avenue Bridge'. By selecting this response, they were automatically skipped forward to Q9. The respondent selected 'Own Research' as the source of their knowledge about Commonwealth Avenue Bridge.

Q10 Please identify if you are a member of one or more of the following organisations?

Respondents were asked to identify if they were a member of one or more of the following professional organisations. Respondents were allowed to select all that applied. A total of 519 respondents answered this question.

Answer Choices	Responses	
I am not a member of any of these organisations	71.10%	369
National Trust Australia	11.95%	62
Canberra and District Historical Society	8.67%	45
Australia ICOMOS	6.55%	34
Other heritage/design organisation (please specify)	6.17%	32
Lake Burley Griffin Guardians	5.59%	29
Engineers Australia/Engineering Heritage Australia	2.70%	14
Australian Institute of Architects	2.50%	13
Planning Institute of Australia	0.96%	5
Total Respondents: 519		

Of the 32 respondents that chose 'Other', additional heritage/design organisations that were mentioned included the Australian Garden History Society; Friends of Albert Hall; Canberra Modern; and Australian Museums and Galleries Association, among others. Other non-heritage/design organisations were also mentioned.

Values**Q10 How strongly do you agree or disagree with the following statements?**

Question 10 gave respondents a list of statements relating to Commonwealth Avenue Bridge and asked them to rate how strongly they agreed or disagreed with each one, using a six-point scale. Respondents were only allowed to select one option on the six-point scale per statement. A total of 519 respondents answered this question.

Statement	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	No Opinion/ Don't know
Commonwealth Avenue Bridge is part of my transport route	2.12% 11	5.01% 26	7.51% 39	28.32% 147	54.14% 281	2.89% 15
Commonwealth Avenue Bridge is a key part of Canberra's design and planning	1.73% 9	4.82% 25	9.06% 47	27.36% 142	54.34% 282	2.70% 14
Commonwealth Avenue Bridge is an important Canberra landmark	5.01% 26	8.67% 45	12.52% 65	25.82% 134	46.24% 240	1.73% 9
Commonwealth Avenue Bridge is no different to any other bridge	25.82% 134	31.41% 163	15.99% 83	16.57% 86	9.06% 47	1.16% 6
Commonwealth Avenue Bridge offers a great vantage point to appreciate the lake, special events and other elements of Canberra's urban landscape	1.93% 10	5.01% 26	9.63% 50	36.22% 188	44.70% 232	2.50% 13

Statement	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	No Opinion/ Don't know
Commonwealth Avenue Bridge is an engineering achievement	4.24% 22	7.90% 41	27.75% 144	28.32% 147	24.28% 126	7.51% 39
Commonwealth Avenue Bridge is outdated	37.57% 195	19.27% 100	18.88% 98	12.33% 64	10.02% 52	1.93% 10
Commonwealth Avenue Bridge has many attractive, interesting and surprising views	1.35% 7	2.89% 15	15.99% 83	36.99% 192	40.66% 211	2.12% 11
Commonwealth Avenue Bridge is important for undertaking recreation and leisure activities	1.93% 10	3.08% 16	13.10% 68	32.37% 168	46.24% 240	3.28% 17
Commonwealth Avenue Bridge is a symbol of Canberra	6.74% 35	12.14% 63	17.92% 93	22.74% 118	38.15% 198	2.31% 12

Total Respondents: 519

Combining the Strongly Agree and Agree columns provides an effective way to rank the relative strength of these responses. For example, 424 of the total 519 respondents (or 81.7%) agreed or strongly agreed that Commonwealth Avenue Bridge is a key part of Canberra's design and planning.

Statement	Combined
Commonwealth Avenue Bridge is part of my transport route	82.46% 428
Commonwealth Avenue Bridge is a key part of Canberra's design and planning	81.7% 424
Commonwealth Avenue Bridge is an important Canberra landmark	72.06% 374
Commonwealth Avenue Bridge is no different to any other bridge	25.63% 133
Commonwealth Avenue Bridge offers a great vantage point to appreciate the lake, special events and other elements of Canberra's urban landscape	80.92% 420
Commonwealth Avenue Bridge is an engineering achievement	52.6% 273
Commonwealth Avenue Bridge is outdated	22.35% 116
Commonwealth Avenue Bridge has many attractive, interesting and surprising views	77.65% 403
Commonwealth Avenue Bridge is important for undertaking recreation and leisure activities	78.61% 408
Commonwealth Avenue Bridge is a symbol of Canberra	60.89% 316

Total Respondents: 519

Q12 What aspects or qualities of Commonwealth Avenue Bridge do you like?

Respondents were allowed to select more than one response, therefore the total number of responses is greater than the number of respondents. A total of 519 respondents answered this question.

Answer Choices	Responses	
Connection to Lake Burley Griffin	72.25%	375
Views to and from the bridge	69.75%	362
Symmetry with Kings Avenue Bridge	67.05%	348
Pedestrian access	65.70%	341
Architectural design	45.47%	236
Engineering	26.20%	136
Waterloo Bridge stones	21.19%	110
Other (please specify)	16.18%	84
There are no aspects or qualities of the bridge that I like	4.43%	23
Total Respondents: 519		

A total of 84 respondents selected 'Other' and were asked to specify in an open-ended response those aspects or qualities they liked about Commonwealth Avenue Bridge which may have not been listed. Some responses reiterated the structured answers already provided. New aspects and/or qualities provided by the open-ended responses have been clustered based on their dominant idea and are included below in no particular order:

- bike access;
- links north and south Canberra;
- important element of route to Parliament House;
- functionality;
- duality;
- lighting;
- uniqueness;
- elegant, modern and simple design;
- sense of space;
- visually unobtrusive; and
- personal memories and experiences.

Q13 Which of the following words or phrases apply to Commonwealth Avenue Bridge?

Respondents were allowed to select more than one response. A total of 519 respondents answered this question.

Answer Choices	Responses	
Functional	81.70%	424
Elegant	45.86%	238
Symbolic	38.73%	201
Iconic	35.84%	186
Enduring	35.07%	182
Utilitarian	30.06%	156
Innovative	13.68%	71
Grand	11.18%	58
Boring	9.63%	50
Other (please specify)	8.86%	46
Unattractive	7.71%	40
Spiritual	4.24%	22
Total Respondents: 519		

A total of 46 respondents selected 'Other' and were asked to specify in an open-ended response any additional words or phrases that they think apply to Commonwealth Avenue Bridge. Some responses reiterated the structured answers already provided. Additional words or phrases provided by the open-ended responses have been clustered based on their dominant idea and are included below in no particular order:

- crowded and outdated;
- missed opportunity;
- suitable;
- graceful;
- simple;
- spacious;
- restrained;
- historic and part of Canberra;
- beautiful;
- familiar; and
- links the people to the National Parliament.

Q14 Which of the following statements best applies to your feelings about Commonwealth Avenue Bridge?

Respondents could only select one answer. A total of 519 respondents answered this question.

Answer Choices	Responses	
I feel a deep sense of ownership and/or responsibility towards Commonwealth Avenue Bridge	26.20%	136
I feel some connection towards Commonwealth Avenue Bridge	49.52%	257
I feel no connection towards Commonwealth Avenue Bridge	24.28%	126
Total Respondents: 519		

Q15 Do you have a favourite view of Commonwealth Avenue Bridge?

Respondents could only select one answer. A total of 519 respondents answered this question.

Answer Choices	Responses	
No	60.89%	316
Yes (please specify)	39.11%	203
Total Respondents: 519		

A total of 203 respondents selected 'Yes' and were asked to describe in an open-ended response their favourite view. The open-ended responses have been clustered together with data showing the number of times a particular view was mentioned. Single responses often mentioned multiple views, therefore the total number of responses is greater than the number of respondents.

Views	Times Mentioned	% of Total Respondents
View FROM bridge	98	48.27%
• East (ie toward the Carillon)	35	17.24%
• West (ie towards Black Mountain, Brindabella Mountains)	34	16.75%
• South (ie towards Parliament House)	21	10.34%
• North (ie towards Civic)	8	3.94%
View TO bridge	140	68.97%
• From the east (elevation/oblique side view)	28	13.79%
• From the west (elevation/oblique side view)	27	13.30%
• From south	6	2.96%
• From north	15	7.39%
• Void	43	21.18%
• Underneath and/or from water	11	5.42%
• Aerial	4	1.97%
• Night-time	5	2.46%
Neither view to nor from (ie bridge in water reflections)	1	0.49%
Total Respondents: 203		

Open-Response Questions

Q16 In your own words please describe why Commonwealth Avenue Bridge is (or is not) important to you?

Respondents were asked to describe in their own words if and why Commonwealth Avenue Bridge was important to them. A total of 401 respondents answered this question, although it was not mandatory. Due the high response rate, and for ease of analysis, the responses have been reviewed and clustered according to their dominant idea/theme with illustrative quotes provided.

Function and Amenity

- *I can't get to work without it.*
- *Much of my exercise centres around this area on a weekend. I see all types out walking, running, cycling in a harmonious manner.*
- *I ride to work. I use the bridge to get across the lake. It connects to the wider cycling network. The active travel connections are the most important to me.*
- *The bridge is important to me as an access route through Canberra and as part of a walking route around the lake. However, I do not know enough about the bridge to appreciate its importance in other ways.*
- *It is important as a significant travel route connecting north and south Canberra; accessible via car, bus, on foot and bicycle.*
- *It is important to me as it makes my commute across the lake easier. Though it is so busy as it is only 1 of 3 places you can cross the massive lake that divides Canberra. It is important as it is a major arterial road that connects Canberra's north and south.*
- *Serves a good function for travelling over and around the lake.*

Views and the Wider Canberra Landscape

- *It is elegant and gives UNINTERRUPTED views to the lake, National Museum and the Brindabellas.*
- *I love walking the lake with my husband, and enjoy the views on our way around.*
- *The bridge is understated and functional, but also has become an integral part of the views to and from Lake Burley Griffin.*
- *Commonwealth Avenue Bridge is important to me because it links and provides views to and from the many beautiful parkland spaces and national institutions nearby.*
- *I appreciate the simplicity of the lines of the bridge and vista along the space between the two roadways.*
- *It is an important transport corridor. It allows people to view the lake and other Canberra landmarks from a unique vantage point.*
- *Its presentation is distinctive of the Canberra style (eg restrained, classic) and it is an iconic part of our city. Its loss would be devastating. It also doesn't interrupt my appreciation of the greater landscape, it enhances it. It frames the area beautifully and sympathetically.*

Design and Planning

- *Commonwealth Avenue bridge is of a beautiful modernist design and sits lightly on the landscape leading up to Parliament House.*

- *I love the elegant simplicity of the design that chimes so well with the other national edifice buildings of Canberra.*
- *It is a key part of the Griffin Plan in that it was meant to be subtle enough not to disrupt the views of the bush.*
- *It is part of Canberra's frame on which the city is build. The symmetry of the bridge is very important to the aesthetics of the lake and surrounds.*
- *An elegant engineering solution that defines an edge of the Parliamentary Triangle.*
- *The Bridge fits perfectly in the landscape setting and the simplicity of the design is enduring. It speaks of Canberra's modernity, as a designed city in the landscape.*
- *It creates an elegant balance with Kings Avenue Bridge – reinforcing one of the principal axes of the Parliamentary Triangle, core of our planned Capital City.*

Place-making and Sense of Identity

- *It's part of my memories of Canberra – my daily bike commute, my lunchtime runs. On the best days, I remember feeling a sense of optimism – a wide sky, the lake and parliament house.*
- *It has been there ever since I have been in Canberra.*
- *A bridge I've known from its birth. Though I haven't lived here for 43 yrs until past 2 years retirement, Commonwealth and Kings Ave bridges are central to this beautiful city. To me crossing the bridge gives a deep sense of connection. Home! The old tree plantings on the southern side have significant historical links too. I grew up with a lot of the influence of Walter Burley Griffins plans for Canberra, do people know this today ?? This bridge is a central part of Walter Burley Griffins vision. The Lake is his name sake and vision the bridges and landscape all link together. A significant part of Canberra, its backbone.*
- *The bridge connects me to Canberra. I recall the old white timber bridge and the opening of the lake with new bridge symbolises a dream of many residents.*
- *I watched it being built along with Kings Ave, and the filling of the lake. Together they have provided the structure, connection and fabric which Canberra has grown around, and make it the city it is today. It has and should always be the central family and community, recreational space for residents and visitors to enjoy.*
- *Part of my history and culture – I grew up in Canberra – and an important part of Canberra's heritage. Plus, I love that the lanes going in opposite directions are split with a big gap in the middle right down to the water. Stuart Andrews once drank champagne at a table and chairs strung between the two sides – wearing a tuxedo! There is a photo of it at Fit-to-Manage in Deakin. I'm sure there are many stories. ...*
- *It is quintessential Canberra and please don't mess with it.*

Symbolic Link

- *Canberra is defined by its north and south, and the bridge connects the two.*
- *It is important to me because it connects the North and South sides, with fantastic views of Canberra Landmarks.*
- *Commonwealth Avenue Bridge connects Canberra's densest concentration of social and economic activity (Civic) with the most important precinct in the nation (Parliament House and the Parliamentary Zone). It is also a key part of Canberra's main north/south inter-town public transport route. In this sense, it has immense functional and symbolic significance for Canberra as both a federal and municipal city.*
- *I love the design of the exposed concrete. It provides a feeling of formal link between Parliament, the lake and the city. It is part of what makes Canberra the place that it is. Formal grandeur vistas centralised around parliament house.*

- *Its view to Parliament house and the city going either direction adds to its symbolism as a key thoroughfare through the capital.*
- *The bridge is an iconic piece of Canberra infrastructure. The arcing road deck has become a symbolic threshold while crossing from north to south Canberra (vice versa).*
- *It is an important connection to the Lake Burley Griffin.*

Landmark Qualities

- *It's an icon in Canberra, vastly important infrastructure, great viewing platform and a major feature of the Parliamentary triangle.*
- *It is memorable from the very first visit to Canberra how Commonwealth Avenue is straight as an arrow across the lake directing towards Parliament House, and the low profile of the bridge creates a sense of drama to the eyelines such that the path to power is unobstructed.*
- *It is very important and I feel part of the National Capitol to show to the world.*
- *I think it is an iconic piece of architecture which fits in with other surrounding iconic buildings ie. National Library, Hyatt Hotel etc.*
- *I know I am near the middle of our capital city when I drive over it to get to the NLA, the NGA, the Parliament, the Hyatt Hotel and many other places.*
- *I think it is iconic to Canberra.*

Q17 Please describe any events, stories or memories you have of Commonwealth Avenue Bridge?

Respondents were asked to describe any events, stories or memories that they have of Commonwealth Avenue Bridge. A total of 269 respondents answered this question, although it was not mandatory. Due the high response rate, and for ease of analysis, the responses have been reviewed and clustered according to their dominant idea with relevant quotes also provided.

Recreation and Leisure

- *Rowing training on frosty winter mornings, sheltering under the bridge in a shower, or from the hot sun in summer. Taking care to miss the pylons when concentrating on the movement of oars and boat. The beautiful rhythm of light and shade crossing under first one roadway then the next with the relief of both light between then shade; two stripes of shade across the water. Seeing the water rippling below when driving across the bridge on the inside lane. The sound and sensation of riding my bike across the once very uneven paving of the pedestrian path. Another cyclist coming towards me and their handbar colliding with/connecting with the back of my hand. My little girl being frightened by the traffic as we scooted across. The lovely strip of down lighting from the hand rail.*
- *Kayaking and rowing on a frosty morning under the bridge when the waters are still. Strong memories as a child paddle boating under the bridge to the jet fountain and getting wet.*
- *just walking across the bridge many times from south to north and v versa.*
- *Dog walking days, marathons, thrice weekly bridge to bridge runs when working in Civic.*
- *I used to live in the Ranger's Cottage in Commonwealth Park (1971–1973) and it was part of my favourite run around the bridges in the mornings.*
- *Catching yabbies under it when I was a child.*

- *Many, many bridge to bridge walks, admiring the lake and its environs. It symbolises arrival 'home' after any absence from the city.*
- *I see it everytime I paddle, imposing and impressive in the distance beckoning us to pass under it.*
- *Many happy memories either walking or cycling the bridge-to-bridge route. A great way to clear your head while the scenery and greenery lift your spirits.*
- *The regular pleasure of crossing the Bridge, by foot, bicycle and vehicle, and seeing the full lake vista as one crosses.*

Public Events

- *I remember standing on the bike path at the south end when the hospital was imploded.*
- *I've watched many events from the bridge, sky fire, balloons, even an exploding hospital.*
- *The fireworks 'waterfall' from the bridge. The hot air balloons going over the bridge.*
- *Yes. I remember attending a birdman rally many years ago and watching very brave (or very foolish!) would-be airmen attempting to achieve the impossible.*
- *Crossing the bridge on foot on a warm night during Enlighten with my young Daughter and Father. Peaceful and serene in the dark. We saw a possum upon return trip to the car. Typical Canberran city meets bush moment.*
- *Watching fireworks and fly overs. Driving over it to major events and home. A pathway for major protest activities.*
- *F18 fighter jet doing a dump and burn over Commonwealth Avenue Bridge as part of Skyfire.*
- *I have fond memories of seeing fireworks like a waterfall coming off the bridge. I recall the motorcade of President George HW Bush driving over the bridge – while the car procession was impressive, the grand scale of the bridge looked very appropriate for our nation's capital.*
- *walking over it to go to floriade when i was younger. and sitting near it on the sky fire night the first ones!!*
- *The walk across Commonwealth Avenue Bridge on the First Sorry Day.*
- *Walking across it in the company of other like-minded citizens as part of a number of civic demonstrations en route to Parliament House.*
- *I marched across it once in a university protest against the introduction of tertiary fees.*
- *1976 bicycle ride against uranium sit down.*

Driving

- *Driving across it for the first time as a child and it still holds that special place in my heart.*
- *In the 1960–70s, there was always a heavy stream of cars crossing the Commonwealth Ave bridge on a Friday and Saturday night around 11pm – the Starlight driving in theatre had finished and South side people were going home.*
- *Watching rowing as I drive to work.*
- *Morning traffic.*
- *When I first moved to Canberra to work for the public service, I remember driving across Canberra Avenue Bridge for the first time and seeing the flag atop Parliament – it gave me a sense of purpose. I enjoy that aspect of the drive every day.*

- *I remember first visiting Canberra in 1993 and heading to a party in Forrest. Driving south across the bridge at night and heading across the lake with the view of lights and Parliament House ahead is still a vivid memory of my visit til this day.*
- *I remember driving over the bridge on the day the twin towers fell and looking at the view of Parliament House and thinking how lucky we are to live in Australia.*

Accidents/Incidents

- *My daughter crashed her car once approaching the bridge.*
- *I remember being driven underneath as it was being built in 1963 and later unfortunately someone driving off the bridge to their death when the bridge was new before the metal piping was put along the footpath edges to prevent this happening again !!!*
- *Several years ago a star picket metal post was thrown from the bridge piercing the structure of the Saloon on the PS Enterprise. Fortunately no one was injured and unfortunately the miscreant escaped.*
- *I have had many trips across Commonwealth Avenue Bridge. To be honest, my memories are primarily of difficult traffic along the bridge and feeling unsafe as a pedestrian in a fairly hostile environment. It is not a place I associate with wanting to stop and enjoy as it is so busy and spaces for pedestrians are so confined.*
- *No specific memories, however I do have associations with feeling unsafe/crowded riding a bicycle and walking across the bridge due to limited space for cyclists and foot traffic.*

Wind

- *Almost being blown off with my sister.*
- *My strongest memory of the bridge is riding across it one morning when the wind was howling down the lake. I could barely make it across and thought I might end up in the lake if it went badly. That was long before the new railing between cars and bikes was put in and I also almost ended up in the morning traffic. Scary at the time, exciting too. Not as high or scary as Golden Gate Bridge or Lions Gate Bridges (in San Fran and Vancouver respectively – I've also ridden across those).*
- *Only jogging over it trying to run 5km and getting blasted by winds.*
- *Its [sic] subject to some strong crosswinds.*

Nature, Seasons

- *Running over the bridge a few years ago in a massive storm. Traffic pushed waves of water at me as thunder rolling rumbled and lightning crashed around me.*
- *Driving across in different times of the year and enjoying the unique real seasons in Canberra.*
- *I love seeing the pigeons roosting when I'm stuck in peak hour traffic...*
- *memories are when all the seagulls used to come in and cover the green lawns on the south of the bridge.*
- *I've walked the bridge to bridge circuit dozens of times – in snow, sleet, rain, wind and extreme heat. The feeling of exposure and views of the lake, national institutions are always special.*
- *The view from the bridge of the trees lining the lake from Nat Library to NGA in blossom.*

Captain Cook Memorial Jet

- *many memories of crossing the bridge walking, riding, in a horse drawn carriage and getting drenched when the wind blew water from the Captain Cook fountain.*
- *April 1970 for the 'opening' of the fountain.*
- *Driving across with a strong easterly covering my car with water from the fountain.*
- *being sprayed by water from the fountain on a windy day...*
- *Going across the bridge (eastern side in particular) and being 'sprayed' by the Captain Cook Memorial jet.*

Prior to Construction and Construction

- *Way before its construction, I used to horse ride under where it now is (in the 1950s & 60s)!*
- *I remember when it was built and Lake Burley Griffin was developed and filled with water. Used to go horse riding near where the bridge is now located.*
- *The destruction of the old bridge and the building of Commonwealth Bridge...*
- *first used when there was river underneath it!*
- *I recall when 14 years old arriving back in Australia in late 1962 from 4.5years overseas in Europe and seeing the new Commonwealth Avenue Bridge under construction. I recalled the earlier bridge, and that this one was very different in design, part of the lake being finally developed as envisaged by Walter Burley Griffin.*
- *Mucked around it when it was being built.*
- *I remember seeing it being built.*
- *i crawled through it during its construction!!*
- *I remember when it wasn't there, just a wooden bridge across the river through a lucerne paddock, I remember watching it be built on the open dry land and then the as the lake filled up, it transformed into something soaring and magnificent. It was magical and it still is.*
- *Walking through it (under the roadway via the doors in the podiums at each end) when it was under construction.*

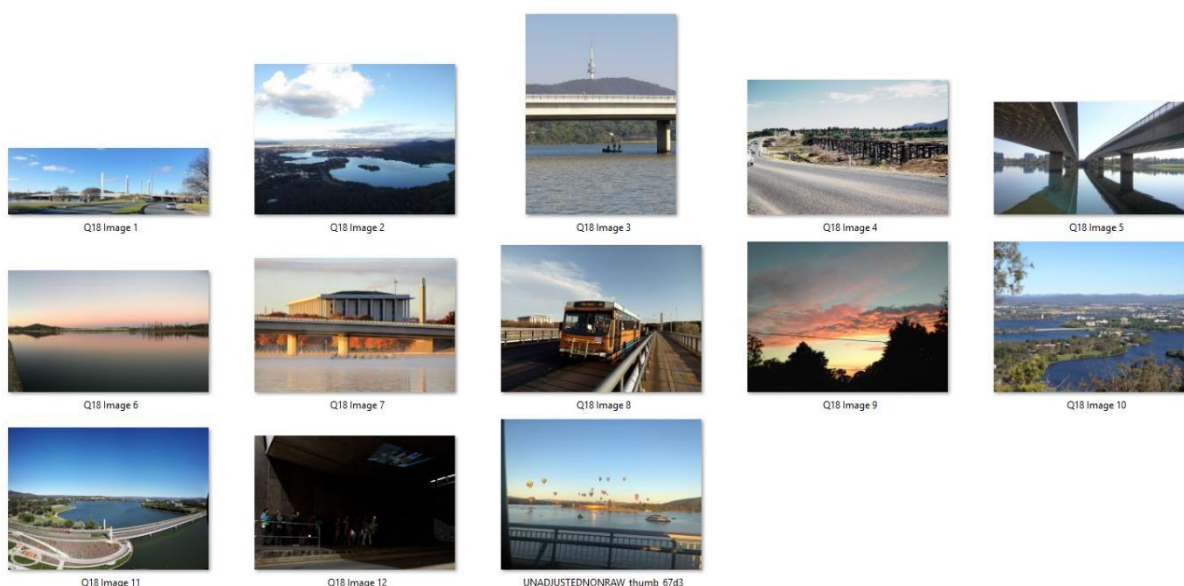
Friends and Family

- *I often use the time to call family in Melbourne, and often call them and send photos of my walk.*
- *Walking across the bridge with family as a social form of exercise. It feels nice – open, breezy, wide views and this seems to prompt reflective family conversations.*
- *Carrying my large dog over the bridge once he discovered we were high over water.*
- *My favourite memory is the time one October when two friends and I walked from the National Library to Acton for an impromptu dinner – the sun was setting, we looked over the lake – all sojourners in Canberra – and we appreciated its beauty...*
- *I rode my pushbike across it in my first week in Canberra to get to my embassy. I stopped along the way because the view was so pretty and took a video to send to my family overseas. I felt proud to be living in Canberra, such a green and cultural city.*

- *Meeting my husband-to-be on my bike every morning at the Australian of the Year photos and cycling from there over the bridge (or sometimes Kings Ave) to work in the city. Many childhood memories too. The questions make me realise I should have photographed it more.*
- *So love driving north across the Bridge at night to pick up my son from ANU, with the surrounding lights along the shoreline sparkling. And in the day the tree lined/green shoreline is equally beautiful. Have enjoyed walkathons and family Bridge to Bridge walks. Too many memories to recount all.*
- *Going on a lake excursion by paddleos with my grandchildren from east and west basins on the lake. They insisted staying underneath the bridge to touch each pillar before proceeding further. It was important to them as part of the lake.*

Q18 If Commonwealth Avenue Bridge has been the subject for your photography or other artistic endeavours, you are invited to upload an image.

Thirteen respondents answered this question. Thumbnails of the images are shown below.



Q19 Is there anything else you would like to add?

Respondents were offered the opportunity to provide additional thoughts. This question was not mandatory; however, 237 respondents answered this question.

The majority of responses received made reference to the current ACT Light Rail City to Woden project, with respondents expressing their personal views on what they would like to see occur. Other concerns such as maintenance of the bridge and the bike/pedestrian pathways were also mentioned. In terms of understanding the aesthetic and social values of Commonwealth Avenue Bridge, the responses did not add significantly to the data. Some memorable comments offered include the following:

- *When it was being built (and I was a boy) one of the men working on it told me they were building it for a thousand years. I believed him and I still do. If that beautiful structure is still there after a thousand years, at least we will have achieved something here.*
- *The key elements of the design of Canberra need to be retained including the intangible value of the views to the Brindabellas and the important iconic design elements that the Griffins provided for all Canberrans to be proud of*

GML Heritage

- *Check out how Commonwealth Ave bridge is used in television programs such as Total Control to represent Canberra and the link to Parliament House; it has been interesting to watch this use of the Bridge in film increase over the years.*
- *The Waterloo stones need to be re-interpreted. Link context to CBR's own stories of Waterloo survivors / early settlers and the UK women welders who built the second Waterloo Bridge in WW2.*
- *Clearly the Bridge is iconic and represents much of the Canberra planning heritage of creating an attractive city to work and live in.*
- *The Bridge was designed to physically link, for the foreseeable future, the core north and south parts of Canberra, as does the Lake as a landscape feature, although more practically in a transport sense, and it continues to do so, elegantly. So it has utilitarian, commercial, social and political qualities because of this, not just aesthetic and design virtues.*
- *It's an understated, timeless, and competent design from the times when Canberra was being built as a national capital city to embody the same values.*
- *In many ways it's the centre of the city.*
- *I think that the Commonwealth Avenue Bridge is an important part of Canberra's transport network and urban landscape. Any changes to the bridge should be carefully considered and their impact to the social values of the bridge be taken into account.*
- *If you want to see how to add a rail track to the CAB, check out what we did in Perth with the Narrows Bridge. Engineering done perfectly!*
- *We could examine the possibility of another 'Nippon Clipon' (for trams), similar to the one attached to the Auckland bridge in NZ to increase traffic capacity.*

Q20 If you would be interested in being contacted to discuss the heritage values of Commonwealth Avenue Bridge further, please leave your details.

A total of 119 respondents answered this question; however, details have not been reported for privacy reasons.

Appendix C

Focus Group Workshop Summary

Appendix C—Focus Group Workshop Summary

Introduction

Two focus groups were held to assist in understanding the views of local Canberra people who have direct and potentially long-standing, continuing, strong or special associations with Commonwealth Avenue Bridge (CAB). Members of the groups were drawn from the CAB online survey respondents who had indicated a willingness to participate in a focus group. The two focus groups comprised small, facilitated discussions with participants from (though not representatives of) targeted groups:

- **Focus Group 1:** Heritage practitioners, professionals, and heritage-related interest groups. This group comprised 10 participants with interests linked to a range of community and heritage organisations including National Trust of Australia, Australian Institute of Architects, Lake Burley Griffin Guardians, Engineers Australia/Engineering Heritage Australia, Walter Burley Griffin Society, ICOMOS, and Australian Museums and Galleries Association. All participants are current residents of Canberra.
- **Focus Group 2:** Recreational users, photographers, and others. This group comprised seven participants. It included people with connections to the CAB, some of whom identify as users of the place and its surroundings for recreational activities and/or for photographic and/or other artistic endeavours, as well as association through being residents of Canberra.

Table 1 provides a summary of the responses from the two workshops and includes a column entitled 'Themes / Key Terms' to provide a summary of the topics covered in the discussions with particular reference to the Commonwealth Avenue Bridge and its setting. While cognisant of the Australian Historic Themes Framework¹ (AHTF), the 'Themes / Key Terms' do not specifically reference this framework.²

The following acronyms are used in the table: AWM (Australian War Memorial); AHTF (Australian Historic Themes Framework); CAB (Commonwealth Avenue Bridge); CMAG (Canberra Museum and Art Gallery); KAB (Kings Avenue Bridge); LBG (Lake Burley Griffin); NLA (National Library of Australia); NMA (National Museum of Australia).

Table 1 Commonwealth Avenue Bridge Social and Aesthetic Values Study: Summary of Focus Group Discussions.

Topic	Focus Group 1: Range of Responses	Focus Group 2: Range of Responses	Themes/Key Terms
Length of association	- Most participants are long-time residents of Canberra (extending from 1945, 1946, and 1948, for example). Some have lived here continuously for long periods (longest period of residence was 74 years and the shortest 15 years), while others have lived intermittently in Canberra over a long period. - Three participants recollected the wooden bridge that was replaced by CAB in the early 1960s. One participant rode his bicycle across the wooden bridge over a period of five years in order to attend school.	The length of residence in Canberra varied across the participants. These ranged from 18 months (though a regular visitor prior to this) to 56 years (with some breaks). Four participants have lived in Canberra for 30–35 years, with two of these having lived all their lives in the national capital.	- Phases of bridge construction - CAB as part of daily urban life
Word or short phrase that sums up your response to CAB?	- Unimposing - Modernist - Icon - Part of a triangle - Paired, Pairing, Twinning, Symmetry (with Kings Avenue Bridge); that lead north to Parliament House - Gorgeous structure - Associational; Historic value; Sense of place - Experiences of riding over (in light, dark, frost, snow) and sailing under structure (plus walking and running) - Improvement on pre-CAB structure! - Functional - Elegant - Beauty - Minimal, Graceful arches - Access - Link to early Canberra history ('pre-lake people') - Non-static, changing structure (eg blue night-time lighting) - Graceful, Unobtrusive, Essential - Thrilled by the CAB's space and geometry - Understated architectural expression - Extension of Northbourne Avenue - Symmetry	- Symbolic—links local with Federal, Civic to Capital Hill - Functional—major arterial link, transport—used for travel by car and bicycle 'Lovely looking bridge'; 'fine shape' - Balanced by Kings Avenue Bridge (KAB); symmetry with KAB - Part of the Parliamentary Triangle; the CAB pays homage to the Walter and Marion Griffin plan 'as important as Parliament' - Structure has pleasing lines - Views—can see through and across the CAB - Fine example of mid-century, streamlined architecture - Inclusivity—unifies parts of Lake Burley Griffin (LBG) - Brings people and society together; CAB has inclusivity and brings people together 'ray of light' as symbolic of 'union' between one part of Canberra and our Democratic heart - Symbolic of democracy - CAB is far superior to KAB for cyclists - Designed to be accessible - CAB viewing platform enables people to gather (though can cause conflicts with cycle traffic); kids to view Skyfire - CAB as 'home'; 'I know I'm home'—association - CAB as a place with memories of life—commuting, learning to drive, going to exams, travelling over CAB in a pink	Aesthetic terms - Elegant - Graceful - Icon - Symmetry - Unimposing - Unobtrusive - Experiential - Evocative Association with: - Griffin Plan, Parliamentary Triangle, geometry - Democracy & 'Commonwealth' - Individual & collective memory - Landscape setting - Recreation (cycling, walking, jogging,

Topic	Focus Group 1: Range of Responses	Focus Group 2: Range of Responses	Themes/Key Terms
	- Bifurcated bridge which reduces bulk, makes it look slender - Gracility (slender), Gracefulness of the curve 'Appropriateness' (to landscape setting) - Dual arches, horizontal - Relates to & acknowledges place, suits Modernist landscape of Lake Burley Griffin - Low design, unobtrusive, defines vista - Columns on south side focus view when travelling south - Link north–south, south–north	- cement truck, demonstrations, travelling to Albert Hall for Eisteddfod competitions, graduation ceremonies, birthdays, visits by the Queen (ie life events associated with crossing the bridge). 'It's the story of my life' - Views to the Brindabella Ranges, LBG, water jet - CAB as simple, elegant and subtly imposing - Crossing the bridge by bus; and regularity of crossing CAB as a bus driver (participant's father does this up to 20 times a day)	- sailing, photography) - Place-making - Identity - Linkages, unity
What do you most love about CAB? What image comes to mind? What feelings & memories does it evoke?	- Cursive, spacious, frames views (eg flag display along National Library of Australia [NLA] waterfront) - Demonstration with people occupying three lanes (1976 anti-uranium ride). '...image of three lanes of CAB being covered by people' - Approach to CAB as nationally important (toward Australian Parliament House with flags along Commonwealth Avenue); a public space and 'ceremonial' place for protests & marches; side view allows appreciation of Griffin aesthetic (doesn't block views); Modernist design aesthetic - Gentle curve; processional route (2003 anti-Iraq invasion); views from bridge (mountains, Carillon) - Spans across CAB; views from cycle path (from west side) - Sensation of 'floating' and lightness (no sense of bridge being supported when on the bridge); large amount of non-car traffic (walkers, runners, cyclists); lack of heavy traffic—both in terms of use by trucks and numbers of vehicles; Lake views from car, though blocked by installation of new safety rail (though for cyclists views are wonderful) - Emotion felt when standing on the footpath in the eastern arch—viewing reflection of arch of CAB and shadows; Carillon - View of bridge when riding a bicycle alongside National Library—sense of movement/travelling; CAB in changing seasons, mornings & evenings; participation in demonstrations (eg Reconciliation Day with children) - Respect for CAB architects, engineers—success of interdisciplinary project; long spans, curves; respect for Griffin layout; experience/awareness of CAB while driving along Parkes Way; view between spans (bifurcation of carriageways), which reduces bulk of the structure; quality of light	- CAB: visual clean lines - Leaving the day/angst behind; creates an 'empty mind' and feelings of freedom. Absence of traffic lights adds to this - Feelings of anticipation and not really looking at the CAB (in contrast to Sydney Harbour). ie not experiencing the bridge when on it - Exhilaration of being on CAB - Travelling over CAB and sense looking toward a destination - Associate CAB with a typical cold Canberra morning with mist rising off the lake and the sun shining on your face - Comparable to the Narrows Bridge across the Swan River in Perth - The north–south link is symbolic. 'It's a link in a chain' (and contrasts with Malcolm Fraser Bridge that has no such sense of connection) - The subtle rise and fall when crossing the bridge - The 'turrets' and pylons, which frame the bridge and are aesthetically pleasing. The pylons frame the bridge³ - Enjoyment of non-work-related activities, such as travelling over the bridge for recreational activities (eg to see a movie) and walking around the Lake - Waterloo Bridge stones symbolise links to the UK at the time the stones were gifted	Emotional associations - Sensory experience linked to architecture, seasons, weather, views, recreational activities - Sense of movement, travel - Sense of community - Exhilaration - Anticipation - Freedom - Personal memories, events, protests, demonstrations - Frustration

Topic	Focus Group 1: Range of Responses	Focus Group 2: Range of Responses	Themes/Key Terms
	- View from near water level between the two spans—shows how underside of carriageways are not horizontal, but gently curve; connection with novels, TV (eg <i>Total Control</i>; <i>Secret City</i>) & film; sense of purpose—‘attracts me’—calming; View from top on a typical Canberra day—sunny with brisk winds; splashing effect (‘car wash’) of Captain Cooks Fountain (locally known as ‘CCs piss’) - Additional points: references to CAB as setting in literature and film; approach southward to Hyatt Hotel, NLA, High Commissions; Waterloo Stones as a link to history of empire and aggrandisement (elevation); importance of engineering heritage (eg box girders, pre-stressed concrete); views of boats on the lake, experience of sailing/rowing under CAB; intrusiveness of light poles; use of Kings Avenue Bridge for dignitaries & high-security visitors arriving from Airport; CAB contributes to ‘spatial awareness’ of where you are	- Views to/from the Carillon, NLA, Jet (including from highest point on the CAB when driving). The eye follows the mountains - Robert Menzies: CAB as ‘the finest building in the national capital’⁴ - Spray of water from jet when travelling over—children in car liked experiencing this - Like seeing buses on the bridge; and the full length of the structure. Like views from the bridge; walking on the bridge during a torrential downpour; the view to the NLA ‘Sense of arrival’ into the nation’s capital. Driving over CAB when arriving from Melbourne or Sydney and travelling to Parliament House - Connection with Floriade (the anticipation of walking over the CAB to Floriade in Commonwealth Park) - Use as a thoroughfare (eg Murray-Darling Basin truck—protest route to Parliament House) - George Bush Senior motorcade used CAB on 1992 (rather than KAB). Similarly with LBJ visit (stayed at Canberra Rex)? - KAB as ‘ceremonial’ (use by MPs, Governor General, distinguished visitors, state visits—and FIFO) versus CAB as ‘domestic’ (use by ACT residents) - Ceremonial route is typically via KAB to Parliament, then via CAB to AWM - Historically fruit trucks would park at Capital Hill to sell fresh fruit. Many Canberra residents would travel over CAB to buy fresh fruit - Negatives: can be very windy (for cyclists especially) and catches every breeze; narrow bike path that is not separated from pedestrians (and tourists use the pathways to stop and take in views, blocking the path); temporary rails on west side; surface materials (concrete pavers on pathways are bumpy for bikes)	Other associations - Film and literature references - Historical connections - Events, ceremony, processional route, comparison to KAB

Topic	Focus Group 1: Range of Responses	Focus Group 2: Range of Responses	Themes/Key Terms
		• Camaraderie amongst people walking across bridge—socially, protests, marches, people travelling back home from events/functions (like Skyfire) • Enjoyment of walking under the bridge to Lennox Gardens—a feeling of leaving the city behind. Enjoy landscaping on undersides of CAB • However, the view to the east has too much competition (ie NMA) • Exhilaration of sailing under the bridge (though access for such can be limited where boat sails are too high). The ‘hump’ in the bridge was made for sailing vessels, but has not been successful • Bridge can feel long when walking across it • Understated part of the Griffin Plan	
Favourite view of CAB	• View from Parkes Way in the evening to CAB and seeing the blue strip of light • View from near water level between the two spans • View from Mount Ainslie—Marion Mahoney Griffin view, which gives a vista and shows the Canberra plan/triangle, puts Canberra in perspective • View from Capital Hill, the grass roof, from where can see the whole triangle, as well as CAB symmetry and dual carriageway design • View from cycle path near Commonwealth Park • Plan/aerial view that shows CAB in the context of the Griffin plan • Views from lakeside with Black Mountain in the background • Least favourite view—from a car window • View from CAB to the huge expanse of landscape setting and associated features • View of CAB from on LBG when sailing in the twilight series; and along sailing route from city to sailing club • Many views and images driving along Parkes Way as early morning & late afternoon unfold • View to Bullen Range; and on occasion when can see snow on the Kosciuszko Range	• 11.00pm from KAB to CAB when lights and Central Basin are visible (on late evenings leaving work; riding home after a cricket match in summer; in winter from an open car window when frosty). Late evening views are associated with a sense of quiet and stillness • View from Parkes Way after Acton Tunnel. Likes the ‘glimpse’ and angle of CAB—especially in the morning. Aligns with a Griffin Plan water axis • Bicycle ride up from Flynn’s Drive and Lennox Garden in winter when there is frost and CAB ‘emerges into view’ through mist • During the day when people are rowing under CAB • View from Katie Bender Memorial from area of willow trees • <i>Secret City</i>—the TV show which is a ‘poem to Canberra’. It is beautiful the way that CAB is shown • ‘Fantastic’ views from the NMA—shows CAB as ‘more than the sum of its parts’ • While the NMA is the ‘biggest disaster’, there is a great view to CAB from the loading dock ... and from two seats in the café. The view from here is a ‘lost opportunity’	Special views to CAB from: • Mount Ainslie • Parkes Way • Capital Hill • Cycle ways • Parklands • Lake Burley Griffin • City Hill • Regatta Point • NMA • KAB • Katie Bender Memorial • Carillon Special views from CAB to: • LBG

Topic	Focus Group 1: Range of Responses	Focus Group 2: Range of Responses	Themes/Key Terms
	- Views as a 'moving vista' - There is not any view to be disliked! - Light poles on CAB as unobtrusive - Not just a bridge; part of a landscape aesthetic; part of a panorama - Horizontal design - Whether walking or cycling, CAB promotes views to and from the structure - Iconic place (icon having religious associations), 'a venerated image' - CAB has equivalence to Black Mountain Tower and Mount Ainslie as part of the identity of Canberra - Views are tied to the technical achievement of the bridge, its uniformity, colour and tone control through the use of concrete	- View from Henry Rolland Park is another way people can appreciate the view. The symbolism (connecting Capital Hill, the apex of the Griffin Plan; and the idea of democracy associated with Parliament House). Can see the mid-century stream-lined route. Retention of the artistic and functional character - Maintaining the vistas of CAB is essential - Canberra is the national capital and represents the nation. Vista to national parks - Compared to Washington DC—where buildings are 'imposed' on the landscape (eighteenth/nineteenth centuries) and that balance is 'not right'. The CAB emphasises Australian tradition - When CAB was completed, the 'hump' (in part to allow sail boats underneath) was seen as an issue. Now it is seen in a positive light, since the hump now creates a sense of exhilaration and anticipation - Views to the pylons - View from Regatta Point - Fireworks display on the bridge - View from City Hill—hard to get to but a nice view - Night views to strobe lighting under handrails as travelling over 'clover' leaves; and of cyclists - In any future development, the aesthetics of the CAB need to be maintained. The best views are from the central, highest part of the bridge—to Central Basin; Parliament House; Parliament House flag; City Hill; Brindabella Range; Arboretum. The views from the lower parts of CAB to NLA and other buildings. And views of the trees between the NLA and High Court, which are colourful, change seasonally, and beautiful. Beautiful views travelling south in winter with lights on the buildings and the flag billowing - The view is not the same to and from KAB - CAB is 'understated' and sympathetic to Griffin Plan. Should be maintained	- Central Basin - Parliament House and flag - City Hill - Brindabellas & other ranges - Arboretum - NLA - High Court - Black Mountain / Tower - Captain Cook's Fountain - Carillon

Topic	Focus Group 1: Range of Responses	Focus Group 2: Range of Responses	Themes/Key Terms
		- Commonwealth Avenue has a park-like quality - Croquet lawn, with Canadian and New Zealand High Commissions on Commonwealth Avenue, illustrative of a white British Empire. Opposite the croquet green is the monument to the Magna Carta. These, with Albert Hall, are echoes of a colonial society - CAB notable for not having development immediately adjacent to it; no businesses either	
Additional remarks	- Other potential focus groups—car drivers, bus drivers, rowing community (use CAB as a marker) - Engineering achievement of bridge due to its uniform colour achieved by control of the colouring of concrete 'Commonwealth' as an important word - There are currently four Heritage Management Plans, but CAB is not included in any of these. Why has NCA split these up? - What is CAB's role as a component of potential National and World heritage listing? - CMAG as a source of images and ability to scrutinise social media accounts/data	Participant's father worked for the Parks and Gardens Department, which was set up on a clover leaf for some time?	—

Endnotes

¹ Australian Historic Themes Framework, Commonwealth of Australia 2001.

² Relevant ***Australian Historic Themes*** noted include:

- 3.8.7 Building and maintaining roads
- 3.14.1 Building to suit Australian conditions
- 4.1.4 Creating capital cities
- 4.1.5 Developing city centres
- 4.2 Supplying urban services
- 4.6 Remembering significant phases in the development of settlements, towns and cities
- 7.2.1 Protesting
- 7.8 Establishing regional and local identity
- 8.10.2 Creating visual arts

GML Heritage

- 8.13 Living in cities and suburbs
 - 9. Marking the phases of life
- ³ One pylon is used as a sewer vent; the others are decorative.
- ⁴ Sparke, E 1988, *Canberra 1954–1980*, Australian Government Publishing Service, p 138.

Appendix B

Additional Technical Information and Images

Appendix B—Additional Technical Information and Images

Bridge Stressing

The following is an extract from the National Association of Australia State Road Authorities (NAASRA) Symposium.¹

In-situ Segments

At each pier and at one third of the way along each span are located poured in-situ diaphragms of prestressed concrete. Diaphragms are continuous from flange to flange and from outer web to outer web of the superstructure except for access holes and some smaller diameter service holes (see Figure 7 below).

The pier diaphragms are 3' 6" thick and are prestressed both vertically and transversely with 12/0.276.

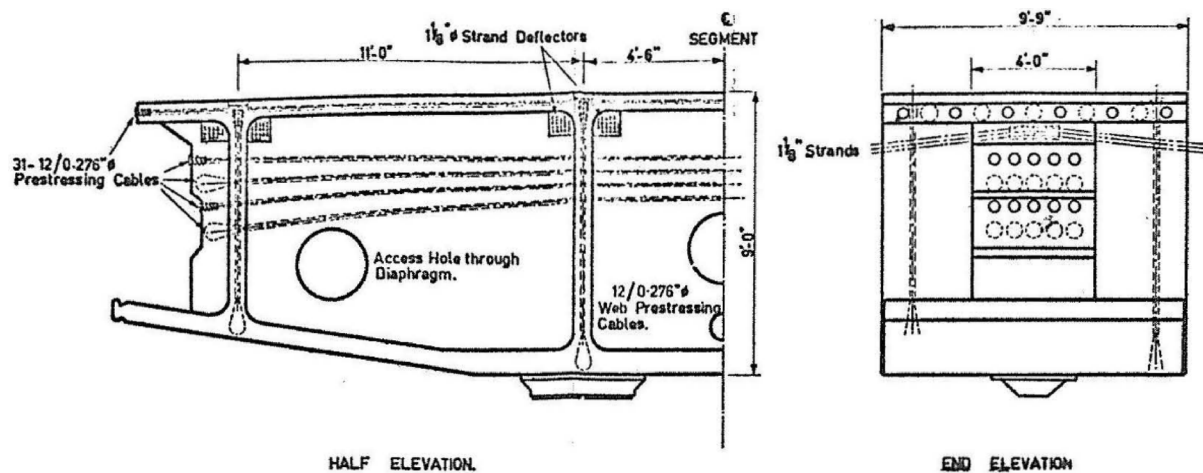


Fig. 7.—Commonwealth Avenue Bridge—Transverse Pier Diaphragm.

Freyssinet cables enclosed in metal ducts. The intermediate diaphragms are 1' 3" thick, of the same shape as the pier diaphragms and are prestressed horizontally with eight 12-wire Freyssinet cables.

Infill Concrete and Temporary Stressing

Infill concrete jointing between segments commenced at the North Abutment and proceeded south. As soon as all joints in the first span (span 5) had been concreted and attained a compressive strength of 1,000 lb/sq.in., four longitudinal cables were threaded through this span and stressed to a load of 45 tons only so as to prevent relative movement between adjacent segments with resultant damage to the infill concrete. These cables were later restressed to the design load when permanent stressing took place, and formed part of the final stressing.

This procedure was followed in all spans, leaving one joint open between spans, with the difference that the cables in spans 2 and 4 were purely temporary and were anchored on temporary 3" thick steel plates fitted in the infill joint adjacent to the piers. The temporary cables and anchorages in these spans were removed subsequent to final stressing.

The joints between temporarily stressed sections in each bridge were left open until all spans had been completed. At this time the final four joints were concreted simultaneously using high early strength cement. When this concrete had reached a strength of 1,000 p.s.i the first eight full length stressing cables

which had been threaded through the structure previously were stressed to full load and final stressing continued the next day.

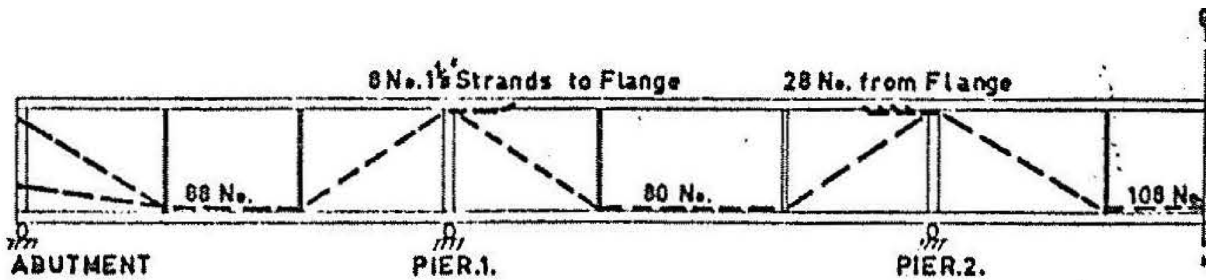


Fig. 6.—Commonwealth Avenue Bridge—Longitudinal Stressing Profile.

Longitudinal Stressing.

The long cables were approximately 1046 ft. long. The cables were stressed from both ends at once using Gifford-Udall hydraulic jacks, with a total extension of 20 inches. The total extension at each end of each cable was approximately 44 inches, necessitating three stressing stages, to attain a full load of 63 1/4 tons in each cable (see Figure 6 above).

The anchorage system used was the Gifford Burrow system, incorporating a steel female cone, and a male cone split into three wedges, held together with a light steel circlip. The barrel was seated on the flat surface of a steel anchorage assembly, which was cast into the anchor block.

Transverse and Vertical Stressing

All transverse and vertical stressing cables were the Freyssinet type 12/0.276 and were stressed on the monowire short cable technique. In this method, individual wires were pulled to the design load of 10,500 lbs. and were locked off. Each wire was then retensioned and a steel shim inserted under the anchorage barrel so as to eliminate loss due to draw-in of the anchorage wedges.

Additional Images from Construction Reports

The following photographs have been extracted from the Department of Works Construction Report.²

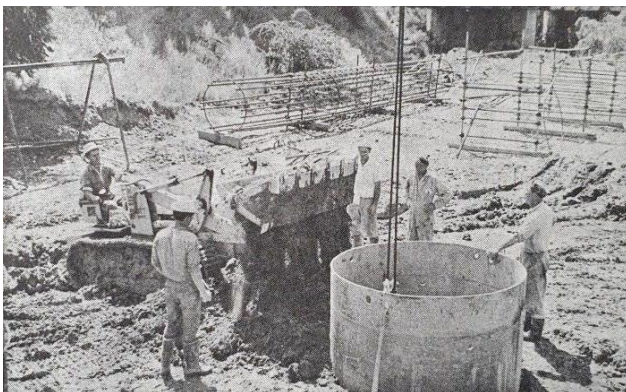


Figure 1 6ft Diameter Steel Liner and partially made up reinforcing cage at North Abutments.

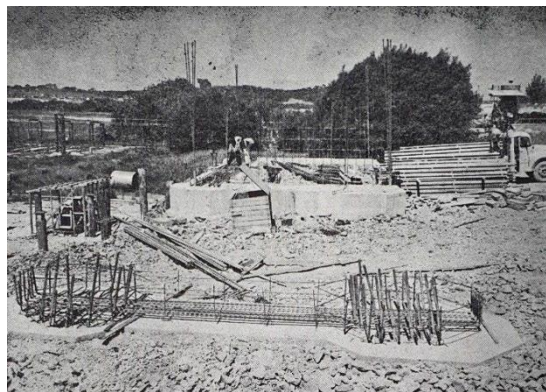


Figure 2 South Abutment Pile Caps.

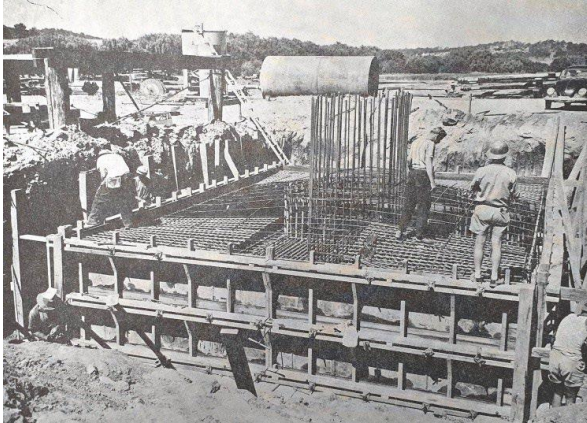


Figure 3 Typical Pier Pile cap prior to pouring.

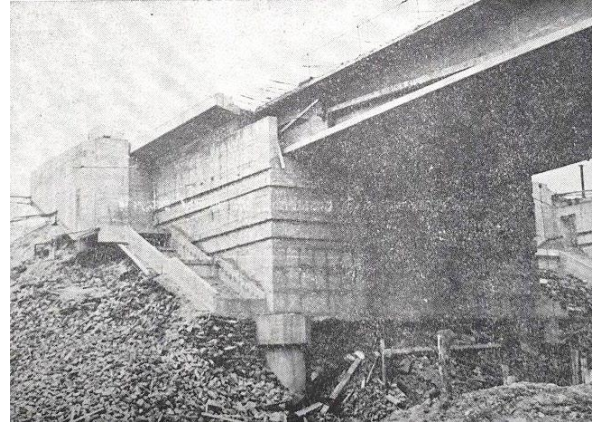


Figure 4 South East Abutment prior to placing exposed aggregate and granite cladding.

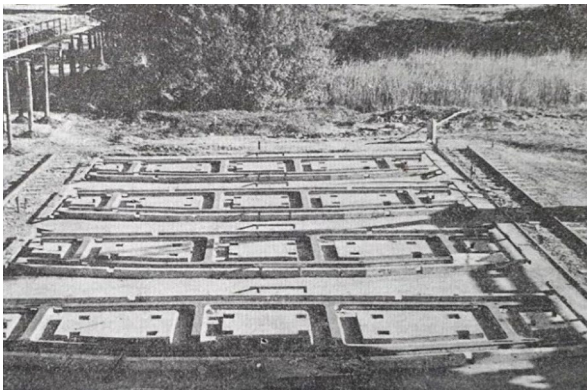


Figure 5 Casting Beds.

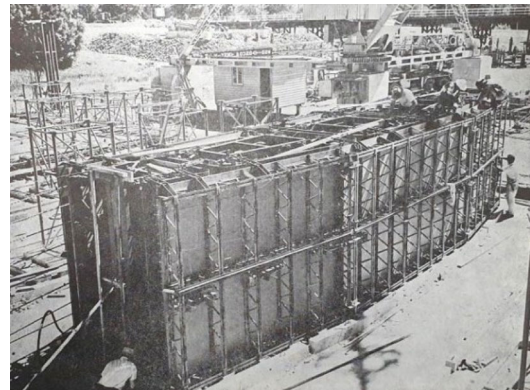


Figure 6 Multi-webbed box segment being finally checked for dimension before preparing to place concrete. Observe fixed steel bracing frames on casting beds.



Figure 7 Transverse Stressing. Pier Segment Diaphragm.

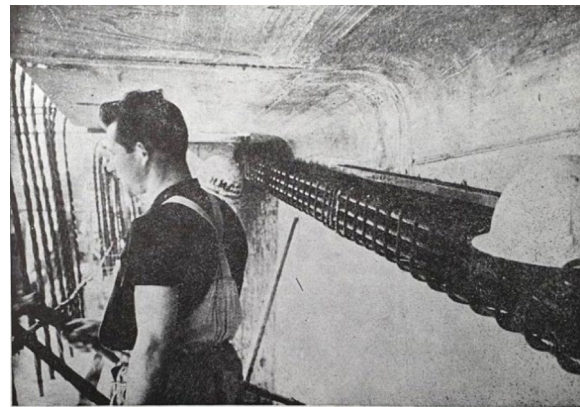


Figure 8 Longitudinal stressing cables on outer web wall prior to placing protection concrete.

The following two photographs have been extracted from the Hornibrook award submission.³

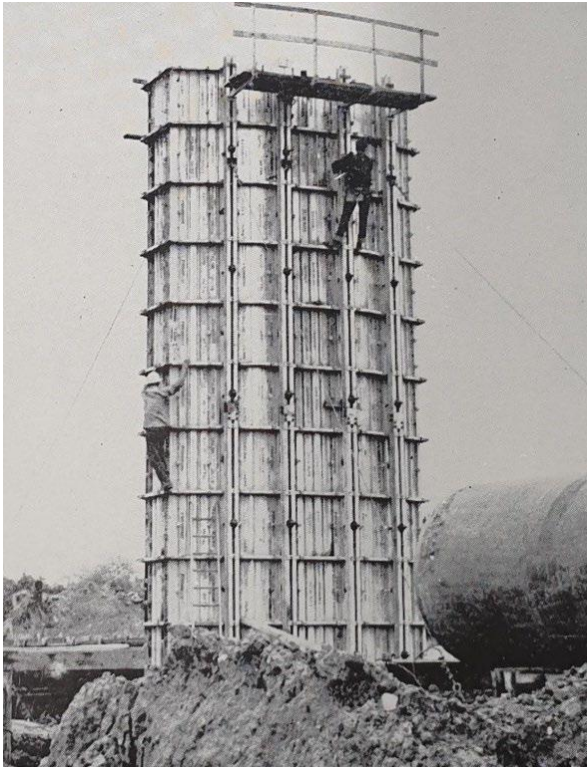


Figure 9 Pier formwork in place.

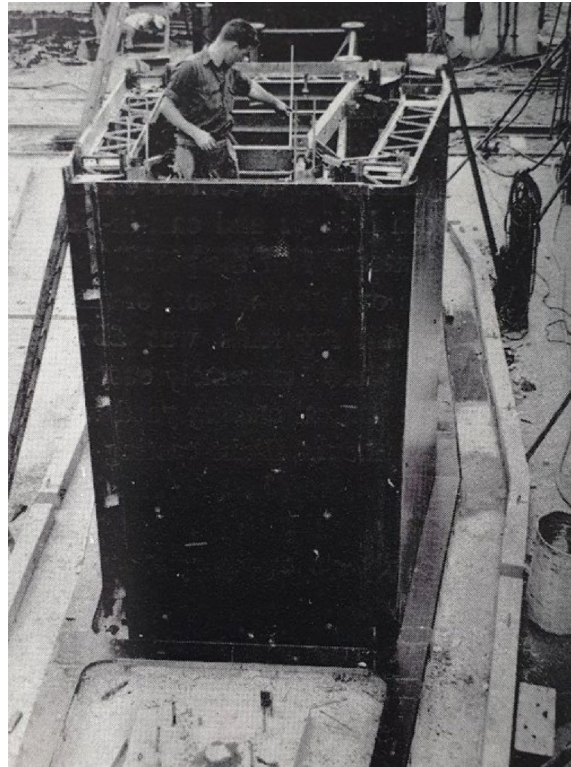


Figure 10 Box segment formwork.

Endnotes

- ¹ NAASRA *Symposium on Bridges, Inspection Notes and Data*, February 1969, Section 1, Commonwealth Avenue Bridge. The federal government in July 1989 disbanded NAASRA and created a new organisation, known as Austroads.
- ² Kelleher, G and English, G, *Commonwealth Avenue Bridge Construction Report*, Department of Works, Canberra 1964.
- ³ M. R. Hornibrook (NSW) Pty Ltd, *Commonwealth Avenue Bridge; Construction Achievement Award Entry*, 1965.

Appendix C

Modern Bridges: Comparative Analysis

Appendix C—Modern Bridges: Comparative Analysis

The following provides a historical overview of the use of prestressed concrete bridges within an Australian context and of the contribution of engineering firms G. Maunsell and Partners and M.R Hornibrook Pty Ltd.

A comparative analysis of Commonwealth Avenue Bridge with Kings Avenue Bridge and other G. Maunsell and Partners designed bridges within Australia is also provided to aid in establishing the rarity and representativeness of Commonwealth Avenue Bridge.

Bridge Form Development in Australia¹

In the eighteenth century, bridges in Australia were predominantly stone arches like Richmond Bridge (1825) in Tasmania and Lansdowne Bridge (1836) in New South Wales. Simple timber-beam bridges were also commonly used for short spans on country roads. The use of iron was more costly and less common, but more elaborate bridges had cast iron piers with wrought iron girders like the Sale Swing Bridge (1883) in Victoria. With the strength of Australian hardwoods, timber truss bridges became the most economical choice in many situations and proliferated in New South Wales and Victoria. The Tharwa Bridge (1896) in the ACT (then part of NSW) was typical of that form.

The twentieth century brought the opportunity for mass-produced rolled steel, which was superior to wrought iron, and tended to replace timber in open truss structures, enabling more elaborate arches and cantilever bridges with much longer spans. Notable bridges of this period were the Sydney Harbour Bridge (1932) and the Story Bridge (1940) in Brisbane. In some bridges like the Hawkesbury Rail Bridge (1946), steel trusses had a similar look to the earlier timber trusses. Steel was also used for girders made of riveted or welded steel plate, such as the Murrumbidgee River Bridge (1915) at Cotter ACT at one end of the scale, and the Westgate Bridge (1978) in Melbourne at the other end. One disadvantage of mild steel structures was the need for painting to avoid corrosion, presenting a need for ongoing maintenance to protect bridge's structural integrity and appearance.

The introduction of reinforced concrete at the end of the nineteenth century provided the opportunity for economical material to compete with steel. Initially it was used in arch bridges with a somewhat similar appearance to earlier stone and iron bridges, as can be seen in a comparison of Melbourne's Princes Bridge (1888) with its curved iron girders, and the nearby Morrell Bridge (1899) also crossing the Yarra River, which was the first reinforced concrete bridge in Australia. Later the technology developed for precast reinforced concrete beams which had sufficient strength as simply supported concrete girder bridges, such as the Monash Bridge (1910) at Benalla in Victoria.

A form of bridge which can involve a combination of materials is the suspension bridge, the common feature being towers at each end from which steel cables are strung as a catenary, supporting the deck which spans below. The earliest existing road bridge of this form in Australia is the Hampden Bridge (1898) at Kangaroo Valley in NSW, where a pair of timber trusses are supported at spaces along their length by steel cables which are attached to a pair of catenary cables suspended from ornate sandstone towers. A later variation at Indooroopilly in Queensland is the Walter Taylor Bridge (1936) which features massive reinforced concrete towers from which steel cables suspend a steel and timber deck. A more modern form is the cable-stayed bridge, where the bridge deck is supported by a series of cables emanating from the top of a tower. It is usual to have a tower at or near each end of the bridge, as with Sydney's Anzac Bridge (2000), but Australia's first cable-stayed bridge, the Batman Bridge (1968) over the Tamar River north of Launceston in Tasmania, had a single steel tower

on the west bank of the river from which the cables supported its steel deck. In most cases cable-stay bridges are designed to achieve very long spans between towers, but in this case, it was to overcome poor foundation conditions on the east bank which precluded the design of a more conventional bridge. Suspension bridges and cable-stay bridges are economical for very long spans, but are only suitable where there are not height restrictions placed on their dominant towers, such as at locations close to airports, or where considerations of aesthetics or associated heritage values allow.

Prestressed Concrete Bridges

Technical Overview

Reinforced concrete has been used in structures in Australia since the end of the nineteenth century, whereby the reinforcing steel allows the structure to handle tension, since concrete without reinforcement is strong in compression but weak in tension, and tension is induced by loading, causing bending, which in turn would cause cracking and failure if not prevented by the reinforcement. In major structures, pre-stressing is used in addition to normal steel reinforcing to allow lighter or longer beams to carry heavy loads without the lower side of the beam being stressed to the point where it would otherwise crack under tension. The greater strength is achieved by inserting steel tendons which are permanently tensioned to compress the concrete along its length and counteract the tension that would occur under load. In this form of prestressed concrete, the steel tendons within the beam are stressed before the concrete sets hard, and not released until the concrete has cured and gained its full strength after several days. The stressed tendons are either anchored at the ends of the concrete beam, or permanently gripped within concrete casting before the tendons are released at the ends. This was the case with the long-prestressed 'T' beams forming Kings Avenue Bridge.

A variation on this is when reinforced concrete is precast without stressing, and the tendons are inserted and stressed by jacking to tighten them to the desired tension before anchoring them with wedges or the like to hold the stress. In this sense the 'pre' in pre-stressing does not mean stressing before the concrete sets, but rather stressing them in compression before the structure takes up load. This was the case with individual multi-webbed box segments on Commonwealth Avenue Bridge. A more detailed description of this process is provided below.

A further variation used with segmented structures is to post-tension external high-tensile steel cables, which run from end-to-end of the assembled box segments, and stress them between endblocks with jacks to hold the segments tightly together. The segments may then be sealed together while the cables are permanently anchored with wedges before releasing the jacks. The post-stressing cables are regarded as external since they are tensioned in air, even though their path may be inside a hollow box girder formed by the segments. However, they are then normally encased in concrete to protect them from corrosion. This was the case in a staged process on Commonwealth Avenue Bridge, where the segments making up each span were post-tensioned to a degree between diaphragms that were cast above each supporting pier and at abutments. The whole length of five spans were then post-tensioned to a much greater degree between anchor blocks cast at each abutment.

After the World War II, prestressed concrete started to appear gradually in Australia, with the earliest prestressed concrete bridges being constructed in the mid- to late-1950s.² At the time of their construction, Kings Avenue Bridge would have been an early but fairly conventional prestressed concrete bridge, while Commonwealth Avenue Bridge was one of the leading exponents of a post-tensioned box girder bridge design and construction in Australia.

Economics, Aesthetics and Durability

The choice of materials and design form of bridges usually comes down to a balance between capital cost, appearance and ongoing maintenance cost. These factors are significantly influenced by the required length (river or gap to be crossed), width (number of lanes), expected load the bridge has to carry in the near and longer term, the foundation material on the land or under the water that will support the bridge, as well as the accessibility of the site for material supply and construction, and options for diversion of existing traffic. Some of these factors may be within the designer's ability to influence, while others are externally imposed constraints at the time, such as a pre-determined site, the state of reliable technology development, and confidence that a skilled workforce is available to achieve the design intent using such technology.

For example, in the design choice between concrete and steel, developments in concrete materials led to concretes with higher strength and improved durability.³ Use of prestressing led to even greater strength and length of beams compared with conventional reinforced concrete, while development of box structures led to less concrete being required for a given strength and consequently economical achievement of greater spans.

Designing a bridge is a multi-faceted and complex process—particularly in a developing planned national capital city, where the aesthetic statement to be made by the end product is often paramount. All of these factors played out in the design and construction of Commonwealth Avenue Bridge.

Prestressed Concrete Bridges in the Australian Context

The earliest authority to work on prestressed concrete in Australia was by the Commonwealth Experimental Building Station, which published a report on tests carried out on concrete panels in 1947.⁴ Some guidance was provided for use of prestressing in buildings was issued at the request of Sydney City Council in 1955, and the 1957 British Standard Code of Practice for the Structural Use of Reinforced Concrete in Buildings (which made no reference to prestressing) remained the recognised standard until 1964 when an official standard for the use of prestressed concrete was accepted by the Australian Standards Association. In the 1950s a few small prestressed concrete bridges were built in Australia, including in Gatton Shire in Qld and Bowral in NSW.⁵ They were generally single span and regarded by risk-averse local government authorities as experimental.⁶

The first prestressed bridge with several spans was built in 1954 at Teven in NSW when a contract was let by the Tintenbar Shire Council to Stresscrete Constructions Pty Ltd of Sydney.⁷ The company had been consultant for the prestressed floors in an industrial building in Melbourne the previous year, the first in Australia.⁸ Stresscrete's Managing Director, James Antill, was examiner in engineering construction for the University of Sydney and the University of New South Wales, and the Institution of Engineers Australia. The 37m Seven Bridge consisted of three simple spans, with the centre span 20m long. The girders were cast off site, and each contained three high-tensile steel bars, initially prestressed to enable them to be handled. The spans were made continuous by prestressing 38mm diameter high tensile steel bars from end to end.⁹ Two girders per span subsequently supported a cast in situ concrete deck.

The design of larger prestressed concrete bridges followed, the longest being the Tasman Bridge in Hobart and the Gladesville Bridge in Sydney, both of which are described in more detail below. While design work commenced in 1956 on the high-level Tasman Bridge by the English firm of G. Maunsell and Partners, and a contract was signed in 1957, construction did not begin until April 1960. This allowed the shorter bridge across 'the Narrows' in Perth to be designed by the same firm in 1956, and

constructed between 1957 and 1959, making it the first of the Maunsell designed bridges to be completed. The arched Gladesville Bridge was more complex in both design and construction, and although construction began in 1959 it was not completed until 1964.

In the meantime, Kings Avenue and Commonwealth Avenue Bridges in Canberra (which were of a similar scale to the Narrows Bridge) were designed and constructed between 1959 and 1964, ahead of the completion of the Tasman Bridge in 1965.

This group of post-tensioned concrete bridges built confidence in the soundness of the design and others followed, including:

- Brisbane's Victoria Bridge (1969) and Captain Cook Bridge (1973)—both box girder cantilever bridges designed by the Qld Co-Ordinator Generals Department; and
- another Maunsell designed box girder, the Stirling Bridge in Fremantle (1974).

New South Wales followed the trend with the:

- Tarban Creek (1967) segmented arch bridge;
- Pheasant's Nest (1980); and
- Mooney Mooney (1986) cantilever box girder bridges designed by the Department of Main Roads with mixed success.

Other states such as Victoria have tended to favour steel box girders for major bridges, and simply supported prestressed 'T' girders for highway bridges and overpasses.

Contribution of Engineering Firms, G. Maunsell and Partners and M.R Hornibrook Pty Ltd to Prestressed Bridge Design

G. Maunsell and Partners

In October 1955, aged 71, Guy Maunsell shunned retirement and established a consultancy firm in London that would have global recognition—G. Maunsell and Partners.¹⁰ Maunsell was the managing senior partner and the 11 other engineers were all previous Maunsell, Posford & Pavry staff, including 29-year-old Miles Birkett who subsequently moved to Australia as managing partner.

The post-war era of the mid 1950s was a period of worldwide infrastructure rebuilding and increasing prosperity. Innovations and emerging techniques, such as prefabrication and precasting, were driving advances in construction. Prestressed concrete had been pioneered by French engineer Eugène Freyssinet. High-tensile steel was replacing mild steel for reinforcement and was also suitable for use in prestressed concrete, which permitted much longer spans in beams and slabs than reinforced concrete, and used lesser quantities of materials.

The timing suited G. Maunsell and Partners to demonstrate their expertise in highways and transportation, using the new prestressing techniques and becoming well known for their roads and bridges. For the first three years of operations their few UK contracts were balanced by work overseas, particularly bridge projects in Australia. A visit in 1955 by the WA Chief Bridge Engineer to Europe to study recent bridge development prompted his dissatisfaction with the aesthetics of a design prepared by his own department for the Narrows Bridge over the Swan River in Perth. G. Maunsell and Partners were appointed consulting engineers for the contract in April 1956. The structure was designed in conjunction with architectural firm W. Holford and Partners.

In 1956, G. Maunsell and Partners were awarded the design contract for a new bridge over the Derwent River at Hobart which became known as the Tasman Bridge. It was a project that had been mooted in 1952 when G. Maunsell and Partners were recommended to the Public Works Department of Tasmania to report on the condition of the existing floating bridge over the river, which was prey to storm damage. Maunsell advised a high-level bridge as a replacement, but had to wait four years until the scheme could be funded. The construction contract was signed in 1957.

John Baxter was made managing partner of G. Maunsell and Partners in 1957 and Edward Birkett moved to Australia to establish a branch office of the firm in Melbourne in June, where he worked on bridge designs. Over time, as staff numbers increased, Australian engineers went to work in the London office and vice versa. Among other things, Birkett was responsible for the supervision of the construction of the Gladesville Bridge in Sydney and the Tasman Bridge. At the same time, the partners were exploring the possibilities of work elsewhere in the world.

Gladesville Bridge across the Parramatta River in Sydney was designed by G. Maunsell and Partners, with Freyssinet, Guyon and Muller as consultants. At the time of construction, its 305m single span concrete arch was the longest ever built.

Though design work of the Tasman Bridge commenced in 1956 and the contract was signed in 1957, construction did not begin until 1960. The first two lanes opened to traffic in August 1964, with full opening of all four lanes in December that year. The bridge was in constant use until the evening of 5 January 1975, when the bulk ore carrier SS Lake Illawarra hit the structure—two piers and 127m of the deck collapsed, and 12 people were killed. G. Maunsell and Partners were consultants for the rebuilding.

With Prime Minister Menzies having invited Sir William Holford to advise on Canberra's planning in the mid-1950s, his report which confirmed the importance of the two bridges flanking a lake formed by the Molonglo River in the Griffins' earlier design. The report also led to the creation of the NCDC to manage Canberra's development. So it was not surprising that G. Maunsell and Partners were selected in conjunction with W. Holford and Partners to design the bridges, since they at the time partners on the design for Perth Narrows Bridge. Design of Kings Avenue Bridge was undertaken in 1959, followed by Commonwealth Avenue Bridge.

Guy Maunsell's health continued to decline, and he died at home on 20 June 1961, aged 76. He was not directly involved in the design of the Canberra bridges and he did not live to see the Kings Avenue Bridge completed in 1963. Birkett continued to operate the branch office of the firm in Melbourne and was actively involved in all the G. Maunsell and Partners projects as Australian Partner. With Geoffrey Fernie, Birkett presented an important paper to the Institution of Engineer Australia conference in Canberra on the 'Bridges in the Canberra Central Lake Area-Design in 1964'. Edward Miles Birkett was a Fellow of the Institution of Engineers Australia until his untimely death in 1972.

The significance pioneering work by G. Maunsell and Partners using digital computing deserves elaboration. The recognised designer of the Gladesville Bridge, Anthony Gee, made extensive use of a British Ferranti Pegasus computer, using paper tape input and programs he had written.¹¹ He went further in correspondence to say:

*'When I tell my engineering acquaintances over here that I used a computer for bridge design in 1958, they flat out just don't believe me: the first recorded example of such a thing in America was in 1965 but fortunately I have 2 magazine articles to prove it!'*¹²

The same computer and programs were used by G. Maunsell and Partners engineer Edward Birkett in designing Commonwealth Avenue Bridge. Birkett stated:

Use was made of the Ferranti " Pegasus " computer, first to calculate the section properties together with fixed end moment factors for the individual spans and, secondly, to obtain bending moment influence lines for the continuous structure. The latter operation involved rapid solution of the eight simultaneous equations evolved from slope deflection theory for five influence loading points taken separately in each span. ¹³

M.R Hornibrook Pty Ltd

Sir Manuel Richard Hornibrook (1893–1970) was a builder and civil engineer.¹⁴ He founded the firm M.R Hornibrook Pty Ltd that later merged with Baulderstone to become one of the largest Australian civil engineering firms. Knighted in 1960, Hornibrook was highly respected as a builder of bridges across the eastern states of Australia and Papua New Guinea as well as for other major projects.

At the age of 19, he and his brother established their own business with small construction projects.¹⁵ The company began carrying out drainage schemes in Brisbane suburbs for local councils in 1918, and then contracted for large sewerage works across Queensland. In 1922, the firm excavated the state's first open-cut coalmine at Blair Athol, and constructed water-supply systems elsewhere. By 1926 business had developed to such an extent that M.R Hornibrook Ltd was formed. The company extended into NSW, establishing a subsidiary company (Hornibrook Bros & Clark Co. Ltd) and Hornibrook Constructions Ltd was registered in Papua New Guinea. Over a period of 40 years these companies built wool stores, wheat silos, wharves, sugar sheds, tank farms, water mains, factories, shipping beacons and electricity power stations. A major achievement was the successful completion in the 1960s of the superstructure of the Sydney Opera House, including the sail-like roof.

Hornibrook's first sizeable bridge, erected for the Department of Main Roads across the Burrum River in 1925, was the earliest publicly funded reinforced-concrete bridge in Queensland. The Hornibrook Highway, a toll road which he launched as a private venture during the Great Depression, included what was Australia's longest bridge at the time of its construction and provided full-time employment for hundreds of men. The group built more than 100 bridges, some of the better-known including the William Jolly, Story and New Victoria bridges in Brisbane, the Northbridge and Iron Cove Bridge, Sydney, the Kings Avenue and Commonwealth Avenue bridges in Canberra, and the Markham River Bridge in the Territory of Papua and New Guinea.

Hornibrook brought modern, mechanized methods of civil-engineering construction to Queensland and Australia. The company established its own workshops for maintaining the heavy machinery which had become an essential part of large-scale contracting. It also developed facilities for designing and manufacturing the specialized tools required for specific contracts.

Hornibrook devoted much time and effort to raising the professional status of civil-engineering contracting in Australia and to improving educational facilities. He was active and held high office in the Master Builders Federation of Australia, the Australian Federation of Civil Engineering Contractors and the Chartered Institute of Building (Britain).

The Canberra Bridges

Kings Avenue Bridge, 1961–1962

Designed:	1959, G. Maunsell and Partners with W. Holford and Partners
Built:	October 1959–February 1962 by M.R Hornibrook Pty Ltd
For:	National Capital Development Commission (NCDC); Supervised by Commonwealth Dept of Works
Form:	Twin structures with four parallel simply supported prestressed beams for each span
Structure:	Semi-continuous prestressed 'T' beams with increased depth towards the centre
Overall Length:	271m with seven spans and a main span length of 47m
Width:	Four traffic lanes—two bridges of 10.8m with space between for future mass transport needs
Clearance:	6.4m
Features:	• First prestressed concrete bridge to be built in the ACT • Elegant low curve in elevation in keeping with forming the east flank of the parliamentary triangle • Prestressed long-span beams precast and launched progressively from the southern abutment with a moving gantry. Broad piers formed with precast shell units • Innovative bridge roadway lighting from line of fluorescent light mounted in handrail allowing clean lines above the bridge deck, which won the annual award of the Illuminating Engineering Society.
Recognition:	• Part of Engineers Australia's recognition of Lake Burley Griffin as a National Engineering Landmark in 2001
Brief Description:	Kings Avenue Bridge was the first of two bridges to be designed as architectural structures in Holford's interpretation of the Griffin Plan for the lake and parliamentary zone. Holford's interpretation confirmed their place as important elements in the sides of the National Triangle delineated by Commonwealth Avenue and Kings Avenue, spaced symmetrically about the land axis between Capital Hill and Mount Ainslie. While still an elegant prestressed concrete structure, Kings Avenue Bridge is simpler structurally than Commonwealth Avenue Bridge, having precast 'T' beams the length of each span, where they were half lapped and supported on pier bearings. Having four 'T' beams side by side to form the width of the superstructure, the design incorporated cast in situ diaphragms to stiffen the structure and transfer load from the roadway. Overall, this was less demanding than what was proposed for Commonwealth Avenue Bridge, and facilitated the demonstration and improvement of some concepts before their adoption in the later bridge. The piers in Kings Avenue Bridge were designed to be much broader and closer than the Commonwealth Avenue Bridge since the spans were made shorter to provide some shielding of the view of the east basin which was considered unattractive from below the bridge level. The concrete beams were cast and prestressed in a casting yard on old Kings Avenue roadway and were lifted and placed by a travelling gantry over the dry river floodplain. In this way they were launched from the southern abutment, then progressively cantilevered span-by-span—with the gantry running on rails placed over the previously laid spans. After walkways and kerbs were formed on the completed deck, aluminium handrails were installed incorporating lines of walkway and roadway fluorescent lighting built onto the handrails and illuminating the white concrete parapet for night-time display of the bridge structure. Services including water mains were run exposed between the 'T' beam webs, through holes cast in the concrete diaphragms.



Figure 1 Kings Avenue Bridge from Mount Ainslie with Carillon and Aspen Island in the foreground. It has shorter spans and broader piers than Commonwealth Avenue Bridge. (Source: K Baker, 2013)



Figure 2 Half lapped join of precast beams over bearing on pier. (Source: K Baker, 2020)



Figure 3 Under side of Kings Avenue Bridge demonstrating an industrial appearance with four 'T' beams and exposed pipes passing through diaphragms. (Source: K Baker, 2013)

Commonwealth Avenue, 1961–1963

Designed:	1959, G. Maunsell and Partners with W. Holford and Partners
Built:	March 1961–November 1963 by M.R Hornibrook Pty Ltd in association with Henry J Kaiser of the USA
Form:	Twin structures forming a single geometric arc
Structure:	Post-tensioned prestressed concrete, with main superstructure of multi-web box-shaped segments of continuous depth over the five spans
Overall Length:	314 m with five spans and a main span length of 73m
Width:	Six traffic lanes— two bridges of 14m overall with space between for future mass transport needs
Clearance:	9m
Features:	• Fitting ceremonial entry from the city centre to the Parliamentary Zone, with similar appearance to Kings Avenue Bridge from a distance in outlining the sides of the parliamentary triangle • Clean lines of superstructure on slender octagonal piers allowing view of lake and mountains from below and above • The first continuous multi-web box segmented concrete bridge in Australia, being of uniform depth castings and post-tensioned across the full length of the bridge • Art Deco pylon on each end to emphasise the stature of the formal entrance and alignment with Capital Hill • Roadway and side panels of bridge superstructure lit by lines of fluorescent lights built into the handrails and below the walkways, enhancing the night-time appearance • Pioneering design using digital computing for the structural analysis, in particular the design of the multi-webbed box segments
Recognition:	• Part of Engineers Australia's recognition of Lake Burley Griffin as a National Engineering Landmark in 2001 • Described by Prime Minister Menzies as 'the finest building in the National Capital'¹⁶
Brief Description:	The superstructure of the bridge consists of a multi-webbed box girder continuous over the five spans. This aspect is the most unusual feature of the bridge. It is made of 102 identical precast box segments per bridge, each 3m long and weighing over 50 tonnes. These were cast on the river flat just east of the old Billabong Bridge and stored on site. An extensive timber falsework structure was erected between the abutments and straddling the piers to support the box segments and form a sweeping curve. The box segments were then accurately placed on the timber falsework, and concrete stiffening diaphragms were poured in situ above each pier and additionally within spans.¹⁷ The 7.6cm gap between segments was filled with concrete as each span between piers was completed and tied together with steel cables. Lifting of the segments into place was achieved using a mobile steel gantry which had been used to launch the beams on Kings Avenue Bridge. When all box segments were in place end-to-end, they were further squeezed together using 80 steel cables running the length of the bridge, which were post-tensioned using large jacks and gripped by wedges to hold the tension while the cables were encased in concrete to prevent future corrosion and cable failure. The bridge was then self-supporting and the timber falsework could be removed. The precast segments had been placed with steel reinforcement projecting from the outer edges, to which cantilevered footways were attached, along with kerbs, paving, handrails, and lighting. Concealed services were passed along the outer web of the bridge and covered by the exposed aggregate finished panels. The services included two 45cm diameter sewer mains, a 60cm water main, several 11,000-volt power cables, lower voltage power cables for the lighting, and communication cables. The pylons at each end were primarily architectural, but one serves as a ventilator for the sewer main.



Figure 4 Graceful low arch of Commonwealth Avenue Bridge viewed from Flynn Drive. (Source: K Baker, 2013)



Figure 5 Showing the clean lines of the bridge when viewed at water level. (Source: K Baker, 2013)

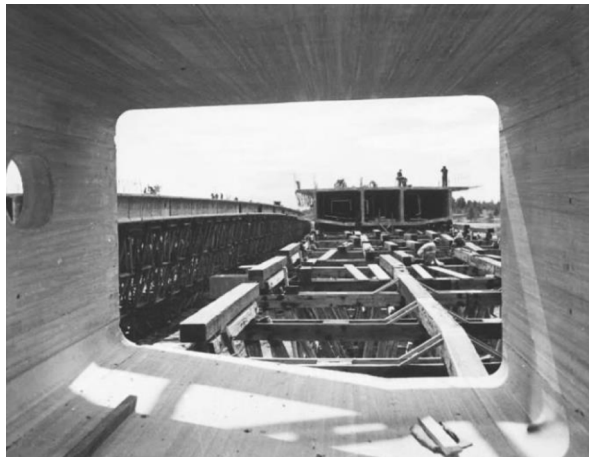


Figure 6 Multi-web precast segments that enable the clean lines. (Source National Library of Australia, nla.obj-145674879-1)

Other Maunsell Post-tensioned Concrete Bridges in Australia

Narrows Bridge, Perth¹⁸—Initial Bridge 1957–1959

Designed:	1955, Maunsell, Posford and Pavry of London, subsequently G. Maunsell and Partners
Built:	1957–1959 Christiani & Nielsen A/S of Copenhagen and J O Clough & Son Pty Ltd of Perth
Structure:	Balanced cantilevers with central supported span, consisting of precast segmented 'I' beams initially supported on timber trestles before being post-tensioned continuously over the full length.
Overall Length:	333m Number of spans: 5 Main span length: 98m
Width:	Six traffic lanes: overall 27.4m, roadway 25m
Clearance	8m
Features:	At the time of its opening: • it was the largest precast, prestressed continuous beam bridge in the world • Its centre span of 98m was the longest of its type in the world • It was the first bridge in Australia to use a segmental construction method and external post-tensioning cables.
Recognition:	Engineers Australia's National Engineering Landmark Award received in 1999.
Brief description:	The superstructure consisting of eight rows of 'I' beams were each continuous over their full length. The beams varied in depth from 1.5m at the abutments to 4.2m at the river piers. The beams were fixed at the northern abutment, and an expansion joint at the southern abutment catered for movements. Being built over water, the bridge had four sets of piers in the river bed from which the precast segments were placed over temporary timber trestles in a balanced cantilever form extending north and south from each pier. The cantilevered girders joined to form the side spans, while a separate girder was placed directly above the water to fill the gap to form the longer central span. After post-tensioning, reinforced concrete walkways and infill splicing of the deck between the 'I' beams were formed in place. Anodized aluminium balustrading and safety fences were installed and the lighting comprised aluminium standards at 24m centres. Services consisted of five water mains, a sewer main, gas mains and telephone and power cables. Increasing congestion on the crossing during the 1970s led to the bridge being widened to seven lanes.¹⁹ But by 1998, the volume of traffic using the bridge had increased again and it was the busiest piece of freeway in Australia. Instead of widening the bridge again, a separate road bridge was built to run parallel to the original to carry six lanes of traffic. It opened in 2001. A third bridge was built in the 6m gap between the road bridges for trains to cross, which opened in 2007.



Figure 7 The Narrows Bridge over the Swan River, Perth WA. A later duplicate road bridge is in the foreground. (Source: Wikipedia Creative Commons Mailer Diablo)

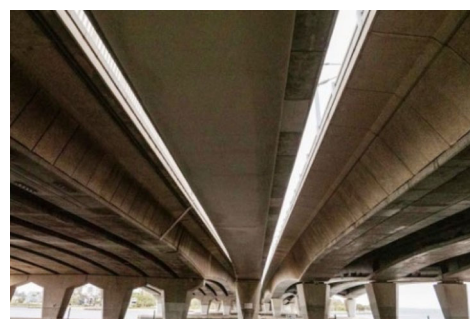


Figure 8 Bridge underside showing precast segmented 'I' beams. The original 1959 bridge is on the left, the railway bridge runs down the centre. (Source: ABC News, 13 Nov 2019)

Gladesville Bridge, Sydney 1959–1964

Designed:	1957, Anthony Gee of G. Maunsell and Partners with Eugene Freyssinet, Yves Guyon and Jean Muller as consultants ²⁰
Built:	December 1959 to October 1964 by Reed & Malik Ltd (UK) and Stuart Bros (Sydney)
Form:	Open concrete arch
Structure:	Post-tensioned segmented arch of four box segment ribs. The deck above the arch deck consists of eight longitudinal precast prestressed 'T' beams with four intermediate cast-in-place transverse beams per span, making a waffle slab.
Overall Length:	Bridge and elevated approaches 580m; Bridge deck is 579m; number of spans—single span plus approach; main and approach spans—305m; arch length—305m
Width:	Originally six traffic lanes reconfigured to seven lanes—overall 27.4m; roadway 25m
Clearance:	45m
Features:	- At the time of construction the longest concrete arch ever built - Pioneering design using digital computing for the structural analysis
Recognition:	- NSW State Heritage list 2014 - Engineers Australia International Engineering Heritage Landmark received in 2014 - International Historic Civil Engineering Landmark from the American Society of Civil Engineers 2014
Brief Description:	The original intention for Gladesville Bridge was a steel cantilever but when Freyssinet was presented with Maunsell's alternative, he recognised the engineer's talent for pushing the boundaries of concrete bridge construction and approved the design. Early design work on the concrete arch was carried out by Maunsell's employee, Anthony Gee, using the Ferranti Pegasus computer later used for calculations on the Sydney Opera House shells. This bridge was the first major structure in the world designed with the aid of a computer. Gladesville Bridge's arch consists of four prestressed concrete box ribs, with the ends constrained by concrete thrust blocks embedded in the bedrock. Arch segments were brought by river and installed over steel formwork with hydraulic fluid-filled gaskets in place. These were used to lift the arch away from its formwork, and the fluid was then replaced with liquid concrete. The main deck is a concrete waffle slab.

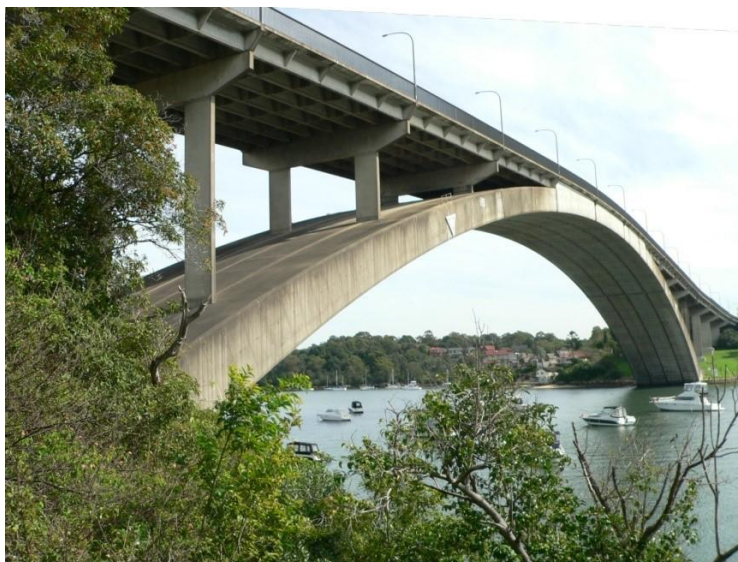


Figure 9 Gladesville Bridge over Parramatta River, with high clearance for shipping. Note the arch with four square box ribs supporting the waffle deck. (Source: Michael Clarke)

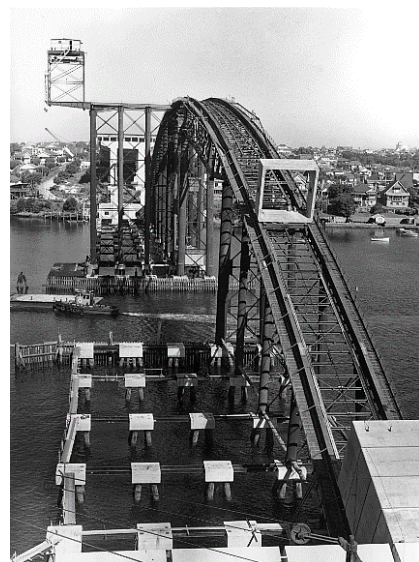


Figure 10 Under construction, showing box segments of the first rib being places on temporary steel supporting arch. (Source: NSW RMS)

Tasman Bridge, Hobart 1957–1964

Designed:	1956–1957, G. Maunsell and Partners, London
Built:	April 1960 to December 1964 by Reed, Braithwaite, Stuart and Lipscombe, Salisbury, England
Form:	High-level prestressed concrete girder bridge
Structure:	Six parallel precast post tensioned 'I' beams for the main navigational span, and six parallel precast prestressed beams per span for the remaining spans.
Overall Length:	1395m; 19 spans with main span length 95m
Width:	57.2 ft—four 11ft lanes; since the rebuild, five lanes 3.35m wide
Height and clearance:	60.5m and 46m clearance
Features:	- At the time of construction, the longest highway bridge in Australia - Tasman Bridge is a striking high-level bridge on the Hobart skyline across the Derwent River. It made a significant difference to the traffic flow from the east coast which was frequently impeded by a lift span on the former floating bridge. Severely damaged in 1975 by the bulk ore carrier, Lake Illawarra, the bridge took more than two years to rebuild and reopen to traffic.
Recognition:	None known
Brief Description:	There is very little publicly available on the bridge other than the Tasmanian Government statistics published after the rebuilding,²¹ and informative films of the construction and reconstruction²² from which methods of construction can be deduced. The bridge was designed and built with precast post-tensioned 'I' beams extending from pier to pier. Six beams side-by-side formed each span with a reinforced concrete deck. After two piers and three spans of the bridge fell in 1975, the designers, G. Maunsell and partners, were re-engaged to advise on the repairs.²³ Reconstruction of the Tasman Bridge commenced in October 1975. Although reconstruction in the original form was the preferred option, it was found that steel box girder construction was more readily achievable under the circumstances. The bridge reopened in 1977.



Figure 11 The Tasman Bridge over the Derwent River was built at high level to accommodate shipping lanes, with multiple spans across the river and approaches. Consisting of a superstructure of simply supported prestressed concrete beams. Some spans were replaced with steel after major damage by a ship. (Source: Creative Commons Phil Wardle)



Figure 12 Underside of Tasman Bridge showing the six parallel concrete 'I' beam structure with steel replacement in the adjacent span. (Source: Creative Commons Wiki Ian)

Stirling Bridge Fremantle 1972–1974

Designed:	1971, G. Maunsell and Partners with Cameron, Chisholm and Nicol, Architects
Built:	1972–1974 by J. O. Clough & Son Pty Ltd
Form:	Single aesthetically designed long flat structure with expectation of future duplication
Overall Length:	415m; seven spans with main span length of 81.4m
Width	Four traffic lanes—overall 16.4m; traffic lanes 14.6m
Clearance:	9m
Features:	A refinement of previous structural design employing twin box girders and reinforced in situ deck, without the need for diaphragms between the girders
Recognition:	- Engineering Heritage Marker from Engineers Australia 2014 - Award of Merit at the from the Australian Consulting Engineering Association
Brief Description:	A long flat highway bridge crossing the Swan River at Fremantle.²⁴ The bridge superstructure consisted of two rows of precast hollow 'T' segments, post-tensioned and covered with an in situ reinforced concrete deck slab. Starting from the southern abutment, the bridge spans progressively reduces in length while the 'T' segments reduce in depth. The simplicity of the structural twin box girder arrangement was achieved due to analytical advances in calculating the transfer of shear stresses in the structure. It was possible to eliminate diaphragm connections between the twin box beams through an accurate analysis of the stress transfer across the reinforced concrete deck slab spanning between those beams. A 450mm diameter water main was slung under the roadway between the boxes and provision was made for power and communication ducts through the inside of the boxes and under the footpath slab.



Figure 13 Stirling Bridge over the Swan River. The segment depth and span length decrease progressively. (Source: J. O. Clough & Son, Engineers Australia)



Figure 14 Side-by-side 'T' segment box girders structure during construction. (Source: J. O. Clough & Son, Engineers Australia)

Comparative Analysis Summary

Bridge	Designed	Built	Form	Length	Lanes	Width	Clear	Spans	Main Span
Canberra Bridges									
Kings Avenue	1959	1961–1962	Twin Beam	271m	4	2x 10.8m	6.4m	7	47m
Commonwealth Avenue	1959	1961–1963	Twin segmented Multi web	311m	6	2x14m	9m	5	73m
Other Maunsell Bridges									
Narrows, Perth	1955	1957–1959	Cantilever segmented	335	6+	27.4m	8m	5	98m
Gladsville, Sydney	1957	1959–1964	Segmented 4 rib arch	580m	6+	26m	45m	1+app	305m
Tasman, Hobart	1956-57	1960–1964	Beam	1395	4+	17.5m	46m	19	95m
Stirling, Freemantle	1971	1972–1974	T Box segmented	415m	4	16.4	9m	7	81m

All the prestressed concrete bridges of any size built around the time of the Commonwealth Avenue Bridge were designed by G. Maunsell and Partners under slightly varying company identities. An earlier bridge at Teven in NSW, built in 1954 by Stresscrete Constructions is significant as the first multi-span prestressed post-tensioned bridge in Australia, but it was so much simpler in form and size that it has not received other recognition.

The first G. Maunsell and Partners designed bridge in Australia was the Narrows Bridge over the Swan River in Perth in 1955, which was constructed following a visit to London by the WA chief bridge engineer. The design, carried out by the London-based firm pioneered in Australia the bridge design concept of post-tensioned precast concrete segments, with each span made up of multiple segments. The Narrows Bridge design consisted of precast segmented 'I' beams supported over the water before being post-tensioned over the full length of the bridge. The use of post-tensioning segments was a precursor to the Commonwealth Avenue Bridge, although its form was different in that it balanced cantilevers from adjacent piers, with a further part of the main span placed in between. The design was performed four years before both Canberra bridges, with works completed around the time the design of the latter commenced. The Narrows Bridge clearly deserves recognition for a number of firsts, but the structural design advanced after that time, particularly in the design and casting of concrete segments.

Guy Maunsell's was further involved in bridge design in Australia after he was invited by the Tasmanian Government to advise on the existing floating concrete bridge in Hobart. Maunsell's advice was for it to be replaced with a high-level bridge, for which he obtained the design commission in 1956—that is, three years earlier than the design of Canberra's Kings Avenue Bridge. Although the Tasman Bridge was significantly larger, the two bridges were structurally similar in that apart from the main navigational span, they were both simply supported precast prestressed beams covered with a reinforced concrete deck which was supported on concrete piers. Due to delays the Tasman Bridge was completed after the two Canberra Bridges. While it was the longest prestressed concrete bridge in Australia it was not the most technically advanced.

G. Maunsell and Partners' big advance in bridge design was through the use of a computer for stress analysis and design, which was pioneered by Anthony Gee on the Gladesville Bridge in 1957. As an arch bridge it had a completely different form to the two Canberra bridges, but it advanced the concept of post-tensioned segmented precast box sections. Like the Narrows Bridge design, the segments were arranged side-by-side, but for Gladesville they were hollow square segments rather than 'I' beam segments. When it was completed in 1964, Gladesville Bridge was the longest concrete arch in the world and received international recognition.

Kings Avenue Bridge involved the same design team as the Narrows Bridge, with G. Maunsell and Partners structural engineering and W. Holford and Partners providing architectural input on the aesthetics. Yet in some ways, it was the simplest of Maunsell's Australian bridges, being precast simply supported beams. Kings Avenue Bridge's successful construction gave the NCDC and Department of Works confidence to proceed with the more advanced Commonwealth Avenue Bridge. Construction contractor, M.R. Hornibrook Pty Ltd, had the experience and locational advantage to successfully tender for the bridge that followed.

Commonwealth Avenue Bridge had the benefit of design experience on segmented construction placed over falsework from the Narrows Bridge, but its big advance was in computer-aided design of multi-webbed precast box segments. This allowed for a reduction in concrete and a cost saving in erection as it used a single multi-webbed box segment the width of the roadway compared with eight parallel 'I' beam segments for the Narrows, or four parallel box ribs for Gladesville. The full-width multi-webbed box segment did not require infill of gaps between parallel segmented beams, whereas the parallel 'I' beam of the Narrows and parallel 'T' beams of the Kings did.

The Stirling Bridge was the last G. Maunsell and Partners design considered within a decade of the Commonwealth Avenue Bridge. It represents a further option in segmented box structures and allowed launching the structure from one end while progressively completing the deck above the completed spans. It has been included to demonstrate that the advances in prestressed concrete bridges have been ongoing, with the technology shared and widely accepted by state road authorities.

The Commonwealth Avenue Bridge is clearly an outstanding bridge in the ACT which stands out as a highly significant bridge within Australia—a graceful, functional and cost-effective bridge well suited to its place in the National Capital. It is highly representative of the characteristic slim profile and structural form of prestressed concrete bridge design in Australia from the 1950s.

As the last of the G. Maunsell and Partners designed in the 1950s, it is the most innovative—with the design of the precast segments departing from multiple 'I' beam or square box to multi-webbed box-shaped segments. In this regard it was the first multi-webbed box segmented bridge in Australia, demonstrating cost and construction advantages.

It was designed and built for a clean view from water level, with a fully enclosed superstructure allowing greater expression of its architectural lines

Through the paper presented to engineers Australia by its designers in 1964 and in the NAASRA Symposium on Bridges held in Canberra in 1969 it demonstrated leadership in prestressed concrete bridge design and construction to the engineering profession and construction authorities in the eastern states. Referring to Holford's architectural input in his paper to Engineers Australia, Birkett noted:

Commonwealth Avenue Bridge, being landmark from many viewpoints, needed a design strong enough to hold its own in distance as well as in close views and a parallel section in a flat but distinct vertical curve was adopted.²⁵

When the designed parallel section was built, the 102 uniform box segments meant Commonwealth Avenue Bridge could for a short time claim to be the longest bridge of this type post-tensioned from end-to-end.

On a virtually green-field site, the structural design allowed architectural freedom to design an elegant structure to suit its chosen setting—a fitting National Capital landmark for that time and the future.

Endnotes

- ¹ Wikipedia, 'List of bridges in Australia', viewed 30 July <https://en.wikipedia.org/wiki/List_of_bridges_in_Australia>.
- ² Austroads, *Guide to Bridge Technology*, Part 3.
- ³ *AGBT Part 1: Introduction and Bridge Performance*, Section 3.7.
- ⁴ Burchardt, J, 'Innovation in the modern Australian concrete building business: the introduction of prestressed concrete, 1945–1970', in *Water, Doors and Buildings*, Queens College Cambridge, 2019, p 507.
- ⁵ Burchardt, J, 'Innovation in the modern Australian concrete building business: the introduction of prestressed concrete, 1945–1970', in *Water, Doors and Buildings*, Queens College Cambridge, 2019, p 514.
- ⁶ *Lithgow Mercury*, 15 August 1952.
- ⁷ *Northern Star*, Lismore, 25 August 1954.
- ⁸ *Construction*, 8 July 1953.
- ⁹ *Northern Star*, Lismore, 27 December 1954.
- ¹⁰ Engineering Timelines, 'Guy Maunsell', viewed 30 July 2020 <http://www.engineeringtimelines.com/who/Maunsell_G/maunsellGuy7.asp>.
- ¹¹ NSW Roads and Maritime Services, *Gladesville Bridge Fifty Years Anniversary*, 2014.
- ¹² Gee, A 2014, 'Correspondence with engineers Australia regarding the nomination of Gladesville for international recognition', Engineers Australia, viewed 30 July 2020 <<https://portal.engineersaustralia.org.au/heritage/gladesville-bridge-sydney-1964>>.
- ¹³ Birkett, EM and Fernie, GN 1964, 'Bridges in the Canberra Central Lake Area-Design', in *Journal of the Institution of Engineers Australia*, Vol 36.
- ¹⁴ Wikipedia, 'Manuel Hornibrook', viewed 30 July <https://en.wikipedia.org/wiki/Manuel_Hornibrook>.
- ¹⁵ Australian Dictionary of Biography, *Hornibrook, Sir Manuel Richard (1893–1970)*.
- ¹⁶ Andrews WC, *Roads and Bridges*, p 35.
- ¹⁷ Birkett, EM and Fernie, GN 1964, 'Bridges in the Canberra Central Lake Area-Design', in *Journal of the Institution of Engineers Australia*, Vol 36.
- ¹⁸ Young, D, 'Narrows Bridge (1959)', in *Swan & Canning Rivers Bridges Australian Engineering Week Tour 2012*, viewed 30 July 2020 <https://www.engineersaustralia.org.au/sites/default/files/content-files/2016-12/2012_heritage_bridges_tour_low_res.pdf>.
- ¹⁹ *The West Australian*, 26 April 2017.
- ²⁰ Engineers Australia, 'Gladesville Bridge', viewed 30 July 2020 <<https://portal.engineersaustralia.org.au/heritage/gladesville-bridge-sydney-1964>>.
- ²¹ Parliament of Tasmania, 'Tasman bridge statistics', viewed 30 July 2020 <<https://www.parliament.tas.gov.au/history/tbstats.htm>>.
- ²² Libraries Tasmania, *Tasman Bridge Construction (1965) and Tasman Bridge Reconstruction (1978)*.
- ²³ Wikipedia, 'Tasman Bridge', viewed 30 July 2020 <https://en.wikipedia.org/wiki/Tasman_Bridge>.
- ²⁴ Engineers Australia, 'Nomination of Stirling Bridge for an Engineering Heritage Australia heritage recognition award', viewed 30 July 2020 <https://www.engineersaustralia.org.au/sites/default/files/resource-files/2017-01/hrp.stirling_bridge.nomination.v2.july_2014.compressed_0.pdf>.
- ²⁵ Birkett, EM and Fernie, GN 1964, 'Bridges in the Canberra Central Lake Area-Design', in *Journal of the Institution of Engineers Australia*, Vol 36, p139.