Australian Government
Department of the Environment and Heritage

National Heritage List

Nomination Form

The National Heritage List is a record of places that have outstanding natural, Indigenous or historic heritage values for the nation. So important are the values of these places they are protected by federal law under the *Environment Protection and Biodiversity Conservation Act 1999*. Nominating a place to the National Heritage List means identifying its national heritage values on this form and providing supporting evidence. If you need help in filling out this form, contact 1800 020 625.

Form checklist

1. **read** the *Nomination Notes* for advice and tips on answering questions in this form.
2. **add** attachments and extra papers where indicated (Note: this material will not be returned).
3. **provide** your details, sign and date the form.

Nominated place details

Q1. **What is the name of the place?** Draft nomination for Sydney Harbour Bridge

Q2. TIP *Give the street address, or, if remote, describe where it is in relation to the nearest town. Include its area and boundaries. Attach a map with the location of the place clearly marked. See the* Nomination Notes *for map requirements.*

Q2 a. **Where is the place?** Address/location: Bradfield Highway and North Shore Railway, Milsons Point/Dawes Point, NSW 2000

Q2 b. **Boundary:** As detailed in the Sydney Harbour Bridge Conservation Management Plan (RTA 1998), Precincts 1-5, including the steel arch bridge, abutments, pylons, approach spans and approaches commencing with the rendered concrete walls on the approach viaducts (Based on CMP).

Spanning between Dawes Point in the south and Milsons Point in the north. Boundaries: bridge and its approaches, including pylons, excluding Milsons Point Railway station. Northern boundary is immediately north of Lavender Street Vehicular underpass. Southern boundary is at southern end of the small park alongside upper Fort Street, Sydney (RNE).

Q2 c. **Type of map you have supplied:** Precinct sketches in CMP and UBD street map.

Q3. TIP *For information on where to obtain details of who owns a place, contact your local government. See the* Nomination Notes *for ideas.*

Q3 a. **Who owns it?** Owner's name (If more than one owner, attach a list): Roads & Traffic Authority , New South Wales State Government.

Address: Property Services Branch,

260 Elizabeth Street, Surrey Hills State:NSW Postcode:2010

Ph:02 9218 6928 Fax:02 9218 6970 Email:

Q3 b **Is the owner(s) aware of the nomination?** NO ☐ YES ☒ SOME ARE ☐ (Please list):

Q4. Who has an interest in the place? This could include the property's manager, local environment or historical groups, local council, Indigenous people and developers or industry groups. Please provide names and telephone details.

1. Roads & Traffic Authority 02 9218 6928
2. NSW State Rail
3. NSW Heritage Office
4. Sydney City Council
5. North Sydney Council
6. Sydney Cove Authority
7. National Trust of Australia (NSW)
8. Engineering Heritage Australia 02 6270 6525

Interest of the parties concerned includes:

1. Owner and Conservation Management Plan 1998
2. Joint user with listing in S170 Register 1997
3. Listed State Heritage Register 1999

4& 5. Scheduled in Local Environmental Plans

6. Parkland controlled under approach spans
7. Listing by National Trust 1974
8. Plaqued by EHA as a National Engineering Landmark 1988

Note: It is understood that the NSW Roads & Traffic Authority have prepared a nomination as owners, and that should take precedence over this draft nomination from Engineering Heritage Australia which is provided in support of the nomination by the owner. However if the nomination from RTA is not forthcoming in a reasonable time, EHA will reconsider the status of the draft nomination with a view to making it formal.

About the importance of the place

Q5. **What is its significance?** How would you tell people that this place has great importance to Australia? For example, why does this place, unlike other similar places, best highlight a major aspect of Australia's heritage?

The Sydney Harbour Bridge is the most outstanding and immediately recognised engineering structure in Australia, which has symbolised Sydney and Australia to the world. Its significance has been recognised in National, State and Local Government registers and included in a nomination for World Heritage listing. It is of great importance to the people of Australia as part of the landscape in the most famous view of Australia, portrayed in many paintings, photographs and historical records as well as the focus for national celebration at times like the 1988 Bicentenary and the 2000 Olympic Games.

Some of the recognition accorded the Bridge is highlighted through the extracts below:

The Sydney Harbour Bridge is an Australian icon - and is immediately recognised by Australians and by people internationally. It is a very important landmark in a spectacular location which is strongly linkd to its harbour setting and to the Sydney Opera House. The bridge was a feat of world class engineering when it was completed in 1932. (Hazel Hawke, Chair Heritage Council of NSW, in Statement from the Chair, RTA CMP 1998).

The bridge is one of the most remarkable feats of bridge construction. At the time of its construction it was the longest single span arch bridge in the world. It has been an important factor in the growth of Metropolitan Sydney, particularly since World War Two. The bridge, its pylons and approaches are all important elements in the townscape of areas both near and distant from it. The curved northern approach gives a grand sweeping entrance to the bridge with continually changing views of the bridge and harbour (Walker and Kerr 1974, Modified) (Register of the National Estate 1978) (NSW State Heritage Register updated 2003).

Sydney Harbour is one of the finest natural harbours in the world and has a setting of outstanding natural beauty. Two outstanding artifacts, the Sydney Opera House and the Sydney Harbour Bridge, make an extraordinary contribution to this natural and man made setting. The Sydney Harbour Bridge is an engineering work of great significance. It was, when designed, the largest single span steel arch bridge in the world and continues to have a dominating presence in the harbour landscape. It has a structural and symbolic significance comparable to the Eiffel Tower in Paris. For many decades it has symbolised Sydney and Australia to the world. (Extracts from the Nomination of the Sydney Opera House in its setting with the Sydney Harbour Bridge and Surrounding Waterways for Inclusion in the World Heritage List, Australian Heritage Commission 1980).

The Sydney Harbour Bridge is one of the most famous built structures in Australia; it is certainly the most famous bridge. It is of exceptional significance for the following reasons:

- It is an engineering design and technical achievement of international importance. In terms of span it ranks third in the world but its reputation as the world's greatest steel arch rests on its combination of span, width and load bearing capacity, and for the difficulties overcome in its erection.
- It is the major landmark in the harbour, accepted now for as a part of the landscape in the most famous view of Australia.
- Historically the bridge was seen as a symbol of Australia's industrial maturity. It is the link that promoted the the development of the North Shore, and is the most important event in the development of Sydney's transport system. It is Dr JJC Bradfield's crowning achievement, while credit for the realisation of the Bridge is also due to the contractors Dorman Long and to the English English engineer Sir Ralph Freeman. The Bridge became the focus for political tensions as exemplified by the De Groot incident.
- Socially, for more than 60 years the Bridge has been an internationally recognised symbol for modern Australia. It is a popular focus at times of local and national celebration. (Abridged from RTA CMP 1998).

Q6. TIP *See the* Nomination Notes *for examples on how criteria might be interpreted.*

Q 6. **Which criteria does it meet?** Please try to identify which criteria from the list below apply to the place. In assessing the nomination, the Australian Heritage Council will check the nominated criteria for a place.

The National Heritage criteria for a place are any or all of the following:

☒ **a** – the place has outstanding heritage value to the nation because of the place's importance in the course, or pattern, of Australia's natural or cultural history

☐ **b** – the place has outstanding heritage value to the nation because of the place's possession of uncommon, rare or endangered aspects of Australia's natural or cultural history

☐ **c** – the place has outstanding heritage value to the nation because of the place's potential to yield information that will contribute to an understanding of Australia's natural or cultural history

☐ **d** – the place has outstanding heritage value to the nation because of the place's importance in demonstrating the principal characteristics of:

i. a class of Australia's natural or cultural places
ii. or a class of Australia's natural or cultural environments

☒ **e** – the place has outstanding heritage value to the nation because of the place's importance in exhibiting particular aesthetic characteristics valued by a community or cultural group

☒ **f** – the place has outstanding heritage value to the nation because of the place's importance in demonstrating a high degree of creative or technical achievement at a particular period

☒ **g** – the place has outstanding heritage value to the nation because of the place's strong or special association with a particular community or cultural group for social, cultural or spiritual reasons

☒ **h** – the place has outstanding heritage value to the nation because of the place's special association with the life or works of a person, or group of persons, or importance in Australia's natural or cultural history

☐ **i** – the place has outstanding heritage value to the nation because of the place's importance as part of Indigenous tradition

Q7a. TIP *In describing the place, think about its physical aspects and surrounds, its uses by people, aesthetic qualities and any spiritual or cultural associations. You should try to include photographs and a site map or sketch plan if appropriate. See the* Nomination Notes *for details.*

Q7 a. How would you describe the place?

The Sydney Harbour bridge is a massive steel arch spanning 1650 ft (503m) between bearings which anchor it in place at Dawes Point and Milsons Point. It carries road, rail and pedestrian traffic on a deck suspended 170 ft (52m) above the water, with sweeping approaches and steel Warren truss approach spans linking to the main bridge deck. Granite faced pylons at the abutments give the bridge a sense of stability and greatly enhance its aesthetic appeal and recognisable character, but are not structural elements of the bridge.

The design of the bridge is described in detail in the 1932 paper by Dr JJC Bradfield, Chief Engineer Sydney Harbour Bridge and Metropolitan Railway Construction, and the technical terminology applied to the structure is set out in the RTA Conservation Management Plan. The Bridge details are summarised in the following formal description applied by the NSW Heritage Council, and in a shorter form in the RNE.

Physical Description: The bridge is constructed of a pair of silicon steel trussed arches with hangers holding the deck which is made from an assemblage of steel girders, beams and others steel elements, all painted dark grey. The pylons are faced with granite. The portion of the approaches nearest the arch are constructed of open work steel Warren trusses which are supported by granite-faced pillars. The remainder of the approaches are steel and concrete arch construction with render finish. The span of the arch, measured between the centres of the end pins, is 503m (1650 feet). The arch is divided into 28 panels of open steel work, each panel being 18m (58 ft. 11 in). The rise of the arch at its crown is 76m (250 feet) and the depth of each truss at the centre of the arch is 18.3m (60 feet) and at the end they are 57.3m (188 feet).

Under the heaviest allowable load, the deflection at the centre of the bridge is 114mm (4 and half inches), and the maximum thrust at the hinges, (ie at the ends of the arch) is 200,000 tonne (435,000,000 lb.) per hinge. The top of the arch is 134.5m (445 ft.) above water level and the roadway suspended below the arch is 52m (170 ft.) above the water level. The 'roadway' is 46m (150 ft.) wide and total length including the approaches is 1,163 m (3816 ft).

About 75% of the steel is high-strength silicon steel from Middlesborough, England, specially developed by Dorman Long for the aches and other principal elements of the Bridge. Most of the other steel for minor structural elements and the steel approach spans is mild steel from BHP Newcastle. All fabrication was done on site in workshops especially erected on Milsons Point. The granite facing the towers and pylons is from Moruya. (Walker and Kerr 1974, modified)

[Note: some of the dimensions and weight appear inconsistent with the figures in the Bradfield paper and need to be checked.]

Q7 b. What condition is it in? Describe whether the place is intact or if there has there been any damage or disturbance.

The Bridge is continuously maintained in excellent structural condition. Alterations over the years have been sensitive and subject to the CMP and a Permanent Conservation Order with limited exemptions.

Q8. **What is its history?** Summarise its origins and development. You may need to attach additional information.

In 1815, government architect Francis Greenway, in a report to Governor Macquarie, proposed the building of a bridge from Dawes Point at the city's edge to the northern shore. However it was not until 1922 that legislation was passed and acted upon, authorising the construction of a bridge. Tenders were invited in 1923 in accordance with general plans and specifications prepared by Dr J.J.C. Bradfield, Chief Engineer, Sydney Harbour Bridge and Railway Construction. The plans and specification provided the alternatives of a cantilever bridge or an arch bridge.

Twenty proposals were received from six different companies for various types of design, including suspension bridges not covered by Dr Bradfield's specification. The tender of Dorman Long and Co. Ltd., of Middlesborough England for an arch bridge was accepted, the design being substantially in accordance with one of Dr Bradfield's proposals. The detailed design was carried out by the Contractor's Consulting Engineer, Sir Ralph Freeman, and the fabrication and construction were under the direct charge of Mr Lawrence Ennis, a director of the firm. The design and the construction of the bridge were supervised at all stages by Dr. Bradfield and his staff.

First work on the bridge commenced in 1924, with construction of the bridge approaches, concrete arches and steel truss approach spans. While the approach spans were being built, the foundations on either side of the harbour were prepared to take four steel bearings consisting of large hinge pins and massive steel bases for support of the arches. At each end of the arch span of the bridge, and just behind the bearings, large abutment towers supporting the pylons were constructed. The abutment towers with the pylons are not a necessary structural feature of the bridge. They do not support the arch and were built principally to enhance the appearance of the structure. As the erection of the steelwork was proceeding, the approaches were being constructed, including Milsons Point and North Sydney railway stations, and roadway approaches on both sides of the harbour.

The bridge was opened to roadway, railway and pedestrian traffic by the then Premier of New South Wales, Mr J.T. Lang, on the 19th March 1932, with some intervention by Captain Francis De Groot. The time taken to complete the whole work, including bridge and approaches was eight years from the date of signing the contract on 24 March 1924 to its opening on 19 March 1932. The contract for the bridge construction provided for six months' maintenance by the contractors from the date of opening, after which maintenance became the responsibility of the State. (GHD Transportation Consultant 1982:4)

Space on the eastern side that was originally provided for a proposed Warringah railway was ‘temporarily’ allocated to tramways. However, the railway has never been built. (This comment bears upon Bradfield’s vision for a railway system that would have alleviated considerable traffic congestion in that area today).

There have been some alterations to the traffic lanes, toll collection and traffic control on the Bridge deck. The most significant alteration was the replacement of tramways with additional roadways in 1958 and the subsequent creation of buslanes in 1972. Approaches were modified for the Cahill Expressway to the south in 1958 and the Warringah Expressway to the north in 1968. The original bridge lighting was largely replaced in 1968, with some original lanterns being retained at the Bridge stairs. Floodlighting of the structure was added in 1962 and has been replaced since. Four arch maintenance cranes were replaced in 1997 to meet current occupational health and safety requirements and a new access lift was installed. Minor alterations were made in 1998 to allow escorted small groups clipped to a safety cable to participate in BridgeClimb for a daytime or nightime experience . The tours have been very popular with the one millionth paying customer climbing the over the arch in 4½ years from opening, in April 2003.

Q9. TIP *We’d like to know about other places that have similar characteristics to the place that you are nominating. For example, these other places might have similar species or rock formations; they might be similar buildings or places with similar histories, traditions or beliefs attached to them. We want to know what makes the place you’ve nominated a better example than these other places, in short, why is it outstanding?*

See the Nomination Notes *for more tips.*

Q9. **What other places have similar characteristics?** How do these places compare with the place you are nominating? Sydney Harbour Bridge is the largest bridge in Australia, and no other bridge compares with it in its technical symbolic and social significance.

Other bridges in Australia are significant for their age and other characteristics, such as the Richmond Bridge in Tasmania which was built in 1825 and has been entered in the National Heritage List as Australia's earliest large stone arch bridge.

There are other large steel bridges in Australia such as the Story Bridge in Brisbane, which is of cantilever construction and span of 288m. While it is symbolic of Brisbane, it is not as well known nationally as Sydney Harbour Bridge, and does not symbolise Australia internationally.

Overseas arch bridges which may be regarded as similar in some ways to Sydney Harbour Bridge include the Hell Gate Bridge in the US which is an earlier (1917) steel arch with pylons, but it is shorter with a span of 298m. It was influencial in Bradfield's design, but Sydney Harbour Bridge was much more complex because of its greater span and width. A number of other steel arch bridges are listed in the RTA Conservation management Plan, including the Bayonne Bridge, Kill van Kull, New Jersey which was designed after Sydney Harbour Bridge but completed in the year before it, in 1931. At 503.5m it is 0.6m greater in span, but is narrower and carries less load. The only other longer steel arch bridge is the New River Gorge Bridge, Fayetteville, West Virginia, which spanned 518.5m in 1977.

For international recognition, Sydney Harbour Bridge could be compared with the Tower Bridge in London and the Golden Gate Bridge in San Francisco. The former is a double-leaf bascule bridge of 60m length, built in 1894, while the latter is a cable suspension bridge of 1280m span, built in 1937.

Q10. **What other information is available on the place?** List any articles, books, reports or heritage studies that may provide evidence supporting your nomination. You may also have information from Traditional Owners and Custodians, scientists or heritage specialists. If they have agreed to share their knowledge, please include their contact details.

Roads and Traffic Authority of NSW, Sydney Harbour Bridge Conservation Management Plan February 1998 See also Bibliography included, p157
Register of the National Estate File 1/12/36/65 gazetted 21 March 1978
NSW State Heritage Register No 00781 gazetted 25 Jun 99
Local Environmental Plan CSH LEP 4 07 Apr 00
Local Environmental Plan North Sydney, 2001
National Trust of Australia register 11 Feb 74

Nomination of the Sydney Opera House in its Setting with the Sydney Harbour Bridge and the Surrounding Waterways of Sydney Harbour from Bradley's Head to McMahon's Point, For Inclusion in the World Heritage List, Australoian Heritage Commission , December 1980
Sydney Opera House in its Harbour Setting: nomination and supplementary documents, 2000
Building the Sydney Harbour Bridge: the photography of Henri Maallard, Introduced by Max Dupain and Howard Tanner, 1976
GHD Transportation Consultants Pty Ltd 1982 Environmental Impact Statement for ninth lane and footway on Sydney Harbour Bridge Sydney NSW
Walker and Kerr 1974 National Trust Classification Card - Sydney Harbour Bridge
JJC Bradfield, Sydney Harbour Bridge, The Commonwealth Engineer, 1 March 1932

Bradfield, J.J.C.: "Report on the proposed electric railways for the City of Sydney", New South Wales Government Printer 1916
Department of Public Works, New South Wales: "Contract for the Construction of a Cantilever Bridge or an Arch Bridge across Sydney Harbour from, Dawes Point: to, Milson's Point, Sydney, New South Wales, Australia" New South Wales Government Printer, Sydney. 1923.
"Sydney Harbour Bridge: report on tenders", New South Wales Government Printer, Sydney 1924.
Freeman R: "Sydney Harbour Bridge: Design of the Structure and Foundations", Min. Proc. Instn. Civil Engrs, vol. 238, 1935 pp153-193
Freeman R and Ennis, L. "Sydney Harbour Bridge: Manufacture of the Structural Steelwork and Erection of the Bridge". Min. Proc. Instn. Civil Entire, vol. 238, 1935 pp 194-255
Pain J F and Roberts G... "Calculations for the Steel Superstructure", Min. Proc- Instn Civil Engrs, vol. 238, 1935 pp 256-309
Bradfield J J C: "The Sydney Harbour Bridge and Approaches" Min. Proc. Instn Civil Engrs, vol. 238, 1935 pp 310-401.

Sydney Harbour Bridge Official Souvenir & Programme. Opening Date 19th March, 1932 (This includes inter alia a biography of Bradfield; a paper by Bradfield History of the Bridge – largest arch type in the world ; and a paper by Ennis Bond of Empire – story of construction of bridge; plus many images).
The photographs by the NSW Government Printer now in the State Library of NSW. (The NSWGP was the official photographer).
The photographs of Canon Edward Francis Nicholson (Frank) CASH (1887- 1964) now in the Moore Theological College Library.
'The Parables of Sydney Harbour Bridge' by Canon (Frank) Cash.

http://www.cultureandrecreation.gov.au/articles/harbourbridge/
http://www.bridgeclimb.com/history_frs.htm

Considerations

Q11. **Are there sensitive issues associated with the place?** These may be issues that need to be kept out of the public eye such as matters relating to sacred or religious sites, or the location of rare fossils, plants or fragile places.

NO ☒ YES ☐

If you answer yes, we will contact you to discuss the issues.

Q12a. TIP *An explanation of themes is available in the* Nomination Notes*. For information on current themes for National Heritage List nominations, visit www.deh.gov.au/heritage or call 1800 020 625.*

Q12a. **Do the values reflect a National Heritage Theme announced by the Minister?**

NO ☐ YES ☒

Q12b. **If you answered yes, please state which theme:** Transport

Your details

Your details are needed in case we require more information on the nominated place. Your identity is protected under the Federal Privacy Act 1988 *and will not be divulged without your consent or as allowed for under that Act.*

Are you nominating a place on behalf of an organisation?

NO ☐ YES ☒

If you answered NO, fill in only Details Table One. If you answered YES, fill in only Details Table Two

Details Table One

Title: > First name: Family name:

Address:

State:ACT Postcode:

Tel: Fax: Email:

Details Table Two

Title: Mr First name:Keith Family name:Baker

Organisation name: Engineering Heritage Australia

Address:PO Box 28

Woden State:ACT Postcode:2606

Tel:02 6274 1832 (W) Fax: 02 6274 1920 Email: kmjlbaker@homemail.com.au or keith.baker@deh.gov.au

Final checklist

Before signing and dating your nomination form, please make sure that you have :

☒ attached and labelled the location map and/or site plan

☐ attached and labelled the optional photographs and supporting evidence that you wish to include.

Signature of nominator ..... Date .....

Send the completed form and attachments by mail to: The Nominations Manager
Heritage Division

Department of the Environment and Heritage
GPO Box 787
CANBERRA ACT 2601