

Windsor Bridge Replacement Project

Independent Heritage Review

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PART B - WINDSOR BRIDGE REVIEW

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1.0 Introduction

1.1 Background

This report responds to the Scope of Works outlined in Section 2. This scope was identified by the Department of Planning and Infrastructure. This report provides a review of the historic heritage reports for the *Environmental Impact Statement* (EIS) for the Windsor Bridge Replacement Project (WBRP). This report has reviewed the relevant sections of Volumes 1, 2 and 3 of the EIS. It has also reviewed RMS's Submissions report as well as the Public and Government agency submissions made on the proposal.

1.2 Aim of this report

The aim of this report is to provide an independent heritage review of the historic heritage components of the WBRP. The historic heritage reports for the WBRP will be assessed against published criteria, best practice standards and overall assessment of the quality of the work.

1.3 Review Team

A team of relevant heritage experts has been assembled to undertake this review. The team includes:

- Dr Mary Casey, historical archaeologist and heritage consultant, Director, Casey & Lowe, Archaeology and Heritage. Dr Casey has a PhD in archaeology, a Masters of the Built Environment and a BA Honours. She is an honorary research associate in the Department of Archaeology, University of Sydney and is a member of the Archaeology of Sydney Research Group. She is a full member of Australian Association of Consulting Archaeology Inc (AACAI), the only professional archaeological association in Australia, and a full member of Australia ICOMOS. She is well published in historical archaeology and was editor of *Australasian Historical Archaeology*, an internationally recognised archaeology journal, for five years. Mary has directed archaeological projects on many 18th and 19th-century archaeological sites in Sydney and Parramatta. As part of her PhD research Mary analysed many images and maps of the Sydney Domain and produced a methodology for analysis of historic images and understanding their reliability as historical information and for the prediction and interpretation of archaeological remains and landscapes. Mary has produced sustained and detailed analysis of the two main comparative archaeological landscapes for the Green Hills and Windsor area, being Sydney Cove and the Governor's Domain and Parramatta, with a focus on the period 1788-1821. In 2009 she co-curated an exhibition, *Breaking the Shackles: historic lives in Parramatta's archaeological landscape*.

Mary is providing analysis and input into the overall heritage approach as well as the historical archaeology assessment, archaeological testing, and research design. She is also reviewing the recommendations/requirements in relation to the archaeology if the project was to be approved.

- Craig Burton is director of CAB Consulting Pty Ltd. He is qualified architect, landscape architect, horticulturalist, fine arts historian, heritage consultant and graduate in environmental studies. He has been involved with environmental heritage issues, particularly in the areas of architecture, cultural landscape identification and assessment since 1982. He holds an Adjunct Professorship at the University of Western Australia and has been involved in education since 1979. He is equally experienced as an architectural, landscape and urban designer having undertaken a wide range of design projects and

always strives for design excellence through the integration of different disciplines and particularly the interpretation of heritage values and understanding place with contemporary design. His work is recognised at an international level as well as national, state and local levels.

Craig is providing analysis of the overall heritage approach, with specific attention to the built heritage and the landscape of Thompson Square Conservation Area which is listed on the State Heritage Register (SHR).

- Alex Been is a Senior Structural Engineer and Heritage Specialist with Mott MacDonald Australia. Alex has a Bachelor Degree in Civil Engineering and a Masters degree in heritage conservation. He has over 10 years consulting experience, with particular emphasis on the assessment and conservation of historic structures throughout New South Wales. Alex has previously provided specialist advice to numerous government agencies relating to the conservation of public assets, including buildings, roads, road and rail bridges, viaducts, wharfs, culverts, cranes, sewer and stormwater infrastructure, mining infrastructure and chimneys.

Alex is providing analysis of the history and heritage assessment of Windsor Bridge, particularly as it relates to the technical aspects of the bridge.

All members of the team are recognised experts in their field, and have a range of relevant qualifications as well as many years of heritage experience. The members of this team have undertaken detailed analysis and assessment of similar projects as part of their daily practice.

2.0 Scope of Work

The Department of Planning and Infrastructure brief (DP&I 2013/70) for the Historic Heritage Review identified the following Scope of Works.

The Department requires an independent peer review of the heritage impact assessment undertaken for this project as part of RMS's Environmental Impact Statement, including review and comment on:

1. The technical adequacy and completeness of the heritage assessments, but not limited to:
 - The heritage assessment methodology, the archaeological testing methodology, and/or approach undertaken; and
 - The assessment of the significance of the proposal's impacts (including urban design and landscaping impacts) on historic heritage (including, but not limited to, heritage buildings and structures, historical and maritime archaeology, heritage landscapes); and
 - Taking into account any relevant historic heritage guidelines, industry best practise standards and legislation.
2. The appropriateness of management and mitigation measures recommended for the project;
3. Review and consider the RMS's response to the heritage issues raised in submissions received for the project (the Response to Submissions report and/or Preferred Infrastructure Report); and;
4. Prepare a brief report for the Department on the findings of the review, including:
 - Adequacy of the heritage assessment (as detailed above);
 - Identification of any additional information that is required to address any shortcomings;
 - Appropriateness of the management and mitigation measures recommended for the project; and
 - Recommending conditions of approval that may be applied to the project to avoid, minimise, mitigate and/or manage heritage impacts to achieve regulatory and best practice standards (should the project be approved).

3.0 Review Methodology

The review team each addressed the separate parts of the report relevant to their expertise as outlined in Section 2. The review methodology was designed to address technical adequacy and completeness of the heritage assessment. The requirements of the *NSW Heritage Manual* were specifically addressed in relation to the Thompson Square Conservation Area and the archaeology contained within the square. The *NSW Heritage Manual* provides guidance on standard approaches to investigating, assessing and managing significance. This is discussed further in Section 6.

3.1 Windsor Bridge

Windsor Bridge is a key crossing over the Hawkesbury River, and commences at the northern edge of Thompson Square. This is the location of early historic river crossings such as a punt and ferry. The focus of the review of Windsor Bridge was to understand if the description, historical development and analysis of the technical significance of the bridge was correct and appropriately recognised the significance of Windsor Bridge which was listed on RMS's S170 register as being of State significance. The review methodology included:

1. Inspection of the site.
2. Review of the sections of the EIS, supporting documents, and public submissions relating to the history, significance and impacts on Windsor Bridge.
3. Review of the existing listing for the Windsor Bridge on the NSW State Heritage Inventory.
4. Review of Roads and Maritime Services and third party literature on historic road bridges in NSW (for example: *Bridge Types in NSW: Historical Overviews* (from the RMS website), and *Spanning Two Centuries: Historic Bridges of Australia* by Colin O'Connor).
5. Provision of a report outlining any concerns with the history, significance and impacts on Windsor Bridge relating to the bridge's technical aspects, and a schedule of recommended further actions to complete the EIS, as well as any recommendations for conditions of consent for consideration by the NSW Department of Planning and Infrastructure.

3.2 Archaeological Heritage

1. Review of Working Paper 1 to determine if it addresses the requirements of the *NSW Heritage Manual*, including guidelines for *Statement of Heritage Impact*, *Archaeological Assessment* (1996) and *Significance of Archaeological Sites and Relics* (2009).
2. Determine if the history, analysis and assessment are adequate, correct and fully address the archaeological potential of the study area as well as providing a fully developed sense of its significance.
3. Has the archaeological potential been adequately illustrated as a guide for identifying the potential resource, and the extent and location of the resource during possible major fieldwork? This is a key requirement for understanding its significance as well as providing guidance for future fieldwork and archaeological strategies.
4. Are the archaeological testing methodologies appropriate and do they fully address the archaeological potential and nature of the type of structures which may survive within the study area?
5. Is the research design adequate for guiding the archaeological program on a site of State significance, one of four late 18th/early 19th-century (pre-1810) localities on mainland Australia associated with the beginnings of British settlement? Are industry best practice standards included in the Research Design?
6. Are the management and mitigation measures appropriate?

3.3 Built Heritage & Landscape

1. Determine the appropriateness of the assessment methodology. Does it conform to standard practice for SHR sites as outlined in the *NSW Heritage Manual*, with particular reference to *Statement of Heritage Impact*, *Heritage Curtilage* guidelines as well as James Kerr's *The Conservation Plan*? In addition, the specific guidelines for *Investigating Heritage Significance* (draft) highlights some of the key issues to be addressed.
2. Analysis of views and vistas - does it conform to standard practice for SHR sites?
3. Where problems were identified with the assessment methodology, are they central to the adequacy of the assessment and its understanding of significance, its policies, guidelines and design principles?
4. Is the assessment of impacts correct and appropriate?
5. Are the management and mitigation measures appropriate?
6. Is the proposed urban design of the works appropriate and is there suitable mitigation for these impacts?

4.0 DGRs SSI-4951

The DGRs for the project identified the EIS must address the following specific matters:

Heritage – including but not limited to:

- impacts to *State and local historic heritage* (including archaeology, heritage items and conservation areas), in particular, impacts on the Thompson Square Conservation Area, heritage-listed buildings and sites in the Thompson Square conservation area and the Windsor Bridge should be assessed. Where impacts to State or locally significant historic heritage items are identified, the assessment shall:
 - outline the proposed mitigation and management measures (including measures to avoid significant impacts and an evaluation of the effectiveness of the mitigation measures) generally consistent with the guidelines in the NSW Heritage Manual (1996),
 - be undertaken by a suitably qualified heritage consultant(s) (note: where archaeological excavations are proposed the relevant consultant must meet the NSW Heritage Council's Excavation Director criteria),
 - include a statement of heritage impact for all heritage items (including significance assessment),
 - consider impacts from vibration, demolition, archaeological disturbance, altered historical arrangements and access, landscape and vistas, and architectural noise treatment, and
 - develop an appropriate archaeological assessment methodology, including research design, to guide physical archaeological test excavations (terrestrial and maritime) and include the results of these excavations.

5.0 Key Issues

1. The extensive reporting undertaken for the WBRP *Heritage Assessment and Statement of Heritage Impact* (SoHI) is sprawling, repetitive, and poorly synthesised. Additionally, it is generally inadequate in its analysis of historic maps and images, and incomplete where it does not conform to the guidelines and objectives of the *NSW Heritage Manual*. The scale of concerns about this report relate to what may appear to be minor details but which have significant cumulative consequences which have led to an inadequate understating of the significance of Thompson Square Conservation Area and the reasons for its State significance. On these grounds the reviewers are not in a position to recommend any relevant conditions for consents of approval. While these issues may appear minor within the context of the recommendations from Working Paper 1, that the project should not go ahead because of the impact on the significance of Thompson Square Conservation Area and Windsor Bridge, they are of high importance if the WBRP were to be approved on the basis of the current assessment, analysis, and assumptions which were to be used to provide a guide for managing the impacts on the square. The specifics of this key issue are detailed below.
2. The **Heritage Assessment** is insufficient to fully understand the significance of the Thompson Square Conservation Area. Further work needs to be undertaken to bring the assessment in line with the *NSW Heritage Manual* as outlined in Section 6.1. The required documentation should conform to the information usually contained within a Conservation Management Plan (CMP). The current assessment does not provide an appropriate detailed analysis of Thompson Square Conservation Area and the relationships between buildings and the open space of the square nor any heritage design principles or policies to guide the impact assessment.

As recognised by the Heritage Council of New South Wales in their submission and reiterated in other sections of this report:

There has been inadequate recognition that the State Heritage Register listing for the Square includes the open space and all of the buildings which surround it. Thus the relationship not only within the open space, but between the buildings and the Square, or the entire setting of the Square is of importance. The placement of a new major road along the side of Thompson Square will sever the relationship between the buildings along Old Bridge Street to the Square, and also with the buildings on the opposite side of the Square.

Thompson Square thus comprises a series of interrelated components – the setting, historic plantings, monuments, fencing, roadways, surrounding buildings and connections to the River. Such squares are rare in NSW and in Australia.

This key concern is discussed below, in Section 6.1, in relation to the *NSW Heritage Manual* and qualifications of the team and where they do not comply with the DGRs.

3. The **Archaeological Assessment** does not fully recognise and document the archaeological potential of the Thompson Square Conservation Area. It is not adequately summarised or synthesised in accordance with the *Archaeological Assessment* guidelines (p. 15) which are a component of the *NSW Heritage Manual*.

The Statement of Archaeological Potential does not include the potential archaeological remains of the buildings shown on the Evans' images of 1807 and 1809, or that part of Andrew Thompson's lease or that remains of a boat yard are within the study area. A preliminary table listing the potential archaeological remains, as identified in the history as well as in Evans' paintings, is included in Appendices 2, 3. This identifies that in 1809 there was approximately 16 structures of public and private ownership within the yet to be declared Thompson Square.

There are no proper archaeological overlays or mapping analysis as identified on p. 15 of the *Archaeological Assessment* guidelines. Figures 6, 7, 8, 9, 10 in Chapter 7 appear to be trying to

do this but they provide no analysis/critique of the maps, and how they fit in relationship to each other, or even where the study area is located in relation to the maps. Why is this important? The use of overlays of historic plans in relation to each other and the study area provide information similar to that needed by the landscape specialist but for different purposes. Overlays are essential for understanding which part of properties are within the study area and how potential archaeological remains and property boundaries have shifted over time in relation to the current study area. Overlays of historic maps in relation to each other and the study area are central to defining the archaeological potential and therefore the significance of the study area. They are also key to managing any proposed excavation of an archaeological site, especially one of State significance with all its complexities.

4. The **Urban Design** mitigation measures must be examined closely as they do not relate to heritage significance, or heritage design principles and conservation policies. The mitigation measures do not alleviate the implication that appears to be acceptable to RMS that the WBRP can have such a major impact on a SHR conservation area and State significant archaeology. The urban design report's assessment has concluded that all visual impacts within Thompson Square are High, the highest level of impact. The heritage report's assessment has stated that the only real mitigation for the proposed impacts relates to archival recording, archaeological excavation of the site, reporting and interpretation. The main mitigation for the built heritage appears to be a design which consolidates the park and undertakes planning for a redesign of Thompson Square and the Terraces. This proposed design is not based on a full understanding of the significance of the heritage values of the place, nor on any heritage design principles or conservation policies, on which to base a future design. Therefore it is not mitigating impacts on heritage but an additional impact.
5. There has been no 'evaluation of the **effectiveness of the mitigation measures**' as required in the DGRs. The tone of the report suggests that there is no real way to evaluate such mitigation measures as the impacts are so high. Therefore when impacts are increased, the quantum of new impacts appears to become irrelevant. This is borne out by the assessment in the Submissions Report of raising the bridge by 1m just past no. 4 Bridge Street. The raising of a western embankment wall by an additional 1m is seen as being minimal as the impact is already high. There is no discussion of how the raising of the height of the bridge affects the operation of Thompson Square Conservation Area as a holistic space or that this change further severs the relationship of the eastern buildings from the rest of the Conservation Area.
6. **Will Thompson Square be of State significance if WBRP is approved?** There is no discussion about whether Thompson Square Conservation Area will retain its State significance if WBRP is approved. This discussion should initially focus on the significance stated in the statutory listing, but should then consider this in light of the updated significance assessment undertaken as part of this project. While there is reference to 'residual' impacts subsequent to the mitigation in EIS Vol 1, there is no expression of what 'residual' actually means. It is acknowledged that this can be hard to quantify but the main difficulty here stems largely from the absence of suitable analysis of all the heritage values of the Thompson Square Conservation Area, identification of heritage design principles, and conservation policies. Once these works are done it would provide a means to refine an understanding of what 'residual' may actually mean and convey it to the reader or the determining authority. The report would then be able to quantify the level of impacts.
7. **Working Paper 1 says impacts are so major WBRP should not go ahead.** RMS's heritage consultants in Working Paper 1 state the proposed impacts on Thompson Square Conservation Area are so major the WBRP should not go ahead. But RMS has chosen not to accept this advice because they had already chosen to explore only Option 1 in this EIS. The *Built Heritage and archaeological landscape investigations* report (August 2011) examined the various options. It was very much a proforma examination of the statutory issues. While it stated that

its aims were to 'address all heritage values – historic landscapes, built heritage, archaeological evidence' (October 2009, published 2011:2) it does not do this. It provides lists of statutory items and notes that it was being compiled as the basis for the PEI. It was to provide a preliminary assessment to assist in determining a preferred option. This report identified that the Thompson Square Conservation Area was listed on the SHR as were other adjoining heritage items. The identification of potential archaeological remains within the study area was limited to the punt, the brick drain and three potential archaeological sites. The 1809 Evans' painting was used in a historical background report (2009:18, fig 3.5) but the potential for the remains of approximately 16 structures on this image to be within the Thompson Square Conservation Area was not identified. There is no clear statement that impacting on a SHR item, let alone a SHR Conservation Area, is a major risk issue and this was not identified under client obligations (2009:44). There was no discussion that a SHR listing is an endorsed view of the State government that the item should be conserved in perpetuity as part of the heritage of the State. The only obligation identified in the 2009 report is to apply for S60 approvals. This is an inadequate identification of the heritage issues in relation to Option 1, 2 and 3 as the basis for making a decision about the Options. The report stated that 'The option has the potential to impact on the visual amenity of Thompson Square triggering the requirement for Section 60 applications to address this issue' (2009:57). There is no indication that any options which passed through Thompson Square Conservation Area may have an unacceptable impact and that they should be avoided if possible. There is no identification of constraints arising from the three options which pass through Thompson Square.

The *Preliminary Urban Design and Heritage Review of Options 1 and 3* (August 2011) also appears to address the heritage issues. Its analysis of the 'evolution of Thompson Square' (p.18, Figure 2.16) is flawed. There is no identification of the basis for the 1795 drawing which has the footprint of Thompson Square reserve already defined and George Street to the east which was not formed at this time. Where is the Commissariat store? There is no illustration of the numerous structures within the study area in 1809 or the presence of Andrew Thompson's lease, or the boat yard shown on the 1807 Evans' painting. There is no exploration of the Government Domain within the context of the square. These drawings formed a key element of the analysis of Thompson Square which informed the design principles of this report. There are a number of additional flaws in this analysis. It is noted that this report was commissioned following RMS's decision about only reviewing Option 1 and 3 and following advice from the Heritage Council that it would not approve the route and that they preferred Option 6. It did not feed into the Options choice. This report provides limited overview of heritage issues and design principles but these are not based on a full understanding of the heritage significance of the place. It is noted that a number of these design principles recommended in this report, such as lowering the bridge, narrowing the lanes, etc, have been adopted for the current design.

The earlier urban planning advice from the Government Architect Office *Landscape and visual investigation for bridge options at Windsor* (December 2009) (GAO) on the difference between Option 1 and 6 did not engage with heritage values, only the perceived urban design issues. The GAO report considered that there was no substantial difference between Option 1 and 6. RMS's reliance on urban design analysis for understanding visual issues relating to heritage on this project has produced an incomplete understanding of these issues and heritage values.

Therefore the decision to adopt Option 1 as the only option for a new bridge at Windsor appears not to have any serious investigation of the reasons for the heritage values of the Thompson Square Conservation Area prior to determining that Option 1 should go ahead. The only detailed analysis appears to be subsequent to this decision.

8. The EIS discusses how RMS's **project criteria** for all other options could not be met but RMS does not consider that the failure to meet the criteria relating to conservation of heritage has

any real weight in its decision making. It appears not to be a weighted criterion with any effects on the decision making for the project, other than other route options. The monetary value of the project appears to be the key criterion for deciding on the option thorough the SHR-listed Thompson Square Conservation Area. No real information has been provided in relation to the social and heritage cost of this option to both the Windsor and wider communities, and the heritage of the State, should the proposed option be approved.

Key Issues Windsor Bridge

9. The EIS considers the impact of the proposed replacement project on Windsor Bridge, and correctly suggests that demolition of the bridge would be a 'loss to the cultural landscape of Windsor'.
10. Three main measures are proposed to mitigate against the loss of significance to the place due to demolition of the Windsor Bridge: archival recording, re-use of material, and interpretation through displays and narratives. It is also suggested that if material cannot be re-used in the replacement project there might be opportunities for re-use elsewhere. The EIS correctly states that these measures are not sufficient to mitigate against the loss and that there would be 'residual significant impacts to historic heritage, both in fabric and heritage significance, as a result of the project'.
11. The EIS considers the only route option that would result in little or no loss to heritage significance would be refurbishment of the existing bridge to enable a higher load rating for the bridge, to carry road traffic in either two or three lanes. All other route options require demolition of the bridge as 'the costs to repair and maintain the existing bridge would be substantial even if its use was limited to pedestrians and cyclists only'.

6.0 Adequacy of assessment method against Guidelines

6.1 NSW Heritage Manual (1996)

The *NSW Heritage Manual* (NSWHM) and later Heritage Council documents provides the basis for understanding heritage, the three key stages are:

- Investigate Significance
- Assess Significance
- Manage Significance

Other relevant guidelines include *Conservation Management* documents (Section 5) as well as the *Archaeological Assessment Guidelines* (1996) and the more recent *Assessing the significance of archaeological sites and relics* (2009). These were developed from *The Conservation Plan* by James Kerr and the *Burra Charter* of Australia ICOMOS. These two foundation documents form the basis of heritage management throughout Australia. These are referred to where relevant below.

The WBRP report is called a *Historic Heritage Assessment & Statement of Heritage Impact*. The report has identified that it was written in accordance with the NSW Heritage Manual (NSWHM) (1996), the *Significance Guidelines for archaeological sites and relics* (2009) and the *Archaeological Assessment* guidelines (p. 11, 184, 271, 345). Additionally, it says it was prepared in ‘accordance with the philosophy of the ICOMOS *Burra Charter*’ (p.16, 345).

While the preparation of a Statement of Heritage Impact (SoHI) is a standard document for assessing impacts on heritage sites, it is only standard as a standalone document for ‘minor works to items of regional or State significance’ (NSWHM *Heritage Approvals* p.4). As the SoHI guidelines (p.2) make clear:

However, for a complex proposal that affects an item of State significance, a more detailed conservation management plan would be required to support the application. The publications *Heritage Approvals* and *Conservation Management Documents* in the NSW Heritage Manual explain what these various documents are and how to prepare them.

The requirement for a CMP as ‘minimum supporting information required’ to impact on State significant heritage is also identified in the SoHI guidelines (p.9), Table 1, for major additions, new development adjacent to a heritage item, and new major landscape works. The need to provide supporting documents for SoHIs for proposed works which may impact on State significant heritage is further outlined in a number of NSW Heritage Manual guidelines: *Conservation Management Documents* and *Heritage Approvals*. These documents frequently refer to the Australia ICOMOS *Illustrated Burra Charter* and James Kerr’s *Conservation Management Plan* as the basic guidelines for how this work should be undertaken, for the analysis, statements of significance and provision of policies and recommendations to manage the significance of the place. Guidelines for a CMP or Conservation Policy are available on the Heritage Branch, Office of Environment & Heritage’s website.

RMS has not submitted a CMP as part of this project. While a CMP was written in the 1980s for the Bicentennial works, it is now out of date and inconsistent with modern practice, legislation, and strategies and is not relevant to this project. Parts of the Heritage Assessment and SoHI provide some components of a CMP but a number of key elements are missing. The key requirements of a CMP which are absent from the Heritage Working Paper, as outlined in the CMP guidelines (p.2), indicate decisions affecting a heritage item need to be based on:

- a careful analysis of why the item is significant;
- policies that have been developed to retain that significance; and
- conservation strategies to achieve the long term viability of the item or area.

Specific reporting absent from the Heritage Assessment and SoHI are detailed at the end of Section 7.2.

7.0 Compliance with assessment method

7.1 Competency of consultants to undertake work

The NSW Heritage Manual identified the following professionals were required for a CMP (p. 2):

Historians are skilled at interpreting historical documents and placing an item in its historical and contemporary social context.

Archaeologists are expert at looking at what a heritage item can tell us about the past from the layers of potential and known physical evidence.

Architects, landscape architects, engineers and others with design and construction expertise can quickly assess a heritage item and summarise what its fabric and setting tell us about its significance.

Does the Heritage Working Paper 1 team meet all there criteria?

- The team has two archaeologists among the principal authors:
 - Pamela Kottaras, Biosis, who has not held a permit under S139/S140 or S60 and based on the CV provided does not appear to meet the Heritage Council's *Excavation Director Criteria* for local or State significant sites.
 - Wendy Thorp, who has obtained a permits under S139/S140 and S60 of the *Heritage Act 1977*, and therefore has met the Heritage Council's *Excavation Director Criteria* for sites of local and State significance.
- Following a request to RMS about the qualifications of their heritage team, in relation to built heritage and landscapes, only the CVs for these two archaeologists listed above were provided, as well as brief biographies for other team members:
 - Gary Vines, archaeologist; and
 - Peter Woodley, archaeology degree and a degree in urban design.

Brief CVs for the full team were provided in the EIS.

Adequacy of the Heritage Team to produce the required reporting

The historian for Chapter 4, Historical Development - Windsor, was Wendy Thorp. While she has written many historical overviews for archaeological sites and heritage assessments she is not a qualified historian or a member of the Professional Historian's Association. She has drawn on the extensive historical research provided to the team by local historian Jan Barkley-Jack who is currently writing a PhD on the history of Windsor. Wendy Thorp was also responsible for writing Chapter 7 Archaeological Assessment and Chapter 8 Archaeological Potential. She is appropriately experienced to write these sections.

On the basis of the information provided, none of the team appear to be heritage architects, landscape specialists or engineers with design expertise, experienced in analysing and assessing built heritage and associated landscapes who are required to have a complete understanding of significance or who could produce appropriate heritage design principles and conservation policies and to appropriately assess heritage impacts on the conservation area or guide the subsequent design of the place.

As stated in the RMS response to questions from DP&I, a member of the heritage team said they had worked on reviewing CMPs for the Heritage Branch and another said they had worked on many CMPs. They should:

- Be aware that a SoHI for a site of State significant heritage, particularly one listed on the SHR, should have a CMP or equivalent documents to understand the various elements that

make up the place's heritage significance, provide policies for its management, and as the basis for the assessment of impacts; and

- Produce key components of a CMP for the analysis of significance of a Conservation Area and its management, or a CMP itself.

The study team for the sections of the EIS relating to Windsor Bridge was Pamela Kottaras, Gary Vine, Wendy Thorp and Peter Howard. It is understood that Gary Vines provided at least an overview of all sections relating to Windsor Bridge. We suggest that Mr Vines' professional experience is largely adequate to produce a heritage assessment of Windsor Bridge. The contradictory or vague statements regarding the development of the bridge structure as discussed below may be due to the absence of specific engineering expertise within the team.

7.2 Gap Analysis

7.2.1 Historical Research

While the historical research for the EIS is extensive there are still a number of gaps which are problematic in understanding the historical evolution and development of the place and the nature of the potential archaeological resource.

- Issues of wider historical context:
 - What was the nature of government in early Green Hills?
 - How did the government domain operate? It appears to be quite different to the domains in Sydney and Parramatta.
 - Were there any convicts assigned there?
 - Was there any convict infrastructure in Green Hills prior to 1810?
 - Who built the early government buildings?
 - Who built the buildings in the 1809 painting?
 - Who owned the land in which the boat was being built in the 1807 painting?
 - When were the various buildings around the square built? Current opinion is based on quite early research which in the 1980s was being questioned as inaccurate. The heritage team has questioned the dating of buildings but has not done any detailed land title and building research.

7.2.2 Thompson Square and its Cultural Landscape

Review by the heritage architect/landscape specialist on the review team in relation to the analysis of Thompson Square identified the following issues. These issues are based around best practice and *The Conservation Plan*:

- No clear landscape history analysis and indication of the major landscape components which have undergone change as a result of its historical evolution.
- The landscape analysis is misdirected by too much focus on views and vistas and not the visual and spatial structure of the place which is conceptually the whole of the Government Domain and its relationship with the riverine floodplains locale. No real sense of the experiential qualities of the place in the past or the future under the impact of the proposed traffic infrastructure.
- Visual analysis is limited to 'historic views and vistas' and not the structure of the whole place. It is unclear what is meant by use of the term 'historic view and vista'. Old photos illustrate subjects and can be an interpretative tool but are not necessarily historic.
- What would be useful to inform significance and ultimately the design intentions for the place would be the experience of space through movement of humans along the river, at the landing

place and traversing the topography within the former Government Domain and from without, from the south, east and west.

- Lack of clear identification of both historical and existing landscape character through an analysis of landscape type at the interface between an urban village environment and rural environment.
- An example of the use of landscape type in place of Landscape Character zones might be the breakdown into physical elements through broad headings such as: Waterform, Landform, Vegetation and Built Form. These could then be further refined into components which could be identified through a series of diagrams explaining the evolution of the place.
- Both the existing elements and the components could be assessed and identified as either areas or items of heritage significance. This would then help to inform future proposed design options for the whole place.
- No clear relationship has been provided between the presented new proposed landscape and urban design setting (the consolidated parkland) as an interpretation of the significance of the place.
- Built Form and Heritage section is not a comprehensive consideration in terms of existing built fabric.
- The Study Area as presented does not clearly communicate 'evolution and development through time'.

7.2.3 Conservation Management Plan or Equivalent

There are a number of areas of analysis and advice missing from Working Paper 1 which should be found in any standard CMP to be endorsed by the Heritage Council. This requirement of a CMP for State significant sites is clearly stated in the *Statement of Heritage Impact* guidelines:

- Series of drawings by the heritage architect/landscape specialist outlining the historical evolution of the study area within its historical overall landscape (Appendix 2). In the case of this project it should illustrate the evolution of the Green Hills settlement and wharf, government domain, the Andrew Thompson's lease and civic place, then Thompsons Square. It should show how Thompsons Square evolved throughout the twentieth century with phased drawings showing the periods/stages at which various buildings around the square were demolished and erected.
- Analysis of how the square, the roads, the space, the wharf and punt worked within the landscape as a whole. This would follow on from the previous analysis.
- Develop an understanding of why the square was considered Georgian when apparently a number of the buildings were erected subsequent to this period, if this is accurate. The design of the School of Arts and the cottages appear to be trying to maintain this characteristic of the place. There are a number of conundrums about the dates of buildings. Instead of seeing this as an interesting gap in understanding the history and heritage of the square and perhaps another layer to its significance, it has been dismissed as not being 'Georgian' but mostly mid to late Victorian.
- The absence of a heritage architect/landscape specialist on the EIS team creates a number of gaps in the assessment and understanding of the significance of the square and the conservation area. Architectural analysis of the architectural significance of the square is required rather than presenting historical backgrounds to the buildings to fully recognise and understand the architectural style and evolution of Thompson Square.
- A set of heritage design principles and policies to manage the significance of Thompson Square Conservation Area and fully assess the impact of the development.

The absence of this type of analysis and reporting is that the Working Paper does not provide appropriate assessment of the impacts or provide appropriate design principles for the urban

design. The urban design, apparently the major mitigation strategy, does not relate to the significance of the square, and focuses on calling it a park when it is a civic place.

When landscaping within a SHR area, it is the role of the heritage team to provide design principles for the SHR area, and also to provide the starting point for the design of any landscaping. The absence of these elements of the report also makes it difficult to assess the full impact of the WBRP. The concept of the square is not fully understood and therefore it is not adequately assessed. A suggested methodology for the type of landscape analysis is provided in Appendix 1.

7.2.4 Heritage Assessment

The Heritage Assessment is inadequate for fully understanding the significance of Thompson Square as outlined above. Further work needs to be undertaken as outlined above.

7.2.5 Archaeological Assessment

The Archaeological Assessment, Chapter 7, does not fully recognise the archaeological potential of the Thompson Square. The history report (Chapter 4) is unfocused due to the lack of synthesis which is problematic for the reader, who is trying to work out what happened on the site and if the assessment of archaeological potential is adequate. The lack of summary lists or tabulation of potential sites makes it hard for the reader to understand the end result of all this work. It is not adequately summarised or synthesised in accordance with the guidelines (p. 15). Furthermore:

- It has not made any clear statement regarding the potential archaeological remains of the buildings shown on the Evans' images of 1807 and 1809. There is no plan where these have been located to aid the analysis. A draft table listing the potential archaeological remains, as identified in the history and Evans' paintings, is included in Appendix 3. This sort of table should have been produced in the Archaeological Assessment as a synthesis of the potential remains, whether they likely to be inside or outside the study area, how easy would they be to find, determine use etc.
- There are no proper archaeological overlays or mapping analysis as identified on p. 15 of the *Archaeological Assessment* guidelines. Figures 6, 7, 8 in Chapter 7 appear to be trying to do this but they offer no analysis of the maps, and how they fit in relationship to each other, or where the study area is. Additionally, they are not particularly accurate. Why is this important? The use of overlays of historic plans in relation to each other and the study area provide information similar to that needed by the landscape specialist but for different purposes.
 - i. They are essential for understanding which parts of early properties are within the study area. It is not clear from Chapter 7 that the eastern edge of Andrew Thompson's lease is within the study area. This is identified in the Barkley-Jack history for the square and is suggested by the 1812 Meehan plan. This is also this reviewer's interpretation of the historic plans but these have not been overlaid.
 - ii. They provide an essential tool for the location of potential archaeological remains, and becomes a key document for the archaeological program in terms of interpretation the potential archaeological remains. Examples of overlay plans of plans are included in Appendix 4.
- Analysis and understanding of historic plans and images is problematic, as the Working Paper includes little or no analysis of the reliability of historic plans and images. Unless due care is taken to understand the source of the plans and their accuracy in relation to each other, reliance may be placed on plans which have not been demonstrated to be reliable. Reliance has been placed on some early lithographic images, notably the

Wallis lithograph which is based on an original sketch which is quite different to the later lithographs and therefore is not accurate enough to be evidence. The Evans' images are reputedly of 1807, 1809 and c1810 and, while they have been identified in the assessment, they have not been adequately described and analysed. What are the differences between them? Is the chronology of the images correct? What are the anomalies in the c1810 image which suggest that it may actually date earlier, possibly c1805 or 1806? See Appendix 5 for some preliminary comments on this. Do the archaeological remains of the more than 16 buildings illustrated within the study area on the Evans' 1809 painting survive within the study area? What is the nature of the buildings within the study area based on Evans' images: a group of private houses or huts within small fenced enclosures? These are likely to include archaeological remains of fireplaces, rubbish pits, gardens, outbuildings, cesspits, deposits and artefacts. Some may be private businesses or government buildings. There is very little information about these buildings in the historical records which makes the Evans' paintings essential for understanding their presence and possible archaeological potential and significance.

7.2.6 Discussion and Statement of Significance

These are inadequate because of all of the above issues and for the following reasons:

7.2.6.1 Assessment and Statement of Archaeological Significance (Working Paper 1:225-230)

Criterion E: Research Potential

an item has potential to yield information that will contribute to an understanding of NSW's cultural or natural history (or the local area);

The assessment and statement of archaeological significance does not fully address the range and nature of the potential archaeological resource within the study area. It does not address any substantive research questions under Criterion (e). How do we understand this criterion is a key feature if it is not adequately addressed? It is acknowledged that the understanding of this potential State-significant resource is imprecise but this discussion does not mention any potential remains other than the bridge or the evolution of Thompson Square. There is quite a lot that is known about the potential resource which could be addressed, as outlined in the gap analysis.

The Statement does not mention the settlement of Green Hills, and that the main structures were removed.

Below is a more useful indication of what the discussion of archaeological potential and significance within Thompson Square could include:

- Remains of a number (less than 5?) early buildings and occupations dating from the late 18th and early 19th century that were erected as part of the early Green Hills settlement.
- Structures and features thought to be within the study area were associated with administration of law and order, and the provision of storage for grain which was essential to the supply of the colony as well as storage of government rations, and remnant track or roads.
- A few stages of wharfage, essential to the shipment of grain to sustain the town of Sydney, were erected at the river's edge.
- All predicted potential remains from this period (1789-1800) were associated with the administration of the Green Hills and the surrounding Hawkesbury region and possibly there were some private residences but this is uncertain.
- Between 1807 and 1809 there were approximately 16 separate buildings (Evans' images), a mixture of private houses with fences and associated archaeological features and deposits,

official government buildings and residences, a boat yard immediately west of Andrew Thompson's lease, and possibly the western part of his lease which may include remains of his early house, garden, and later stores buildings as well as buildings along the river bank.

- Governor King erected a three-storey stores building, the later Commissariat stores, the western end of which probably projects into Bridge Street and the study area, and other surrounding buildings such as the soldiers' barracks and the school and church.
- By 1812 Governor Macquarie had incorporated the settlement at the Green Hills into one of the five Macquarie towns, Windsor. A new square was defined within the former civic place and was named after Andrew Thompson, an emancipated convict.
- Thompson's buildings along the eastern edge, and partly within what became Thompson Square, were demolished, as well as the other buildings shown in Evans' paintings which were within the footprint of the new Thompson Square and George and Bridge streets.
- Governor Macquarie ordered the reclamation of the foreshore, and the design of a new wharf by Francis Greenway, as well as the construction of other infrastructure such as a brick oviform drain and delineation of a street grid.
- A new road to the wharf may have been defined but it is likely that early traditional tracks continued to provide access to the wharf.
- Other potential remains, such as early houses and government buildings, not mentioned in the historical records or included on maps or in historic images, may survive within the study area.
- The roads made for the bridge and the 1930s road realignment will have impacted on the potential archaeology within the study area.

Examples of Research Questions

Following are some research questions which have been developed for early sites in Parramatta. Similar types of questions could be developed for Windsor. These questions are not recommended for Green Hills/Windsor but are provided as examples of the range and nature of questions that could be developed if the project was approved and the archaeological resource impacted. The reviewer notes that what has emerged as result of reviewing these Parramatta research questions is how different the Green Hills was to Parramatta, even though they were contemporary early settlements. Green Hills it is quite a different settlement, without the planned landscape of Parramatta or Toongabbie. It is *ad hoc* place, full of emancipated convicts working for government, farming just outside of town, with constables such as Andrew Thompson but also a lot of unknown residents erecting structures and living in the civic place and presumably providing services for what becomes a major distribution centre for grain to Sydney and Parramatta, through the Commissariat stores.

Examples of Research Questions for Parramatta

Establishing Parramatta

- Evidence for the nature of early agriculture on the site prior to the extension of the town grid to the south and the incorporation of the study area into the township. Does evidence of the type found on the southwest corner of George and Charles Street (Leighton's development) survive on this site, such as drainage channels?
 - Evidence for the pre-European landscape.
 - Nature and affect of modification of the pre-European landscape by early agricultural practices.

Free Life in Colonial Parramatta

- What differences were there between the lives of free or forced or institutionalised settlers?
- How did the deprivations of a frontier life alter the way in which free people lived in early colonial Parramatta?

- Nature of early agricultural practices, evidence for dairying etc. Address this issue through both the analysis of archaeological features as well as through analysis of early pottery and pollen samples. Does it indicate a level of self-sufficiency prior to the 1820s which then disappears as the services of the township developed?
- Consumption and commerce in colonial Parramatta:
 - How does the evidence found within the study area link into issues associated with the local, regional and global economies?
 - What does it tell us about cultural and social practices in colonial Parramatta, relating to lifeways, diet and other issues associated with consumption?

Landscape of Colonial Parramatta

- How does the evidence from this site feed into the changing perceptions of the convict-period landscape of Parramatta? The houses within the study area appear initially to be occupied by emancipated convicts and their families.
- Other issues to be considered are resistance to the way in which control manifested itself in the landscape and in daily life. Issues of power are central to the expression of landscapes of control.
- Remaking of the landscape, the social cultural and political context and how it was manifest in this landscape. Are many of the same issues influencing the way in which the landscape was formed similar to those which affected the Sydney Domain?
- Order and amenity: is the layout of houses and other structures the result of cultural and social practices? What was the role of these practices in changing the landscape and modifying people's behaviour?

Life in the Individual Households

This addresses all households relating to both early and later nineteenth-century occupation.

- The nature of life in the individual household - how were they the same and/or different?
- Evidence for the nature of childhood and the way in which gender identities were constructed.
- The nature of the material culture and consumption patterns of the various households and how these remains related to the transformation of their environment from rural town and onto an urban place.
- The way in which servants/staff may have lived in these households.
- Layout of the house and outbuildings and how this structured life in the individual household.
- Is there evidence for customary patterns (buildings, food, religious practice, cultural artefacts)?

Social Values of archaeology

The report's understanding of Social values (Criterion (d)) for the archaeology is incorrect, mentioning 'past' communities and ability to demonstrate social significance which does not conform to existing guidelines. The social values and significance attached to archaeological remains should be considered in the context of exposed archaeological remains within Windsor Museum, and the value that has been placed on these remains by the community groups, such as those interested in the history of Windsor and Hawkesbury, and the value they place on their early history and its fabric and artefacts. The report has not mentioned this or indicated that public consultation etc has been undertaken about the significance of the place and its archaeology.

Statement of Significance

Even though this is 3.5 pages long it is a much better discussion than the actual discussion of significance. However, the Statement of Significance still fails to identify the research potential of the site, and the potential archaeological remains and artefacts and how and why they are significant. The focus is on the potential to 'document and demonstrate' the changing town (230). Other issues with the completeness of the Statement relate to adequacy as outlined above. As the research potential is a key part of the significance of an archaeological site the failure to address

this in the Statement of Significance means that it has not adequately addressed a key element of the place's significance. While it not uncommon for the Statement of Significance written by a heritage architect for the 1980s SHR listing not to address archaeological research potential, it is surprising that a Statement of Significance written by an archaeologist does not engage in any meaningful way in discussing the research potential of the place and the significant research questions which make it of State significance.

Level of Significance & Comparative Significance

There is occasional reference to the archaeology of the Thompson Square Conservation Area being of comparable significance to the early archaeology of Sydney and Parramatta. To this should perhaps be added Toongabbie, another late 18th-century planned settlement for agricultural purposes which was listed on the SHR in November 2012.

There is some debate about the level of significance of the potential archaeological remains within the study area. It is acknowledged that they are of State significance but they are not considered to be of National significance. National significance is deemed to be a listing on the National Heritage List (NHL).

Parramatta is a key comparative archaeological site, but which elements of Parramatta are the most comparative? The early settlement pre-dating 1790, before the town was laid out? Or the layout of the 1790s convict town providing temporary accommodation for convicts and those managing the convict labour? Or the pre-1820 sections of the town? Much of the potential archaeological evidence as illustrated by the Evans' images has not been incorporated into the significance assessment or the land within Andrew Thompson's lease. How does this undermine the assessment of the site to have archaeological values of National significance? Let alone the significance of the Thompson Square Conservation Area itself?

7.2.6.2 Windsor Bridge and Heritage Significance

Section 8.6.2, Vol 2 of the EIS provides an assessment of the significance of Windsor Bridge under each of the standard evaluation criteria. The assessment under Criterion C summarises the bridge's technical significance as follows:

- Windsor Bridge exemplifies two historical phases in bridge building technology employed in New South Wales in the nineteenth century.
- Windsor Bridge is an unusual amalgam of technologies in response to specific environmental conditions and budget.
- Despite alterations and substantial refurbishment it retains its original form.
- The replacement mass concrete (This should read "precast reinforced concrete") components are an early use of this material and provided a benchmark in the development of the technology.

The bridge is listed in the EIS as having State Significance primarily due to its technical merit.

While the bridge is assigned state significance within the EIS, contradictory statements regarding the bridge's significance under each criterion, and the reasons for such, give an unclear picture of the bridge's significance and therefore the bridge's significance is in danger of being misrepresented.

The summary statement of significance in Section 7.1.3, Vol. 1 (and repeated throughout both volumes of the EIS) states that the bridge is a "state significant structure that is rare and has historical and technical significance". The bridge is also identified in Table 7-6 as having state significance under criteria A and C as well as local significance under criteria B, D, E and G.

However, in the same table the bridge is assigned no significance under criterion F (rarity), which is in contrast to the summary statement of significance above.

The comparative analysis of the bridge uses examples of bridges that are not particularly relevant. There are several bridges throughout NSW that have similar attributes for a comparative analysis, or better inform the place of the Windsor Bridge within the historical narrative of bridge construction in NSW.

The assessment of significance suggests that the use of cast iron piers was rare for road bridges. This is not true. There are many examples throughout New South Wales. However, it is correct that the use of cast iron or steel piers is rare for a bridge with the original height and spans of Windsor Bridge. Once the bridge was raised to its current height in 1897 the form of the substructure (i.e. the use of cast-iron piers rather than timber trestles or similar) could then be considered appropriate.

7.3 Archaeological Testing and Predictive Modelling

There were two stages of archaeological testing for this project. The first stage was reported on in the Working Paper 1: Appendix 3 and the second stage in the Submissions report.

7.3.1 Working Paper 1: Appendix 3: Testing report

This is oddly written due to the persistent use of imprecise language and/or non-standard excavation terminology. This makes it hard to understand what was found and recorded.

This testing did not comply with the approved research design:

- Fewer and smaller trenches than agreed.
- Reliance on the Aboriginal test trench for southern end of Thompson Square rather than the approved test trench for non-Aboriginal archaeology.
- Inadequate recording, no sections or schematic sections with depths. Have to extract this information from the report and this is not always there.
- While there are plans there are no RLs on them.
- Rarely uses dimensions when describing findings.
- No context list – a schematic section would have worked for this, such as a table with context numbers, description and depths.
- No artefact catalogue in original report. This was provided following request from DP&I as part of this review. A non-database catalogue was forthcoming. This does not conform to standard best practice.
- Need to provide adequate evidence of findings in the testing reports as have to demonstrate what the results are for other readers, agencies or statutory authorities.

With the exception of the first dot point, the report needs to be revised to address the issues above. If this project is not approved then these test trenches may be the only testing undertaken within Thompson Square within this generation, therefore it is important that the results be adequately reported.

Research Questions for Test Trenches

The questions have produced an incorrect focus on the excavation of the test trenches and not on the survival of the potential archaeological resource and its interpretation. They should have addressed:

- Degree to which archaeology may survive across the study area?

- Intactness and depth of deposits?

Only once this understanding is achieved can they then progress to determining what the impacts may be. Failure to excavate to the top of natural in the historic Test Trenches 1 and 2 means that they have not obtained a complete understanding of the archaeological issues. The approach used in the Aboriginal archaeology testing was to take the trenches down to clay, which Aboriginal artefacts would not have penetrated, and as a result the Aboriginal archaeology testing has achieved a better understanding of the archaeological profile in each of their test pits. They have a better understanding of the potential for Aboriginal archaeology within the project area than the historical testing has achieved. The Aboriginal archaeological testing methodology was not limited by expected design impacts.

Below is a discussion of the results of Aboriginal archaeological testing and how it relates to the interpretation of the archaeological potential of parts of Thompson Square.

Aboriginal Testing

057E/50N (Aboriginal Test Pit A in Historical testing report)

Found 114 Aboriginal artefacts, from 300-350mm down, spit 4.

- Identified the upper 0-300mm was disturbed.
- This would be a mixture of introduced topsoil mixed with remnant topsoil.
- Where topsoil survives on an early site this level of disturbance can be fairly standard.
- What is clear is that from 300mm down the soil profile is intact. Therefore the historical archaeological evidence will survive at this level. Many of the post holes from timber structures, rubbish pits, cesspits etc will be dug at depth and therefore evidence will have survived beneath 300mm. This is the whole model of archaeological potential for the survival of 18th-century archaeological sites in Parramatta.
- As this trench was located at the top of the slope that it would possibly be more truncated than archaeological remains further down slope and to the north. No discussion of this.
- Re the upper 0-300mm:
 - Likely to be a mixture of introduced soil for the park turf over the last 150 years as well as remnant topsoil, if there was any.
 - Just because a deposit is disturbed does not mean that it does not contain significant artefacts. If this upper 300mm was on a pre-1820 site then there is a possibility it may contain significant artefacts. On three Casey & Lowe sites, three separate areas had remnant topsoil above natural, above the predicted footprint of a convict hut. This was gridded and trial sieved. In one area the first evidence of bone-button manufacturing in NSW was found, probably by a resident of a convict hut. In another, behind a pre-1819 hotel, we found extensive evidence of activity and associated artefacts. This was determined to be relatively undisturbed through the presence of conjoins of fragments of clay tobacco pipes. On another project the remnant topsoil above a hut was found to contain a substantial and surprising series of artefacts. Many were very early in date.
 - Section 4.6 (p.50) says there were some historic artefacts found within the upper 300mm - were they catalogued?

Interpretation of this trench in Appendix 3:

Section 4.6 (p.50) interpretations of the results of the Aboriginal testing suggests that 'the deposit above the intact sand dune was homogenous and suggests that anything from the nineteenth century or earlier was removed in this area'.

- This review disagrees with this interpretation. There is no recognition that remnant timber structures are found at depth, and that from 300mm and deeper they are likely to survive. If

the site was built up then the intact layer was once higher in the soil profile. It is unclear how a 1x1m trench can be extrapolated to a much larger area for historical-period remains. It is **unsafe** to base any interpretation of the historic archaeology from this test trench other than to say that the upper 300mm is disturbed, that there is an intact soil profile containing Aboriginal artefacts in this area, and therefore there is likely to be intact historic-period remains in the vicinity.

- As a larger test trench was not excavated there is an inadequate understanding of what survives in plan within this area. No discussion of this is provided.

Aboriginal testing – ATP D 017E/630N (Working Paper 3: 25)

- Historic artefacts were identified in the top deposit, however, no catalogue of these items has been provided, and more description is provided in the Aboriginal report than in the historic report.
- Description of a deposit of shells from this trench states that they were not local shell, and had come from a saline environment. Shell was found down to a depth of 1m. The shell was identified as belonging to coastal or estuarine environments. The closest saline limit is Portland, some 20km away.
 - 370-400mm, 500mm: mentions shell lenses, not just shells, whole and broken.
 - Interpretation of these deposits in the Aboriginal report as imported shell, most likely for historic purposes associated with gardens or buildings, incorrectly suggesting brick making. Burnt shell is the key ingredient in early shell mortar, as a source of lime.
 - The report suggests the archaeological material is not *in situ*. This is presumably an interpretation in relation to Aboriginal archaeology rather than historical archaeology.
 - Some of the shell was redeposited Aboriginal midden material, and had stone artefacts in association.
- Found about 64 Aboriginal artefacts in this trench, Spit 6 (500-600mm).
- The report mentions historic feature in bottom spit, 900-1000mm, contained brick (whole, partial, fragment?). No description or plan of this. No mention in historic interpretation of this trench, and the brick is not catalogued in the list provided to DP&I.
- The bottom of this trench, 700-1000mm, was interpreted as being natural. Borehole excavated into this deposit continued for 1.5m and interpreted as culturally sterile (for Aboriginal archaeology) fluvial sand. Therefore it was likely deposited in geological time and as such does not contain Aboriginal material however it is still cut through by historic-period activities.

Historic interpretation - ATP D 017E/630N – Appendix 3

- The report mentions lenses and cuts but does not see them as archaeological and requiring recording. This should have been done. It does not make it clear that the shell is not local and was imported from some distance and not a locally available food supply. It may well have been from an Aboriginal midden but brought from elsewhere (by non-Aboriginal people) and used for making lime mortar for buildings.
- 600-700mm deposit turned to yellow clay loam found in TT2. Excavation continued for another 300mm. This deposit contained artefacts, bottle glass and some brick. Again not catalogued, no real understanding of where it came from? Is this deposit natural or imported?

Two of the test pits (C, B) were considered by the Aboriginal archaeologists to be very disturbed.

Interpretation of Results

The report interpreted the results of the Aboriginal Test trench (Test pit 1), where the upper 300mm were disturbed, as having little or no archaeological potential for historic period remains. The Aboriginal testing identified intact natural soil profile and recovered 114 Aboriginal artefacts. This test pit was seen as the most intact area for Aboriginal archaeology and recommended detailed

excavation of this area. As historic-period remains would have been cut into natural soil, and at depth, this also means that the southern part of Thompson Square should have intact historic-period remains.

There is no overlay of the test trenches in relation to historic plans or where they may have been located in reference to the Evans' images. Therefore the interpretation is not grounded in a clear understanding of the findings in relation to known activities.

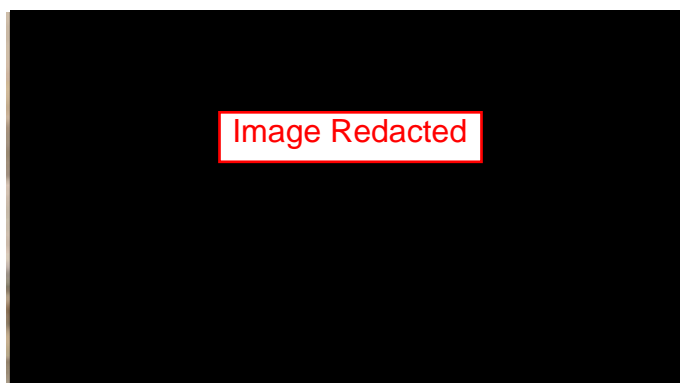
What is clear is that natural soil profiles with intact archaeological structures are likely to survive within the study area.

7.3.2 Testing and Geotechnical report March 2013 – Submissions Report

- None of the cores near TT10 or TT11 identified bedrock in the upper 1500/2000mm but worked stone found in the trenches was interpreted as bedrock in TT10.
- Stone in PC11 was a block or floater 230mm deep sitting in clay.
- No PC6 bore log list.

While the archaeologist states that the size of the trenches are too small to draw large conclusions (39) they appear to reject this cautious approach on p. 40 when they predict major land forming to the north of the Commissariat building (41-42). This interpretation is not supported by plans or images. It may reflect localised events rather than wider site formation as extrapolated from the results.

Further comparative analysis of the Evans' c1810 paintings shows there were buildings to the west of the 1803 Commissariat (Appendix 5). One of the Evans' paintings has been dated as c1810 (Evans 3) and therefore later than the 1809 painting (Evans 2) but both heritage consultants reviewing this project would date it as earlier.¹ According to the *Australian Dictionary of Biography* (ADB), Evans is living in the Hawkesbury between 1805 and 1809, and possibly as late as 1812. Evans 3 does not include Thompson's warehouse or his store on George Street, which is shown in the 1809 image. The area to the west is less well developed. This suggests Evans c1810 (Evans 3) predates the 1809 image. Therefore the testing holes may have hit either a threshold stone or hearth stone in one of these buildings or something similar or a floater. Bedrock and the associated interpretation is highly unlikely, and is contradicted by the boreholes, historical images and maps and plans showing the area's topography.



Evans 1: Details (EIS says c1810 and later than Evans 2, 1809).

Analysis of 'major landforming' is mostly based on analysis of PC5 and PC12. Where the archaeologist has interpreted the 600mm and 700mm of silty sand as fill, the summary borehole

¹ This date is provided in the Mitchell Library Catalogue, is accepted by Barkley-Jack in her history and also adopted by the heritage consultants for this project.

logs in Appendix 1 do not support this interpretation. Also in comparing Indigenous Test Pit A there is a suggestion (not stated) that this sand was also fill? But it contained Aboriginal artefacts and was considered to have intact strata.

Interpretation of redeposited clay

Some of the analysis in chapter 8 of the 2013 testing report is naive concerning the redeposition of clay. Experience gained through excavating a number of sites in the red clays of Parramatta, suggests it is not uncommon to find redeposited clay or natural. On one site the whole footprint of a convict hut was buried beneath a thick deposit of red clay. In another case, an early cellar was excavated into red clay and was later backfilled with red clay. Excavating early sites is never straight forward, and redeposition of natural soils, whether sand or clay deposits, is fairly common.

Recording methodology

There are no schematic sections showing depths of deposits, notably the top of natural (or a table with description of contexts and depths). There was no survey plan of the test trenches, no RLs on deposits for comparison with other trenches or future archaeological works or proposed construction works. These are standard methodologies for testing reports.

Issue

The interpretation of the results of the test trenches is not supported by the results of the testing. What are the alternative interpretations? Have they correctly identified the archaeological potential in this area? These have not really been discussed. There is a need to consider impacts on the potential remains identified in Evans' c1810 painting. These should be incorporated into the interpretation of the testing results. The extensive analysis of the roadmaking is unnecessary. While recording of the road is reasonable the usefulness of the analysis of 20th-century roadmaking, which has no heritage significance, is unhelpful and makes the report somewhat unfocused.

While the discussion about redeposition is useful, the over-interpretation of this material is problematic. A more cautious approach is suggested. The assumption that the stone found in TT10 and TT11 is bedrock rather than the anomaly, in contrast with the boreholes, is unsafe. The results of this testing have then gone on to inform Appendix F of the Submissions report.

7.3.3 Predictive modelling

Working Paper 1 provides mixed messages about archaeological potential as outlined above. It says that the study area has an intact and complex archaeological profile but suggests that the archaeology within the southern section of site is disturbed. The report generally takes the view that Thompson Square has a complex archaeological profile across the study area, except where there are already substantial impacts. The predictive modelling of archaeological potential across the study area is generalised and non-specific, partly because the consultants have not engaged with the 1809 Evans' image and have not identified that the western part of Andrew Thompson's lease as being within the study area or the boat yard shown on the 1807 painting. The statements of archaeological potential focuses on the historical reports rather than engages with Evans' paintings or even Meehan's 1812 plan which has some interesting information to convey.

7.4 Windsor Bridge

7.4.1 History, Research and Analysis

The history of the bridge in Section 4.12 as well as the description of the bridge components in Section 6.3 focuses mainly on the original construction from iron and timber. The sections dealing with the change from a timber deck to concrete are very brief. The EIS and supporting

documentation contain contradictory information relating to the construction of the concrete elements of the bridge. Examples of insufficient or contradictory information within the documents include the following:

- Section 5 of the EIS refers to ‘unique design of the concrete deck’ without expanding on why it is unique (as the beams were precast on the river bank and lifted into place – a new form of construction in NSW and possibly Australia). The statement of significance is therefore vague on the import of this uniqueness.
- Little mention of the importance of the production of the cast iron cylindrical piers (and presumably the bracing elements) at an Australian forge. A very rare and early example of this type of fabrication in NSW and Australia.
 - Contradictory and incorrect description of how the replacement of the timber elements with concrete elements was carried out (Contradictory statement in Section 6.3.6: ‘eight precast girders’ and ‘girders...cast in-situ’).
- The AECOM report states that ‘beam and slab units precast in two segments per span’. This is incorrect. The girders are precast and the slab poured in-situ in two halves to enable staging of the works.
- Vague comments regarding replacement of fabric (Section 5.8.1 – ‘cross bracing renewal...when steel in short supply’). Steel was used in the replacement but there is no explanation of why this may be significant. If steel was in short supply we may have expected an alternative material to be used. The use of steel in this instance may suggest the bridge was considered to be of high importance.
- The comparative analysis and discussion in the EIS (6.5.8, 6.5.9) refer to ‘concrete added to the cross-bracing in the 1940s to further strengthen’. No other mention of this work is made in the EIS. It is unlikely that this work was carried out, and is refuted by photos after the change to concrete elements in 1922. It is more likely that the existing steel bracing used in raising the bridge in 1897 was encased in concrete during the works in 1922.

7.4.2 Heritage Impacts on Windsor Bridge

The Statement of Heritage Impact in Volume 2 of the EIS is concerned only with the single option for the bridge replacement detailed in Section 5 of Volume 1. Brief consideration is given to the heritage impact of the various alternatives to the replacement project in Section 4.2.2.

The executive summary of Volume 2 of the EIS states that ‘retention and stabilisation of the bridge is the preferred action to ensure significance is retained’. The Statement of Heritage Impact (Section 10.3.4, Vol. 2) states that ‘the primary recommendation that has been made is to retain Windsor Bridge’.

Section 4.2.1, Vol.1 states that ‘apart from the refurbishment options, all options included removing the existing bridge as the costs to repair and maintain the existing bridge would be substantial even if its use was limited to pedestrians and cyclists only’, and that failure of the existing bridge in the event of a significant flood ‘may cause physical damage to a new downstream bridge or to other downstream structures’.

It appears possible that route options that put the new river crossing away from the town centre or upstream of Windsor Bridge may allow retention of the historic bridge, however, the EIS concludes that retention of the existing bridge in any capacity would not be cost effective. As such, there is no discussion of any route option that requires a new crossing that makes use of the existing bridge for any primary or secondary purpose.

Two route options (9A and 9B) consider retention and refurbishment of the existing bridge to provide either a two or three lane crossing. Option 9A would preserve the majority of significant fabric. Option 9B would require replacement of the superstructure and the material within the piers, which would have a large impact on the technical significance of the bridge. The discussion of these options concludes that

while both options would produce ‘only minor heritage impacts on Thompson Square’ they ‘do not meet key project objectives and criteria’, ‘are not considered to be cost-effective’ and ‘do not improve flood immunity’.

Section 7.1.5, Vol. 1 notes that either an alternate river crossing or refurbishment of the existing bridge is necessary to avoid significant impacts on the bridge, however, while these options were considered they did not ‘meet as many of the project objectives’ as the current proposal.

Retention of the historic significance of either Thompson Square or Windsor Bridge is therefore not considered adequate justification in the EIS for developing further any route option that allows retention of the bridge.

The EIS contains a Statement of Heritage Impact in Section 10.3 of Volume 2 for the demolition of Windsor Bridge. The statement does not outline the heritage significance of the bridge, however, this has been discussed elsewhere in the EIS. The statement does contain some information about why the bridge may be significant.

To summarise:

- The statement does not outline the impact the works will have nor the significance of the bridge itself, instead focusing on the impact on settings and views and the site as an archaeological resource.
- The statement does not discuss possible alternatives to demolition, though the feasibility of alternatives is discussed elsewhere in the EIS.
- The statement contains an explanation of why the proposal for demolition has been made by outlining the existing physical condition of the bridge elements, and providing a justification for the demolition of the bridge.
- The statement correctly concludes that the primary recommendation should be ‘to retain Windsor Bridge’ or to implement mitigation measures to reduce the impact of demolition.

7.5 Construction impact/ assessment

Archaeological Issues

Because of the flawed identification of archaeological potential and the Statement of Significance discussed above, the assessment of impact is inadequate. Therefore any recommendations to mitigate and manage the resource are also inadequate.

Any operational impacts (?)

There will be substantial operational impact on this SHR-listed conservation area but due to the issues identified in previous sections of this report they are inadequately identified or assessed.

Built Heritage & Conservation Area

The limited understanding of Thompson Square Conservation Area, for reasons outlined above, means that there is an incomplete understanding of the attributes which contribute to the square’s significance, what its significance actually is and how this might be managed into the future through the implementation of heritage design principles and conservation policies. Therefore the impact assessment is inadequate for the future management of the significance of Thompson Square Conservation Area.

8.0 Response to Submissions

8.1 General Analysis of the Response to Submissions

There were 51 submissions regarding adverse impacts on Heritage for the Windsor Bridge Replacement Project (Submissions Report 20-31). This is very high in terms of concerns about heritage in relation to a standard RMS project. It indicates that concerns are much wider than just individuals residing in and immediately adjacent to the study area. The following headings are those used in the Response to Submissions Report:

Submissions Report: 2.6.1 Adverse impacts on heritage

Proposes mitigation but 'the EIS acknowledges that, despite minimising impacts on heritage as part of the design process, and implementing additional management measures during construction the project would still have significant adverse impacts on heritage...' (21).

Submissions Report: 2.6.2 Impacts on Thompson Square (21-23)

The response addresses the minimisation of the impacts on 'Thompson Square parkland' rather than the Conservation Area. While it covered most of the issues but there were some omissions:

Issues

- As outlined in other sections of this report, Working paper 1 is inadequate to meet the requirements of the Heritage Council concerns.
- The EIS-proposed urban design and landscape concept for the square is not based on heritage analysis as identified by the Heritage Council submission.
- As outlined above, the Heritage Working Paper fails to adequately address the heritage values and significance of the square and therefore fails to provide a sound response to many of the issues raised about TSCA.
- As identified in Submission 84 there is no CMP for impact on a SHR area.
- Acknowledges major impacts to TSCA but proposes physical and visual access to the river as mitigation? This could be achieved without that and it already available.

Submissions Report: 2.6.8 Heritage Approvals

Response to submissions states the heritage assessment has been undertaken by recognised industry specialists in their field - this has been identified as inaccurate in Section 7.1 of this report. If one of the main authors of the report cannot obtain an archaeological permit under the Excavation Director criteria they are not a recognised specialist as their expertise does not meet the most relevant available guidelines. There is no built heritage specialist, heritage and/or landscape architects on the team.

2.14.2 – Accuracy and adequacy of information - Heritage

Old Bridge Street alignment

A number of the submissions indicate that they consider that RMS has provided misleading advice regarding 'Old Bridge Street', specifically that 'Old Bridge Street' always operated as a main access road to the bridge. This has also been included in a letter written on behalf of the Premier by John Ajaka MLC, Parliamentary Secretary for Transport and Roads: 'significantly, the upgraded approach road will be built over the original early 19th-century ridge approaches (Old Bridge Street)'. This letter dated 4 Sept 2012 was included in Submission 92. This observation was repeated in Submissions 39, 54 and 65.

Submission Response

(79) *Evans' 1809 image shows a track going straight down the hill from the current location of the George Street/Bridge Street intersection...It is also shown on historic photographs dated 1923 and plans dated as early as 1855.*

Comment:

- This is an incorrect reading of the 1809 painting. The boat yard is within the eastern side of later Thompson Square and therefore the track is running diagonally and winding down to the river (Appendix 5).
- Interpretation of the 1929 aerial photos is debatable. If you look at the wear patterns from where carts have used the road they are using the western road not Bridge Street. The cart tracks curving down to the river is very clear (Figure 1). There is little indication of cart tracks moving from the eastern road across the northern bend of cart tracks.
- The history presents conflicting comments on the road.
 - Working Paper 1 (p93) (WP1) says 'In 1855 an extension of Bridge Street was made on the eastern side of the square from George Street to the existing road. By 1888 however, a single alignment crossed George Street and continued straight down the slope to the wharf and bridge'.
 - There is no specific reference included in this paragraph. Appear to be using Plates 47, 49 and 50 referenced in the next paragraph.
 - Plate 47 shows the same curving alignment.
 - Plate 48, 1883 image, shows the curving bend illustrated in the 1929 aerial photo below.
 - Plate 49: shows an access road down the eastern side but the main road is still running from the southwest corner of the square.
 - Plate 50: 1879 photo shows that the curved road crossing through the middle to Thompson Square. There may be raised ground to the south of the winding road which suggests that Old Bridge Street does not continue through.
 - What is consistent in all these plans is that the road through the reserve continues to be present and clearly continued to operate as a key element in the road system.
 - Quote on page 97 of WP1 – 'it is rumoured that when the level of the Windsor Bridge has been raised, the approach and roadway on the Windsor side will go straight up through the reserve. This should be a great improvement on the present winding road'. Suggests that it was no operating as a through road.
 - Quote from page 104 (below) suggests that the winding road continued to be an issue into the early 20th century.
 The road leading to the bridge through Thompson Square was an increasing irritation to the community. In June 1901 under the heading "Things We Would Like To See", the local newspaper listed "...the road leading from Windsor Bridge to George Street rendered less winding and precipitous than at present".³²⁹ Council initiated a programme of enquiry to determine a better way to the bridge. A deputation to the Council in 1903 made the case for "...the urgent necessity for doing something to reduce the grade of Punt Hill... The great difficulty at present was the sharp turn on the hill. The steepest place was at the turn and there one horse has to hold the load and either pull it or let it go back for the leaders could do nothing till the corner was turned".³³⁰ A deviation around the old punt house was the favoured solution.
 - In February 1904 it was reported in the local paper that after the engineer had inspected the hill, "it appears that the route likely to be adopted in improving the grade of the hill will be round by the old punthouse which will be demolished, along the river bank then up Kable Street to George Street".

- Submission 93 (p41ff) analysis of the use of 'Old Bridge Street' is convincing in some areas. Quotes similar to above are on page 63-65.

The only reason this is an issue and being discussed in this report is that it has been introduced as a key element into the heritage debate by RMS and various politicians. The use of 'Old Bridge Street' as supporting evidence for the importance of the eastern road alignment is flawed and contradicted by the references quoted above from Working Paper 1.



Figure 1: 1929 aerial photo showing the cart tracks coming down from the western road, in front of the Macquarie Arms Hotel, along the road cutting through the square and down to the bend at the bottom. There is little wear on the eastern 'Old Bridge Street'.

8.2 Windsor Bridge and Response to Submissions

The RMS response to submissions on the impacts of the development on the bridge is outlined in Section 2.6.6 of the draft Submissions Report. The report identifies the main issues raised in the public submissions as:

- The existing bridge is an integral part of Windsor and should be preserved.
- The bridge has significant heritage value and if demolished should have part of its structure preserved for display.
- The bridge is of state, national and historical engineering significance.
- The demolition of the bridge would be an assault on engineering history and a heritage icon that contributes to the economic wellbeing of Windsor.

The response addresses these issues by confirming the listing of the bridge on heritage registers, acknowledges that the project would have adverse impacts and lists the proposed mitigation measures.

The response does not address the main concerns (significance of construction techniques etc) raised by bridge engineers Ray Wedgewood and Brian Pearson, the Engineers Australia Heritage Committee, and G & C Edds / I & J Jack Consortium. The response does not expand further on information already provided in the EIS. It does not appear that any further investigation was made into the claims made in the submissions regarding the potential significance of the bridge. No alternatives to demolition are considered. Additional mitigation measures are neither discussed nor presented as subjects for further investigation.

9.0 Management and Mitigation Measures

The proposed mitigation measures do not avoid impacts on heritage significance. While it is sometimes recognised as acceptable to excavate sites of State significance, the archaeological investigation has to be of a high level and have substantial research and public outcomes. But the end result is that an archaeological site of State significance is lost or compromised.

As commented in the Executive Summary of Vol. 2 *Historic Heritage Assessment & SOHL*:

This report concludes with the assessment that impacts to significant heritage cannot be avoided. Mitigation measures predominantly focus on collecting data prior to impacts, interpretation of data and avoiding inadvertent impact (v).

There are issues with the proposed mitigation, notably the proposed landscape design. As there is no adequate specialist heritage landscape analysis and assessment of the Thompson Square Conservation Area, which is not a park but a public space, the various reports, and specifically the Vol. 3 Urban Design, cannot and do not respond to the heritage values of the place. It does not engage with this heritage place or its significance and it turns it into a park not a civic square surrounded by important heritage buildings, which are central to the heritage identity of Windsor as a Macquarie Town.

The analysis of the visual impacts assesses all of the impacts within the square and to the square as being either High or High to Medium. The analysed views do not address the relationships between buildings and the square itself. Page xi of this report comments:

Whilst the scale of the proposed works would represent substantial adverse changes within highly valued and sensitive settings, some improvements would result from the concept design. For example, the removal of the current Bridge Street alignment from the middle of Thompson Square would substantially improve the form and character of the parkland space, creating a more unified and usable space, and improve pedestrian connectivity between the town centre and the river foreshore as reflected in Council's Plan of Management (xi).

Failure to come to grips with the heritage significance and values of Thompson Square Conservation Area means this report has misconceived what is heritage mitigation and what is drastically altering and possibly further downgrading the square's significance, and the ways in which it is valued. There is no heritage justification for the infilling of the Bridge Street and the realigning of the road to the eastern side. Therefore this proposed redesign is not heritage mitigation. Until there is appropriate heritage landscape analysis of Thompson Square the proposed redesign of the 'park' cannot be proposed as heritage mitigation. The failure to engage with a heritage landscape specialist to redesign the square further exacerbates this situation.

It is noted that Vol 2, Section 10.6 discussed how the current design has been adjusted, with lowering of the bridge, reduction of speeds etc.

9.1 Thompson Square Conservation Area and Urban Design

No clear landscape and urban design mitigation strategies despite references to them in terms of landscape character and visual impact. Very little evidence has been supplied regarding the integration of historic values of Thompson Square with proposed 'landscape treatment'. Provision of new parkland facility does not necessarily address significance of the place and as a mitigation against physical and social impacts of the proposed development. It is not linked into the heritage significance of the square but is proposed as a key heritage mitigation strategy.

9.2 Historical Archaeology

The archaeological recording and mitigation of the proposed impacts has been analysed as three separate options in the Submissions report. Option 1 is not really viable as it provides incomplete recording within best practice methodologies of open area excavation. This is not acceptable in terms the significance of the potential remains. Strategies adopted at other State significance sites include:

- **Parramatta Children's Court**

This contained the remains of a 1790s convict hut and housing into the 20th century as well as a brewery and other remains. The proposed impacts were to retain the footprint of the convict hut and pile the rest of the area around it. The agreed approach was to fully excavate the site outside the conservation zone. In addition the site was backfilled and therefore considerable evidence of the archaeology should still survive in this area.

- **Parramatta Justice Precinct (Parramatta Convict Hospital)**

Established a Conservation Zone in the key areas of the project area but undertook archaeological excavation in all the other areas. Was able to excavate partial remains of the 1792 2nd convict hospital, but kept the whole of the surviving footprint of the 1818 3rd convict hospital. Substantial interpretation outcome for the precinct, in the heritage courtyard and also within the buildings.

Windsor Bridge Replacement Project

- Option 1 is not acceptable on grounds of the significance of the archaeological resource (Submissions: Appendix F: Archaeological Options). Disagree with most of the analysis in Table 2 (28). It is not relevant to making decisions about archaeological significance and approaches to excavation.
- Option 2 has some considerable legitimacy as the preferred option, could be modified to the south of George Street where the impacts are more minor.
- Option 3 would depend upon the final design for the landscaping of the Thompson Square reserve. It is reasonable to leave part of the archaeology of the site *in situ*. In terms of adequacy of information retrieved it is reasonable as long as areas of impact are fully excavated.

Archaeological Research Design

See Section 11.2 for suggested mitigation for the archaeological excavation to ensure a substantial research outcome.

9.3 Windsor Bridge

It is noted in Section 7.1.4, Vol. 1 (p197) of the EIS that demolition of the bridge 'would be a loss to the cultural landscape of Windsor'. Assuming that demolition of the bridge is approved, it is expected that measures shall be in place within the replacement project to mitigate against this loss. Measures are proposed in Section 7.1.5 to minimise impacts to heritage, however the EIS concludes that there would be 'residual significant impacts to historic heritage, both in fabric and heritage significance, as a result of the project'.

Proposed mitigation measures relating to the Windsor Bridge include:

- Archival recording (Measure 15, Section 11.8.4, Vol. 2),
- Interpretation (Measure 25, Section 11.8.6, Vol. 2), and
- Re-use of material (Measure 26, 27, Section 11.8.7, Vol. 2).

While mitigation measures are proposed, there does not appear to be any clear evidence of the mitigation measures relating to the re-use of existing fabric in the new development or physical interpretation of the historic bridge being adopted in the proposed development, as described in Section 5 of the EIS. Section 5.2.6 states that ‘the iron piers, railing, metal components of the bridge abutment and service conduits’ have ‘the potential to be re-used’, however, no firm proposal of how or where they will be used is given.

Mitigation measure 27 suggests re-use of bridge material elsewhere rather than being discarded. It is unlikely that the re-use of bridge material anywhere but in the vicinity of the existing bridge will contribute to preserving the significance of the bridge.

Section 5.4.7 outlines the methodology for the demolition of the bridge super- and substructures. There is no specific reference to the methodology for demolition being adapted to enable retention of particular sections of the existing bridge for either re-use or interpretation, though there is mention of the bridge elements being ‘dismantled carefully so that its construction methods and evolution can be archivally recorded’. The methodology includes the lifting of girders by crane which would enable retention of full lengths of sample girders if required for re-use or interpretation. The method for removal of the bridge substructure includes cutting the iron cylinders and cross-girders into sections for removal. No consideration is given to removing whole pier sections for re-use or interpretation.

10.0 RMS Response to Questions from the Independent Heritage Review

The Independent Heritage Review teams provided a series of questions to DP&I seeking clarification of a number of issues. These questions were provided to RMS:

10.1 Questions and Responses

The questions are listed below with some of the responses. Other lengthy responses are included in Appendix 6.

RMS responses to comments raised by DP&I's independent heritage review	
1. The history of the bridge focuses mainly on the original construction from iron and timber. The sections (4.13.5, 5.7.2) dealing with the change from a timber deck to concrete are very brief. Can you provide additional information on how the work was done and background information on the company and engineers that carried out the works (State Monier Pipe and Reinforced Concrete Works).	Additional information on the original construction of the bridge and background information on the company and engineers that carried out the works is provided in the attached document titled construction methodology (response to Items 1 and 3).
2. There does not appear to be any evidence of the mitigation measures (such as reuse; item numbers 26, 27 listed in section 11.8.7 of the EIS) being adopted in the proposed development. Can you provide further information on what RMS proposes with regard to this?	Possible options for reuse of items in the first instance within the project (and elsewhere secondarily) is being considered as part of the detailed design of the project. It is likely that reuse of elements such as sandstone kerb could form kerbstones steps for example. Use of items in supporting elements of the project would be subject to structural stability considerations as part of detailed design. These options would also be considered as part of a heritage interpretation strategy for the project and the urban design and landscape plan. Hawkesbury Council will also continue to be consulted about potential positive opportunities for reuse in surrounding areas.
3. Provide further information on the construction methodology and techniques used in original construction and subsequent alterations. Provide a clear, concise description of such events, avoiding contradictions	Additional information on the construction methodology and techniques used in original construction and subsequent alterations is provided in the attached construction methodology document (response to Items 1 and 3).
4. On the basis of the comment above, reconsider the significance of the construction methodology and techniques. Important areas of further investigation include the Australian fabricated cast iron piers and the precast girders. Revise the comparative analysis to include relevant NSW bridges that have similar attributes or better inform the place of the Windsor bridge within the historical narrative of bridge construction in NSW. Further investigate the use of cast iron caissons/ piers on road bridges in NSW providing examples.	Additional information is provided in the attached comparative assessment.
5. Revise the statement of significance, assessment of significance, comparative analysis and statement of heritage impact based on the investigations	The additional information has not changed the statement of significance or the SoHI presented in the original report.

above.	
6. Respond to the concerns raised in the public submissions relating to the technical heritage significance of the bridge, based on the results of the investigations above, including claims such as “the oldest concrete decked bridge in NSW”, “first...to be constructed whereby the girders were precast in other than their final position”, “first reinforced concrete bridge girders to have been manufactured in the state” etc with appropriate evidence regarding the historical context of the bridge construction.	Additional information the technical heritage significance of the bridge is provided in comparative assessment in the attached document (Item 6).
7. Please provide further details of who in the heritage team holds specialist expertise in landscape and/or built heritage. Please provide examples of works where this specialist has previously assessed development impacts to items on the NSW State Heritage Register.	This information was provided as a priority response to the Department’s comment on 10 May.
8. Please provide further details/ examples where the key author and reviewer have previously assessed development impacts to items on the NSW State Heritage Register	This information was provided as a priority response to the Department’s comment on 10 May.
<p>9. The RMS assessment recognises three Colonial Georgian buildings on the square:</p> <ul style="list-style-type: none"> • Macquarie Arms Hotel (1815) • Howe’s place, 7 Thompson Square (1835) • 62 George Street, (la. 1830s) <p>a) There appears to be confusion about Colonial Georgian buildings (as an architectural style) and the Georgian period. As such, dates on SHR listings and in the Appendix 4 inventory conflict, i.e.: 6 Bridge Street, SHR listing identifies a 1830s date but the chronology in the Appendix 4 inventory says c1860s.</p> <p>b) There is no reference or discussion as to why these dates are different. Similar issues occur with the Doctor’s House (c1837), inventory bases later date on 1842 plan but this plan does not appear to include evidence shown on the 1835 plan.</p>	Additional information addressing this comment is provided in the attachment (Item 9).
<p>10. The SHR listing says the following buildings are also Georgian:</p> <ul style="list-style-type: none"> • 17 Bridge Street • 6 Bridge Street • Doctor’s House • 5 Thompson Street <p>The dating of these buildings is not considered/ assessed in Appendix 4. The dates of these buildings need to be appropriately analysed as part of the analysis of the historic evolution of the square.</p>	Additional information addressing this comment is provided in the attachment (Item 10).
11. Please provide a catalogue of all finds recovered from the excavations and include illustrations of	A catalogue of finds is included in the attachment (Item 11).

those finds that are datable	
<p>12. Submissions report: Test Excavation to inform traffic signals and cable trenches including evidence from geotechnical cores</p> <p>Please provide:</p> <p>a) schematic sections showing depths of deposits, including the top of natural;</p> <p>b) survey plans of the test trenches, including RLs on deposits for comparison with other trenches.</p>	<p>A response to this comment was provided as a priority response to the Department's comment on 10 May. That response expressed the view of the archaeologist that there was no need for sections and RLs given the nature of the findings as supported by the conclusions in the excavation report.</p> <p>However, following further discussion with the Department these sections/plans have now been prepared and are attached (Item 8).</p>
<p>13. The EIS mentions that there was funding of the Square in 1988 as part of the Bicentenary and discuss its role in community esteem, however, it was funded for its heritage values.</p> <p>a) Does Bicentennial funding (and its proposal), involving Commonwealth government funding, identify the Square as having National Significance?</p> <p>b) How does WBRP proposal affect the works undertaken as part of this grant?</p> <p>c) What were the conditions/ requirements of this grant?</p>	<p>Additional information on the Bicentennial funding is provided in the attachment (Item 13).</p>
<p>14. Additionally the department requests copies of:</p> <ul style="list-style-type: none"> • The March 2013 geotechnical report used in the March 2013 archaeological testing. • Jan Barkley-Jack's History of Thompson Square. 	<p>Copies of these documents were provided as part of the priority response to the Department on 10 May.</p>

11.0 Recommendations

11.1 Further Work

General Recommendations

1. Heritage Values of Thompson Square Conservation Area

- a. Undertake architectural and landscape analysis of Thompson Square Conservation Area in line with standard CMP requirements and methodology suggested in Appendix 1.
- b. Need to reassess visual quality, overshadowing, lighting, noise and vibration impacts given the new raised level of proposed bridge and road levels.
- c. Given this situation it would be worthwhile extending the study area to the extent of the former Government Domain lands, especially to put Thompson Square into a greater Windsor context.
- d. Develop heritage design principles and policies to protect the significance of Thompson Square.
- e. Review the assessment of impacts following this analysis and how they impact on the significance of Thompson Square Conservation Area.

2. Archaeological Analysis

- a. Detailed cartographic analysis of historic plans and Evans' images.
- b. Clear analysis of the potential archaeological resource including the approximately 16 structures within Thompson Square in c1809.
- c. Determine how much of Thompson's Lease is within the study area. Possibly need to have a surveyor analyse this based on data from the period and later.
- d. Include all of the above and an understanding of archaeological research questions within a new Statement of Significance.

3. Windsor Bridge

MacDonald Moot engineer Alex Been proposed the following actions for additional research and revision of the EIS as follows:

- Further investigate the construction methodology and techniques used in the original construction of, and subsequent alterations to, Windsor Bridge. Amend the related sections to provide a clear, concise description of such events, avoiding contradictions. Important areas of further research include the fabrication of the cast iron piers in Australia and the construction of the precast girders. Revise the comparative analysis to include relevant road bridges within NSW that have similar attributes or better inform the place of the Windsor Bridge within the historical narrative of bridge construction in NSW. Further investigate the use of cast iron caissons/ piers on road bridges in NSW. There are several examples.
- Research and provide additional information on the work of replacing the timber bridge deck with concrete and background information on the company and engineers that carried out the works (State Monier Pipe and Reinforced Concrete Works). Amend the assessment of significance to reflect the potential significance of this work.
- Amend the explanation of construction techniques and timeline of alterations to provide a coherent description of the bridge construction in order to demonstrate the technical significance of the bridge.
- Review the assessment of rarity for the bridge.

- Given that the bridge is considered an item of state significance within the EIS, give further consideration to options for the proposed route that retain the bridge to provide either a primary or secondary use.
- Revise the Statement of Significance, Assessment of Significance, Comparative Analysis and Statement of Heritage Impact based on the investigations above.
- Revise the Statement of Heritage Impact for demolition of the bridge to include an explicit statement of what impact the proposed works will have on the bridge fabric.
- Respond to the concerns raised in the public submissions relating to the technical heritage significance of the bridge, based on the results of the investigations above. Respond to claims such as 'the oldest concrete decked bridge in NSW', 'first...to be constructed whereby the girders were precast in other than their final position', 'first reinforced concrete bridge girders to have been manufactured in the state' etc with appropriate evidence regarding the real historical context of the bridge construction.

If demolition of Windsor Bridge is approved we propose the following actions to ensure the loss of significance is limited as much as possible:

- Mitigation measures are to be included in the formal documentation of the proposed project, to inform the demolition methodology for the existing bridge and the re-use or interpretation measures within the replacement project (by RMS). A formal plan to implement these mitigation measures should be presented prior to approval being gained for demolition of the bridge, and not be subject to further consideration after the fact.

11.2 How to Achieve Appropriate Outcomes from the Archaeological Investigation of a site of State and arguably of National Significance

If the WBRP were to be approved DP&I would approve the excavation of a potential archaeological site of State significance and possibly of National heritage significance. This would be against the advice of the NSW Heritage Council and their specialists and the consultants who wrote Working Paper 1. DP&I should consider the ways in which they can ensure that this significant resource is not lost to future generations by inadequate archaeological excavation, poor reporting or failure to produce any report, or a simplistic interpretation of the outcomes of the archaeological project. It is essential that RMS's Excavation Director(s) and team have demonstrated and proven expertise in the management of similar archaeological programs with substantial research and interpretation outcomes. The archaeological investigation and reporting is the main mitigation proposed for the project and a substantial research outcome should be seen as a necessary requirement for such a significant impact.

Research Design

Write a research design that addresses a range of research questions which are relevant to the site and will help elucidate its layers of meaning. It needs to be aware of current high level archaeological research questions. Should demonstrate an awareness of how the Excavation Methodologies are influenced by the Research Design and why certain approaches are adopted. It should provide high level and mid level research questions to assist with the post-excavation analysis as well as the high level response. It must seek to add to existing knowledge by using analytical approaches and strategies. Acknowledge that additional historical research will be undertaken as part of the project to inform the findings. Establish strategies to assist with the analysis of different types of timber structures found during the archaeological project, based on historical and archaeological evidence.

Quality of archaeological fieldwork

Excavating a late 18th and early 19th-century archaeological site is not an easy or a simple task. It is a rare opportunity in Australian archaeology. The archaeology can be quite complicated, through a range of historical events which will have obscured and disturbed the archaeology. While any Conditions of Consent are likely to require a consultant who can meet the Excavation Director criteria for State significant sites, they also need to ensure that the Excavation Director has demonstrated the appropriate skills to excavate the site and has already produced high quality archaeological reports and research outcomes. Many projects on State sites are minor monitoring projects or avoid significant areas of archaeology. Therefore RMS's Excavation Director(s) and team - a good skilled team is essential - need to have proven ability to appropriately manage open area stratigraphic excavations of similar sites.

Therefore any approved excavation director and archaeological company should have already undertaken:

- The excavation of comparable site or sites, in terms of dates of occupation and excavation of timber structures, and similar artefacts.
- Previously produced a high quality archaeological investigation report which has appropriately described the archaeological results of such sites as well as produced substantial response to research questions, outcomes and hopefully published part or all of the results of the archaeological investigation.
- Have identified and used high levels of archaeological recording in line with best practices strategies.
 - This should include digital survey and mapping of sites, production of digital maps etc.
 - Best practice use of recording forms.
 - Digital archives.
 - Possibly 3D recording of structures.
 - Other best practice strategies as identified in the Research Design.

Quality of the Post-Excavation analysis and reporting

Artefact Cataloguing, Analysis and Interpretation

- Use artefact specialists to catalogue the artefacts. While they may use volunteers and/or students to assist, high quality outcomes are not produced by simply using volunteers and/or students. Specialist cataloguers must be used, and they should be identified as part of the approvals process. Artefact specialist must be experienced with the artefacts from this period, notably the bricks, roofing tiles, pottery and miscellaneous objects.
- Use best practice artefact cataloguing strategies, especially minimum vessel counts, type series for miscellaneous objects, glass bottles, bricks and locally-made pottery. The artefacts catalogue is to be entered into a relational database, such as Microsoft Access, for detailed analysis of the artefacts. Final copies of the database are to be provided to RMS and the Windsor Museum at the end of the project. They can provide invaluable data for the management and research on the objects into the future.
- Use of conservators for significant artefacts recovered during the excavation and for structures which may be able to be left in the ground.

Investigation Report

Achieving a high quality archaeological report based on months of fieldwork and artefact cataloguing, and post-excavation analysis, is not a simple task. It is likely to cost as much as the fieldwork and take a number of years to complete. Therefore the DP&I needs to have certainty that RMS's Excavation Director(s) can produce a suitably high level investigation report. The Excavation

Director should already have done this for a number of State significant archaeological sites. This is not a site for learning on. An investigation report also needs to address the Heritage Council's standard conditions of consent.

Further Research Outcomes

All of the research, analysis and interpretation that goes into an excavation report does not necessarily mean that the full research potential of the archaeological sites has been achieved. If it is a significant site there will typically be a number of further avenues of research to be explored. It is likely that considerable further research opportunities will be identified but not fully engaged with in the project report. Possible ways to further investigate the research potential of the site include:

- Set up and fund a research program with the Prehistoric and Historical Archaeology, Department of Archaeology, University of Sydney. Strategies to include:
 - Honours students to undertake thesis on the site.
 - Fund a Post-doctoral research project on the results of the non-Aboriginal archaeological investigation of the site following the completion of the archaeological project and reporting. This should be undertaken within Prehistoric and Historical Archaeology, Department of Archaeology, University of Sydney.
 - Maybe sufficient evidence/results to also fund other research projects, such as an Aboriginal and a history project.

Publications

Ensure dissemination of the results of the archaeological program through publications for public and academic levels. Outcomes may include a stand-alone monograph of the archaeological excavation which can be sold through the Windsor Museum.

Interpretation

Interpretation of the archaeological program during the excavation and following the excavation. Undertake joint project with Windsor Museum to provide high quality outcomes and a range of interpretation strategies. Ensure that the archaeologists are involved in all stages of this project. Develop recording strategies as part of the research design to be utilised in the archaeological project that will provide a range of interpretation outcomes:

- 3D recording
- Video recording
- 3D scanning of significant objects for digital examination
- Photo archive

Use of Volunteers

While it is important to use volunteers so as to provide opportunities to engage the public with the project, it important not to underestimate the role of the trained archaeologists in talking to the public about what has been found. There are always lots of specific questions that only an experienced archaeologist can answer. Opportunities for volunteers can be found with washing of artefacts, working with specialists in cataloguing artefacts, perhaps some limited opportunities during the excavation program. A volunteer strategy should be developed in association with the Windsor Museum.