



Transport
Roads & Maritime
Services

Windsor Bridge replacement project

Submissions report
Incorporating preferred infrastructure report

APRIL 2013



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Roads and Maritime Services

Windsor Bridge Replacement

Submissions Report including a Preferred Infrastructure Report

April 2013 – Final



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Executive summary

Roads and Maritime Services NSW (RMS) is seeking approval under Part 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) to replace the existing bridge over the Hawkesbury River at Windsor (known as Windsor Bridge) with a new bridge around 35 metres downstream of the existing Windsor Bridge. The existing bridge needs to be replaced as its structural integrity is deteriorating with age and it is no longer cost-effective to maintain.

RMS used a range of consultation tools and activities to ensure the community was actively involved in the project development and options selection process. Consultation for the project began in July 2009 with input sought on the ten options to rehabilitate or replace the existing bridge. Consultation continued on the preferred option to allow community issues to be considered in the design of the bridge, Thompson Square and surrounding project elements.

Exhibition of the EIS and bridge design

The EIS was formally exhibited for 34 days from 14 November 2012 to 17 December 2012. A public notice was also made under the *Roads Act 1993* for proposing to construct a bridge over navigable waters.

The exhibition was advertised in a media release, as well as local and metropolitan newspapers. The EIS was exhibited at seven display locations and was made available for review and electronic download on the RMS and Department of Planning and Infrastructure websites.

Community consultation activities were undertaken during the public exhibition period that included release of a community update, an email alert to those preregistered to receive project updates and EIS display information letterbox dropped and mailed to various stakeholders. A number of community information sessions were also held during the exhibition period. The project team was available at these sessions to discuss the project and answer any enquiries.

Submissions received during public exhibition

No submissions were made in response to the navigable waters notice required under the Roads Act. However, the Department of Planning and Infrastructure received a total of 101 submissions in response to the exhibition of the EIS, comprising six government agency submissions and 95 submissions from the community. Five of these submissions were received after the formal exhibition period had closed. The final submission accepted and responded to in the Submissions Report was received on 14 February 2013.

Most community submissions objected to the project due to significant impacts on the heritage of Thompson Square, Windsor and the demolition of the existing heritage listed Windsor Bridge. Other community submissions raised issues around the justification for the project and the integrity and transparency of the project development and community consultation process. Some submissions expressed a preference for a bypass option to avoid heritage and traffic-related impacts on Thompson Square, while others supported the project as a cost-effective and reasonable solution for a replacement bridge identifying benefits to local traffic, flood immunity and pedestrian safety.

Agency and council submissions identified a range of construction and operation phase issues that would need to be addressed by the project, including potential flooding impacts, urban design, and impacts on riparian vegetation and agricultural land. Notably, the Heritage Council of NSW objected to the project on the grounds of long-term irrevocable and serious negative impacts on the Thompson Square heritage conservation area and the heritage of Windsor.

Additional investigations

To respond to issues raised in submissions and during consultation for the EIS, a number of additional investigations have been undertaken and information has been provided as follows:

- Heritage investigations, including additional historic archaeological investigations that confirmed the conclusions of the earlier investigations undertaken as part of the EIS.
- More detailed flooding investigations including modelling that concluded the project would have considerably less impacts than those presented in the EIS, with no or negligible increases in flood levels immediately upstream of the replacement bridge.
- The feasibility of refurbishing the existing Windsor bridge including assessing the alternative refurbishment method proposed by ex-RMS bridge engineers and comparing their refurbishment method with that proposed by RMS.
- Potential impacts, feasibility and costs of the alternative Rickabys Line option proposed by ex-RMS bridge engineers, which would partially bypass Windsor to the west.
- A detailed examination of options for archaeological investigation of Thompson Square prior to construction commencing.

Further information on the deteriorating condition of the existing bridge is also provided. This is in response to submissions that questioned the validity of bridge condition information provided in the EIS.

Design changes

The following project changes are proposed to minimise environmental impacts and have been assessed in the preferred infrastructure report within this Submissions Report:

- Increasing the clearance of the new bridge over The Terrace from 3.6 metres to 4.6 metres to allow large coaches to directly access Windsor Wharf.
- Changing the location of bridge piers.
- Noise mitigation being identified for consideration at additional properties, including heritage properties.

The assessment of design changes demonstrates that these changes will minimise environmental impacts. While the design changes will also result in impacts, they have been assessed as comprising only a minor or negligible change compared to the impacts of the project identified in the EIS.

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1 Introduction and background

1.1 The project

Roads and Maritime Services NSW (RMS) is proposing to replace the existing bridge over the Hawkesbury River at Windsor. The proposal for bridge replacement (hereafter referred to as “the project”) includes the following key features:

- Construction of a new bridge over the Hawkesbury River at Windsor, around 35 metres downstream of the existing Windsor Bridge.
- Construction of new approach roads and intersections to connect the new bridge to existing road network.
- Modifications to local roads and access arrangements, including changes to the Macquarie Park access and connection of The Terrace.
- Construction of pedestrian and cycling facilities, including a shared pedestrian/cycle pathway for access to and across the new bridge.
- Removal and backfilling of the existing bridge approach roads.
- Demolition and removal of the existing road bridge, known as Windsor Bridge.
- Urban design and landscaping works, including within the parkland area of Thompson Square and adjacent to the northern intersection of Wilberforce Road, Freemans Reach Road and the Macquarie Park access road.
- Ancillary works such as public utility adjustments, water management measures and scour protection works, as required.

A more detailed description of the project is found in Chapter 5 of the Windsor Bridge replacement project environmental impact statement (EIS) prepared by RMS in November 2012.

1.2 Statutory context

RMS formed the opinion that the project is likely to significantly affect the environment and would require an environmental impact statement to be prepared under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The project does not require development consent under Part 4 of the EP&A Act. Accordingly, as per clause 14 and Schedule 3 of *State Environmental Planning Policy (State and Regional Development) 2011* the project is State significant infrastructure under Part 5.1 of the EP&A Act and requires the approval of the Minister for Planning and Infrastructure.

An application report to support a State significant infrastructure application under Section 115X of the EP&A Act was prepared by RMS. This application was submitted to the Department of Planning and Infrastructure on 4 October 2011 and the Director General's requirements for environmental impact assessment were issued on 24 November 2011. In accordance with the requirements of the EP&A Act, an EIS was prepared to assess the potential impacts of the project.

In addition, as a roads authority, RMS is authorised to construct bridges across navigable waters, under Part 6, Division 2, Section 78 of the *Roads Act 1993* (Roads Act). The Roads Act provides that such bridges are lawful obstructions of navigable waters.

Sections 79 to 81 of the Roads Act provide for RMS to carry out a public consultation process for a proposed bridge across navigable waters. The notice must indicate where and when the plans of the proposed bridge may be inspected by members of the public, and must state that any person is entitled to make submissions to RMS with respect to the proposal within 28 days from the date of the notice.

RMS must consider any submissions received before deciding whether or not to proceed. If the decision is made to construct the bridge, RMS must notify each person who has objected to the proposal.

1.3 Environmental impact statement exhibition

The EIS was formally exhibited for 34 days from 14 November 2012 to 17 December 2012. The exhibition was advertised in a media release, as well as the following newspapers:

- Sydney Morning Herald.
- The Daily Telegraph.
- Hawkesbury Courier.
- Hawkesbury Gazette.

In addition:

- A community information flyer was sent to around 330 interested stakeholders and 12,000 residents in Freemans Reach, Wilberforce, Pitt Town, Windsor, South Windsor, McGraths Hill, Windsor Downs, Berkshire Park, Bligh Park, Mulgrave and Glossodia.
- An email alert was sent to around 200 registered stakeholders accompanied by community update material.

Unstaffed information displays were also set up during the EIS exhibition period at the following locations:

- Hawkesbury City Council chambers.
- RMS Motor Registry, Richmond.
- RMS Office, Blacktown.
- RMS Head Office, North Sydney.
- Deerubbin Centre (Windsor Central Library).
- NSW Department of Planning and Infrastructure, Bridge Street, Sydney.
- Nature Conservation Council of NSW, Newtown.

Staffed displays in support of the formal public exhibition (but not part of the formal public exhibition administered by the Department of Planning and Infrastructure) were held at:

- Windsor Marketplace (8 December 2012).
- Windsor Riverview Shopping Centre (24 November 2012).

The public was able to access information from the project's enquiries email (Windsor_Bridge@rms.nsw.gov.au) and telephone line (1800 822 486). The EIS was also available for review and electronic download on the RMS and Department of Planning and Infrastructure websites.

For the purposes of the navigable waters notice, plans of the proposed bridge were also placed on public exhibition at RMS' Maritime Office at Blacktown during the same period as the EIS exhibition, from 14 November 2012 to 17 December 2012.

A notice of RMS' intention to construct a bridge across navigable waters was published in the following local newspapers:

- Hawkesbury Courier.
- Hawkesbury Gazette.

1.4 Purpose of the document

During the exhibition of the EIS, 101 submissions were made. The Director General of the Department of Planning and Infrastructure provided copies of the submissions to RMS. This Submissions Report including a preferred infrastructure report (PIR) has been prepared to assist the Department with its' assessment of the project .

No submissions were made in response to the navigable waters notice required under the Roads Act. As such the remainder of this report only appropriately addresses matters relevant to the EP&A Act.

This report identifies the issues raised during exhibition of the EIS and provides responses to those issues (**Chapter 2**). It also includes information on additional studies carried out since exhibition of the EIS (**Chapter 3**), further details of an alternative option (the Rickabys Line option) proposed by ex-RMS bridge engineers (**Chapter 4**), and a description of changes to the project since the EIS exhibition included in the PIR (**Chapter 5**). Revised environmental management measures for the project are also included (**Chapter 6**).

While a number of design changes are proposed, the additional environmental effects of these changes would be minor and would not alter the findings of the EIS. The proposed design changes and associated environmental effects are discussed in the preferred infrastructure report within **Chapter 5** of this report.

To respond to issues raised in submissions and during consultation for the EIS, a number of additional investigations have been undertaken. These investigations (which are detailed in **Chapter 3** and **Chapter 4**) include the following:

- Heritage investigations, including additional archaeological investigations.
- More detailed flooding investigations.
- Investigations into the feasibility of refurbishing the existing Windsor Bridge, including assessing the alternative refurbishment method proposed as part of the Rickabys Line option, and comparing this method with that proposed by RMS.
- Investigations into the potential impacts, feasibility and costs of the bypass component of the Rickabys Line option, which would provide an alternative route to the west of Windsor.

Only minor revisions have been made to the outcomes of the environmental assessment. Minor changes to three environmental management measures presented in the EIS are also proposed.

2 Response to issues

2.1 Respondents

The Department of Planning and Infrastructure received a total of 101 submissions in response to the exhibition of the EIS, comprising six government agency submissions and 95 submissions from the community. Five of these submissions were received after the formal exhibition period had closed. The final submission accepted and responded to in this Submissions Report was received on 14 February 2013. A list of submissions and a description of the respondents is provided in **Appendix A**.

2.2 Overview of the issues raised

Each submission has been examined individually to understand the issues raised. The issues raised in each submission have been extracted and collated, and corresponding responses to the issues have been provided. Where similar issues have been raised in different submissions, only one response has been provided. The issues raised and RMS' responses form the basis of this chapter.

The main issues raised in the community submissions were:

- Objection to the project due its impacts on the heritage of Thompson Square and Windsor.
- Objection to the project due to the demolition of the existing Windsor Bridge, which is listed on RMS' Heritage and Conservation Register in accordance with Section 170 of the *Heritage Act 1977* (RMS' Section 170 Heritage and Conservation Register) and the heritage schedule of the Hawkesbury Local Environmental Plan 2012.
- Objection to the project on the grounds that it does not provide a long-term solution for traffic issues and will allow increasing volumes of through traffic and heavy vehicles to impact the heritage precinct of Windsor.
- Objection to the project on the grounds that there is not sufficient justification for it to proceed due to a perceived lack of benefits and significant adverse impacts.
- Objection to the project and support for an alternative route to avoid impacts on Thompson Square and remove through traffic and heavy vehicles from Windsor town centre.
- Objection to the project due to perceived issues with the integrity and transparency of the project development process, including the integrity of information provided in community consultation and the EIS.
- Support for the project as a cost-effective and reasonable solution for a replacement bridge and its benefits to local traffic, flood immunity and pedestrian safety.

The main issues raised by each of the government agencies were as follows:

- **Environment Protection Authority** – stated that a detailed construction noise and vibration management plan, and a soil and water management plan, should be required by the Minister's Conditions of Approval for the project.

- **Heritage Council of NSW** – unequivocally objects to the project on the grounds of long term irrevocable and serious negative impacts on the Thompson Square heritage conservation area and the heritage of Windsor. The Heritage Council of NSW supports rehabilitation of the existing bridge and construction of a bypass. The Heritage Council also provided detailed Minister’s Conditions of Approval for the project, if it should proceed.
- **Hawkesbury City Council** – supports the project but requested further information on the urban design aspects of the new bridge and consolidation of Thompson Square open space.
- **Department of Primary Industries (DPI) Fisheries NSW** – stated that the EIS adequately addresses potential impacts but requested further consultation on scour protection when detailed design is available.
- **DPI Crown Land** – raised the issue of outstanding Aboriginal Land Claims on Crown Land acquired for the project.
- **DPI Agriculture NSW** – identified that excess land on the northern bank would still be suitable for agricultural/horticultural use and these uses should be considered rather than making the land public open space.
- **DPI NSW Office of Water** – requested that additional consideration be given to riparian vegetation rehabilitation on the northern bank.
- **Office of Environment and Heritage (OEH) (Aboriginal Cultural Heritage)** – recognised that the site may contain superior archaeological deposits and recommended salvage if disturbance cannot be avoided.
- **OEH (Flooding)** – recognised that the flooding assessment undertaken for the EIS is comprehensive, although further work and consultation is required to determine and mitigate the potential flooding impacts of the new bridge.

2.3 Scope of response to submissions

Some submissions raised issues outside the scope of the information provided in the EIS. This included:

- Media releases and speeches in NSW Parliament Hansard by various NSW Government politicians.
- Extracts from planning approval documentation from other developments or from Hawkesbury City Council minutes or other documentation.
- Purported conversations, emails and other interactions between members of the public, politicians and RMS officers.
- Current and potential complaints to the Ombudsman regarding various matters associated with the project.
- Accusations of defamation and associated potential legal action.

While these matters relate to the project, they do not directly relate to the EIS or its scope and objectives as defined in the EP&A Act. Consequently, no response has been provided in this Submissions Report to matters such as those identified above.

2.4 Issue – Alternatives to the project

Many of the submissions did not support the current proposed alignment and other features of the project and suggested that alternative options such as a bypass or alternative route (eg option 6 described in the EIS) would be more suitable. One particular alternative raised in a large number of submissions was the Rickabys Line option, which was developed by ex-RMS bridge engineers. The Rickabys Line option comprises a partial bypass to the west of Windsor and refurbishment of the existing Windsor Bridge using an alternative methodology to the one identified and costed by RMS.

Some submissions suggested that the option development and assessment process had a pre-determined outcome, and insufficient investigation and assessment of alternative options was undertaken. There was also criticism of the project objectives and how they were used to assess different options. Additionally, some submissions were concerned about the lack of detail in the EIS on other recently identified potential alternatives, such as the Rickabys Line option and the alternative Windsor Bridge refurbishment method.

The specific issues raised in submissions in relation to alternatives for the river crossing are identified in the following sections.

2.4.1 Rickabys Line option

Submission number(s)

24, 27-29, 66, 70, 90, 93 and 94.

Issue description

Many submissions supported the Rickabys Line option, which comprises a road partial bypass to the west of Windsor and refurbishing the existing bridge for light traffic. In summary, the respondents raised the following issues:

- The Rickabys Line option developed by ex-RMS bridge engineers should be the preferred option for the river crossing.
- The estimated cost of the Rickabys Line option, as estimated by the ex-RMS bridge engineers, is comparable to the current project cost.
- An alternative route to the west of Windsor, such as the Rickabys Line option, should have been considered during the options development and selection phase of the project.
- The EIS did not contain a detailed assessment or costing of the Rickabys Line option.

Response

Two ex-RMS bridge engineers have developed an alternative option to the project involving a new two lane alternative route to the west of Windsor and refurbishing and retaining the existing Windsor Bridge for light traffic. The two ex-RMS bridge engineers provided details of and preliminary cost estimates for this option in their submission, which suggested that the Rickabys Line option could be constructed for a similar cost to the project. This option was identified in a considerable number of submissions as a preferred alternative option to the project.

The EIS considered the Rickabys Line option identified by the ex-RMS bridge engineers, including three potential alternative routes for the bypass. The level of detail and assessment provided in the EIS for the Rickabys Line option was based on the level of information available at that time.

Since the completion of the EIS, further detail on the proposed Rickabys Line option has been provided by the ex-RMS bridge engineers. Based on this additional information, RMS has developed a preliminary strategic concept design to enable a more detailed impact assessment and costing to be undertaken in response to the EIS submissions. The detailed impact assessment and cost estimates for the Rickabys Line option are presented in **Chapter 4**.

The level of impact assessment undertaken for the Rickabys Line option (as presented in **Chapter 4**) is sufficient to allow a comparison of this option with the RMS project presented in the EIS. While detailed assessment has been undertaken on a number of environmental aspects, a qualitative assessment has been undertaken on others. Examples of situations where a qualitative approach has been adopted include where the level of design detail available is not sufficient to enable an accurate quantitative assessment and where the impacts are likely to be minor and do not require a more detailed or quantitative assessment.

2.4.2 Other bypass options

Submission number(s)

2, 6, 7, 9, 11, 16, 17, 24, 27-29, 32, 37, 38, 41, 42, 44, 45, 47, 49, 52, 54, 56, 58, 62, 63, 66, 68-69, 71, 73-75, 77, 80, 84-86, 91, 92, 95 and the Heritage Council of NSW.

Issue description

Many submissions contended that a road bypass of Windsor should be constructed rather than the project. In summary, the respondents contended that a bypass would:

- Avoid heritage impacts on Thompson Square.
- Provide a better solution for existing and future traffic.
- Remove through traffic and heavy vehicles from Windsor.
- Improve the amenity of Thompson Square and the surrounding businesses and residences.
- Improve pedestrian and vehicle safety around Thompson Square.

Response

A number of options were examined during the options assessment process, including a number of options identified by the community. The options assessment process took into account transport needs, heritage impacts, environmental impacts, engineering constraints and costs. Consultation for the project began in July 2009 with input sought on the ten options, including options to retain the existing bridge, provide a bypass of Windsor or replace the existing bridge at Windsor. While a bypass option was shown to provide a number of benefits, there are a number of additional considerations such as:

- The noise, visual and traffic impacts associated with any bypass are likely to affect areas that are not currently impacted by these issues, including residential and rural residential areas.

- Depending on where the bypass joins the existing road network, all traffic issues may not be resolved or new traffic issues may arise.
- There are other impacts associated with the various bypass options, such as increased flooding, and impacts on flora and fauna.
- Some bypass options, while avoiding impacts on the historic and Aboriginal heritage of Windsor, would still be likely to have adverse impacts on both Aboriginal heritage sites and other historic heritage sites.
- A bypass would cost substantially more than the budget allocated to the project by the NSW Government.

The preferred option satisfies the primary aim of the project, which is to maintain a safe and reliable crossing of the Hawkesbury River at Windsor. An alternative route around Windsor may be considered in the future depending on growth in traffic numbers and local congestion.

2.4.3 Other alternative crossing locations

Submission number(s)

16, 19, 27, 39, 57, 61, 63, 72 and 86.

Issue description

A number of submissions, while not specifically raising the issue of a bypass, suggested that an alternative location for the replacement bridge should be considered. In summary, the issues raised by the respondents included the following:

- The location of the crossing should be moved to protect the heritage and amenity of Thompson Square and the centre of Windsor.
- Option 7, via North Street, should be considered.

Response

In comparison to other options considered, the preferred option for the project performs best in terms of value for money and satisfies the majority of project objectives. The selected bridge design and southern approach road alignment also minimise the potential visual and construction impacts of the preferred option on the Thompson Square parkland. In comparison to the other options, adverse impacts on community amenity and traffic flows during construction would be relatively minor and there would be no significant long-term changes in access to Windsor for local residents or through traffic (although minor access changes include restrictions to 'left in/ left out' for properties on Old Bridge Street and traffic changes for turning movements into George Street). The new bridge would maintain the existing, historic linkage between the northern and southern sides of the river at Windsor and the continuity of Thompson Square as a link to the river and a civic park.

Option 7 was found to have a number of disadvantages that prevented its selection as the preferred option. In particular, option 7 would have adverse traffic impacts on residential areas that currently do not experience high levels of through traffic and associated amenity impacts. It would also have adverse impacts on long-established boating activities on the Hawkesbury River and heritage impacts on the old Court House located along this route.

The adverse impacts of the project have been considered in design and options development, and would be further mitigated and/or managed using the measures identified in the EIS. These include detailed management and conservation measures to avoid, minimise and mitigate impacts on historic heritage, as well as urban design and landscape treatments to integrate the new bridge with the existing environment.

2.4.4 Alternative bridge alignments

Submission number(s)

Heritage Council of NSW.

Issue description

The submission from the Heritage Council of NSW contended the following issues:

- The proposed road plan is inelegant and unresolved.
- The proposed road plan is too close to significant buildings, too wide where the slip road is proposed, and shows no balance between traffic space, pedestrian space, landscape and the physical definition of Thompson Square.

Response

One of the urban design principles that guided the design process was the need to maximise the available open space in Thompson Square by minimising corridor footprint. This is one of the reasons the road has been narrowed to the extent possible and located on the eastern side of Thompson Square. The balance of the different elements of the project has been developed to maximise the functionality of the project for pedestrians, traffic and Thompson Square users, while minimising its impacts on the heritage and character of Windsor. The proposal removes the incongruous diagonal road element from the park which jars with the deliberate rectilinear town plan created by Macquarie.

These considerations also guided the urban design options for Thompson Square open space.

2.4.5 Refurbishment of the existing Windsor Bridge

Submission number(s)

6, 11, 16, 17, 24, 27, 28, 38, 54, 66, 69, 79, 90, 91, 93, 94, 95 and the Heritage Council of NSW.

Issue description

Many community submissions contended that the existing bridge should be retained and refurbished. In summary, the respondents raised the following issues:

- The existing bridge should be maintained for light vehicles.
- The existing bridge should be preserved and maintained as a local road and a bypass provided to serve the major traffic needs of the region.
- The existing bridge should be repaired and renovated instead of construction of the project.

- An alternative refurbishment option for the existing Windsor Bridge has been developed by ex-RMS bridge engineers. The estimated cost of this refurbishment option, as provided by the ex-RMS bridge engineers, is substantially lower than the RMS cost estimate for bridge refurbishment.
- The existing bridge should be refurbished using the alternative bridge refurbishment methodology developed by the ex-RMS bridge engineers.
- There is more-than sufficient heritage justification for the current bridge to be restored and to remain *in situ*. Restored, Windsor Bridge provides a charming and ideal access point for light and local traffic access to Windsor. Restoration of Windsor Bridge would make a genuine and positive contribution to local economic conditions.

The Heritage Council of NSW noted that, in 2009 when an initial series of options were developed and exhibited, the Heritage Council identified refurbishment of the existing bridge as its preferred option. The next preferences of the Heritage Council were for a bypass (options 6 and 8). The Heritage Council also noted that additional studies undertaken since 2009 show that it may be feasible to rehabilitate and retain the existing bridge for another 20 years, subject to the completion of works to address strengthening and repair areas of deterioration.

Response

Options to rehabilitate the existing bridge were considered by RMS when condition assessments identified extensive deterioration issues. Bridge rehabilitation was further considered during the options assessment process in 2009 but was not favoured due to capital and on-going maintenance costs, and need to close the bridge during the rehabilitation works.

Since that time, two ex-RMS bridge engineers have submitted a detailed alternative option for refurbishment of the existing Windsor Bridge. This alternative refurbishment option is described in detail in **Chapter 4**. This option received considerable media coverage and was identified in a considerable number of submissions as a preferred alternative to the project. The alternative refurbishment option was costed by a highly qualified and experienced bridge consultant at below \$3 million, which is substantially less than the RMS refurbishment option (which was estimated by RMS to cost about \$18 million). Additionally, the alternative refurbishment option would require only minimal closures of the bridge during construction.

Much of the difference in costs between the alternative refurbishment option and the RMS refurbishment option can be explained by the differences in design standards that the refurbishment options would achieve. The alternative refurbishment option (as proposed by the ex-RMS bridge engineers) was proposed to provide a bridge suitable for light vehicles (up to 16 tonnes), whereas the RMS refurbishment option would provide a bridge suitable for all vehicles, including current heavy vehicles.

Additionally, the cost estimate for the RMS refurbishment option was the total cost to refurbish the bridge, including the costs of design, project management, environmental investigations, planning approvals, testing and construction monitoring, access and temporary works, contingencies and other incidentals. The costing of the alternative bridge refurbishment option did not include costs for these additional activities, which are required to ensure that the NSW Government is delivering a high quality, durable asset that complies with technical and

environmental requirements. For a complex, one-off project such as the refurbishment of Windsor Bridge, the contingency costs would be high.

An independent estimate of the alternative refurbishment option has since been undertaken by a third party. This costing has been based on the methodology and design standards of the alternative refurbishment option proposed by the ex-RMS bridge engineers (that is, to refurbish the bridge to a level that is suitable for light vehicles only) but uses current industry rates and the same parameters for contingencies and incidentals required by the RMS Estimating Manual. It also includes additional scope that was recommended in an independent appraisal of the ex-RMS bridge engineer's methodology. The results of this independent, more detailed costing indicated that the alternative bridge refurbishment methodology would cost around \$13 million, as opposed to the original estimate of less than \$3 million. Full details of the independent cost estimates are presented in **Chapter 4**.

The methodology of the alternative refurbishment option was independently reviewed to determine whether it was technically feasible and would achieve the desired outcomes. This independent review is discussed in **Chapter 4**. In summary, the results of the review indicate that, while it may be feasible to refurbish the existing bridge for 20 years using the ex-RMS bridge engineers' methodology, the refurbishment would not address the structural issues that contribute to the deterioration of the bridge and would require considerable additional works. It would also require significant ongoing maintenance that make it impracticable from a cost benefit aspect. As an outcome of the review, a revised alternative bridge refurbishment methodology that would satisfy RMS objectives was identified. The estimated cost of the revised alternative bridge refurbishment methodology was estimated at \$15.5 million.

The existing bridge requires extensive rehabilitation work if it is to be used and maintained into the future. In addition to deteriorating with age, the existing bridge does not meet current engineering and road safety standards and the intersections on the approach roads cause traffic delays and have a number of safety issues, such as lack of safe crossing locations for pedestrians and poor sight distances for vehicles. A further limitation of the existing bridge is that it is below the 1-in-2 year flood level while the approach roads have a higher level of flood immunity. The remaining safe life of the bridge cannot be accurately predicted due to ongoing deterioration, heavy use and risk of flooding. RMS has identified that the most effective solution to address these deficiencies is to replace the existing bridge with minimal changes to the bridge location and alignment of approach roads. It is not cost effective to provide both a replacement bridge and retain the existing bridge.

Comments received from agency and community stakeholders have been considered in the selection and refinement of the proposed preferred option. The preferred option addresses the project objectives and provides greater value for money than other options considered. However, compared to other options considered, it does not perform as well in relation to minimising impact on heritage and character. While other options have lower heritage impacts, the costs and other potential impacts of these alternative options are considered to exceed their benefits.

2.4.6 Construction of a tunnel

Submission number(s)

19.

Issue description

One submission contended that a tunnel should be considered instead of the proposed replacement bridge.

Response

A tunnel option was considered in Section 4.2.2 of the EIS, having been raised as a possible option by members of the community. This option was not favoured because it would:

- Require extensive widening of Bridge Street.
- Necessitate the acquisition and demolition of most properties on Bridge Street between Macquarie Street and the George Street.
- Not improve traffic efficiency and would result in substantial traffic impacts as a result of changes in the operation of Macquarie Street intersection.
- Require extensive road closures in the area during construction, including the Windsor Bridge over the Hawkesbury River for around two years. This would impact local and regional traffic, placing additional traffic loads on the North Richmond crossing of the Hawkesbury River.
- Not meet heritage, flood and cost objectives.
- Impact numerous heritage items along Bridge Street, as well as subsurface archaeology.

2.4.7 Upgrading intersections only

Submission number(s)

27, 69, 92 and 93.

Issue description

Four submissions raised the issue that most of the traffic flow benefits to be gained from the project could be achieved through intersection upgrades alone. In summary, the respondents raised the following issues:

- Intersection improvements alone would improve traffic safety and reduce accidents at a substantially lower cost.
- The traffic flow improvements generated by the project will be marginal and will be a result of replacing the George Street roundabout with traffic lights and installing a roundabout at Freemans Reach Road. Both these changes could be implemented without replacing the bridge.

Response

While most of the predicted improvements in traffic performance would result from upgrades to the Wilberforce Road/ Freemans Reach Road and the George Street/ Bridge Street intersections, it is the horizontal and vertical alignment of the proposed new bridge that enables these intersection improvements to be made.

Once traffic numbers increase, the provision of two southbound lanes across the bridge would provide additional traffic capacity in the morning peak and facilitate the safe and efficient operation of the roundabout at the Wilberforce Road/ Freemans Reach Road intersection. A wider bridge would also reduce the risk of traffic accidents and reduce the risk of total road blockage or closure associated with traffic accidents and breakdowns. The increased capacity of the new bridge would, however, only contribute a relatively minor proportion of the total improvement in traffic performance associated with the project.

Without the construction of the new bridge, however, the options to upgrade the northern and southern intersections would be limited. The realignment of the river crossing allows the proposed intersection types at either end of the project to be constructed and facilitates their efficient operation, as there would be a straight road between the Freemans Reach Road/ Wilberforce Road intersection and the George Street/ Bridge Street intersection. By contrast, the existing bridge approach roads are curved and steeper, and the existing bridge is much lower relative to the intersections. This is explained further in the following paragraphs.

For the Freemans Reach Road/ Wilberforce Road intersection, recent road design investigations have shown that construction of a roundabout with the existing road alignments would be exceptionally complex because of the short distance and differences in levels between the existing bridge and the intersection. While traffic lights could be installed, they would not provide the same level of service as a roundabout for all traffic movements and they would be subject to regular inundation by floodwaters (which would increase their cost and ongoing maintenance requirements).

At the George Street/ Bridge Street intersection, it would be exceptionally complex and potentially not possible to install traffic lights if the project was not constructed because the required safe sight line distances for traffic lights could not be achieved with the vertical curvature through the intersection to meet the existing bridge approach road. Furthermore, an additional traffic lane would be required to allow southbound vehicles to turn right into George Street west. This would require the acquisition of some of the upper parkland area of Thompson Square, resulting in some impacts on historic and Aboriginal archaeological resources and an overall reduction in open space within the square.

Additionally, if the project comprised only an upgrade of intersections, it would leave a bridge that does not meet current design standards and is structurally deteriorating due to age, and the ongoing effects of flooding.

2.4.8 Other alternatives

Submission number(s)

19, 24, 43, 59, 66, 70, 76, 84 and 95.

Issue description

Several submissions expressed a concern that the selected option was not the best option and that an alternative should be found. Others suggested that other alternatives had not been properly investigated. In summary, the respondents raised the following issues:

- The current proposal does not respond to the wishes of the local community who use the bridge up to six times a day.
- The current preferred option is not in the best interests of the community and a more sustainable solution should be found.
- The project will change the Windsor area too dramatically.
- The proposed preferred option has been selected because it is the cheapest.
- Viable alternatives have not been properly considered or investigated.
- There are other better options available that must be explored.
- Alternative options that incorporate retention and conservation of the existing bridge and protect the unique heritage of Thompson Square need to be identified.

Response

In comparison to other options considered, the preferred option for the project performs best in terms of value for money and would perform well in relation to most of the project objectives. The project would provide a new bridge, approach roads and intersections to current road design standards. It would also improve the flood immunity of the crossing to match that of the surrounding approach roads, and provide a safer crossing for vehicles, cyclists and pedestrians. The proposed intersection improvements and initial two lane bridge configuration would provide acceptable traffic performance immediately and into the future. The bridge has also been designed so that it can be subsequently reconfigured to a three lane bridge (with two southbound lanes and one northbound lane) to meet future traffic demands, as required.

A range of options were considered during the options selection process, including a number of options identified by the community. Additional assessment of the Rickabys Line option has also been undertaken since completion of the EIS (refer to Chapter 3). Consultation for the project began in July 2009 with input sought on ten options to rehabilitate or replace the existing bridge. Consultation continued on the preferred option to allow community issues to be considered in the design of the bridge, Thompson Square and surrounding project elements. RMS will continue to provide opportunities for the community to participate in the detailed design of Thompson Square. Issues raised in submissions about the consultation process are considered in **Section 2.13**.

The preferred option is the least expensive of the bridge replacement options available but it is not the cheapest in terms of the bridge type designs available. A range of bridge types were considered for the project. The incrementally launched bridge design has been selected for the project to minimise both construction impacts and the visual impacts on Thompson Square. In summary, an incrementally launched bridge design has the following advantages over other designs:

- A lower visual impact and ability to be architecturally enhanced.
- A relatively small number of piers, which minimises both flooding and visual impacts.
- The ability to be constructed and launched from the northern bank, which would minimise construction impacts on Thompson Square.

2.5 Issue – Bridge design

2.5.1 General objection to proposed bridge design

Submission number(s)

1, 8, 10, 13, 27, 47, 57, 64, 67 and 74.

Issue description

Many submissions expressed concerns relating to bridge design. The main issues raised related to:

- Bridge type and form.
- Bridge width and lane numbers, with a preference for more traffic lanes.
- The design speed limit for the bridge, with an implied preference for a higher speed limit.
- Clearance over The Terrace.

A general response to this issue is provided below. Further details of specific issues raised are provided in subsequent sections. Further details for issues relating to traffic and access are also provided in **Section 2.8**.

Response

The assessment of bridge type design options, and the selection of the preferred bridge design, followed the selection of the preferred option for the river crossing, being a replacement bridge 35 metres downstream of the existing bridge (option 1). The assessment of bridge design options took into account road design and safety standards, visual impacts on the landscape and heritage character of Windsor, direct environmental and heritage impacts associated with the scale of construction, and engineering and cost constraints. The selected bridge design option minimises the potential visual and construction impacts of the preferred option on the Thompson Square parkland, while still satisfying the project objectives for safety, traffic flow, flood immunity and community needs (including coach access to Windsor Wharf).

It is recognised that despite minimising visual impacts during the design process, the project will still have significant adverse impacts on the heritage character of Windsor. These remaining adverse impacts would be further mitigated and/or managed using the measures identified in this EIS and any additional measures identified in the conditions of approval. The measures identified in the EIS include urban design and landscape treatments to integrate the new bridge with the existing landscape.

2.5.2 Bridge type and form

Submission number(s)

1.

Issue description

One submission raised specific concerns about the bridge type and form. In summary, the respondent raised the following issue:

- To provide a better aesthetic design and a design more suited to flooding, the piers and superstructure of the replacement bridge should be modelled on the Colo River Bridge on Putty Road.

Response

The proposed design for the replacement bridge has been further developed since completion of the EIS. The EIS states that the new bridge would be an incrementally launched bridge, supported on piers with up to four columns. The preferred concept now comprises two columns for each pier, with the final design of the columns to be selected in consideration of aesthetics and flooding. A Double T superstructure has also been adopted rather than the double box girder design presented in the EIS. This is the same as the Colo River Bridge and is further discussed in **Chapter 5**. The depth of the bridge superstructure would also be marginally lower as a consequence of the Double T design. Further detailed flood modelling is currently being undertaken and will be used to inform further design refinements during the detailed design phase of the project. The proposed bridge design minimises the potential visual and construction impacts of the preferred option on the Thompson Square parkland, while still satisfying the project objectives for safety, traffic flow, flood immunity and community needs (including coach access to Windsor Wharf).

2.5.3 Bridge width and lane numbers

Submission number(s)

8, 10, 13, 47, 57, 64, 67, 74 and 95.

Issue description

Several submissions raised specific concerns about the proposed number of lanes for the replacement bridge. In summary, the respondents raised the following issues:

- The effect of new development on bridge lane requirements needs to be considered.
- A two lane bridge is not sufficient to cope with traffic volumes and will not result in any improvement in traffic flows.
- Replacing the existing two lane bridge with another two lane bridge will not resolve future traffic problems. A two lane bridge will not be sufficient to cope with future suburban development.
- The replacement bridge needs to have at least four lanes to allow for future traffic increases.
- The replacement bridge should have at least three lanes, with one fixed lane in each direction and a timed contra flow lane for southbound traffic in the morning and northbound traffic in the afternoon.
- The proposed third lane on the bridge should be installed immediately rather than some point in the future.
- Conversion of the bridge from two lanes to three lanes would result in road safety issues as the road shoulders would be removed.
- The bridge will be converted to four lanes in future.

Response

The assessment of bridge design options took into account road design and safety standards, visual impacts on the landscape and heritage character of Windsor, direct environmental and heritage impacts associated with the scale of construction, and engineering and cost constraints. The selected bridge design option minimises the potential visual and construction impacts of the preferred option on the Thompson Square parkland, while still satisfying the project objectives for safety, traffic flow, community needs (including coach access to Windsor Wharf), and flood immunity.

The project would open with an initial two lane bridge configuration which would provide acceptable traffic performance immediately and into the future. The bridge has also been designed so that it can be subsequently reconfigured to a three lane bridge (with two southbound lanes and one northbound lane) to meet future traffic demands, as required. The number of lanes provided on the new bridge at opening (ie either two or three lanes) would be decided closer to the opening date based on traffic numbers and road safety requirements, however traffic modelling undertaken as part of the EIS indicates this will not be required.

Traffic modelling has been undertaken to compare the performance of a four lane bridge and a three lane bridge with varying contra-flow arrangements (specifically two lanes southbound and one lane northbound in the morning peak and one lane southbound and two lanes northbound in the evening peak). The results of this modelling indicated that there was only a marginal improvement in travel times with two northbound lanes, even with the predicted traffic growth to 2026. This marginal improvement in travel times does not warrant the construction of a four lane bridge to provide an additional northbound lane. An extra lane on the bridge would also be undesirable due to additional land take within Thompson Square.

While the road shoulders would be reduced with the conversion of the bridge from two lanes to three lanes, if a breakdown or incident occurs on the bridge there would generally be still two lanes open to allow traffic to pass in each direction. This is a considerable improvement in comparison to the existing bridge.

It is noted that northbound traffic flow on the bridge would be controlled by the George Street/ Bridge Street intersection, which has only one through northbound lane. After crossing the new bridge and exiting the new roundabout on the northern bank, there would be no controlled intersections limiting traffic movements either on Freemans Reach Road or Wilberforce Road for a considerable distance so northbound traffic would be generally free flowing.

As discussed in the EIS, the Jacaranda Ponds development involves construction of up to 580 additional dwellings at Glossodia. It would be at least 10 years, however, before this development is completed. A 25 per cent growth in traffic movements (or an increase of 5000 movements per day) has been assumed for the 10 year planning period for the project. This is more than sufficient to cover the traffic generated by the Jacaranda Ponds development and other traffic generating development that may take place. This traffic growth estimate has been used in the latest network modelling, including an additional assessment of the Macquarie Street/ Bridge Street intersection. New information on the performance of the Macquarie Street/ Bridge Street intersection is presented in **Chapter 4**, together with further information on other traffic flow issues.

One submission raised the possibility that the bridge could be converted to four lanes in the future. While the new bridge would be theoretically wide enough to accommodate four lanes of traffic, as discussed previously there would be only a very marginal benefit in traffic performance with an extra northbound lane (which does not justify an additional lane). Additionally, taking up additional land in Thompson Square to provide a fourth lane on the southern approach road would not be acceptable.

2.5.4 Clearance over The Terrace

Submission number(s)

24, 27 and 93.

Issue description

Three submissions raised concerns that the height of the bridge clearance over The Terrace has not yet been confirmed and that this has implications for the information presented in the EIS. In particular, the respondents raised the following issues:

- If the bridge is raised a metre to allow coach access, the assessment presented in the EIS would be invalid.
- Raising the bridge height would increase the significance of impacts on sightlines between buildings in Thompson Square.
- Raising the bridge height would increase noise impacts.

A response to these issues is provided below. Note that other submissions, including the submission from Hawkesbury City Council, raised the contrasting issue that clearance under the bridge over The Terrace needs to be sufficient to allow large coaches to access the wharf. These submissions are addressed in **Section 2.8.14**.

Response

All project design changes since the completion of the EIS have been subject to further impact assessment, including (but not limited to) assessment of noise and visual impacts. The results of this assessment indicate that the changes in noise and visual impacts will not be significant and the overall conclusions made in the EIS regarding noise impacts, visual impacts, and impacts on historic views and vistas remain valid.

It is important to note here, however, that since completion of the EIS, a number of additional properties in Thompson Square have been identified as having residential uses. In undertaking the additional noise assessment for the proposed change in the bridge height to increase clearance over The Terrace, the impacts on these properties have therefore been re-assessed with reference to the appropriate residential noise criteria.

Details of the design changes, the additional impact assessment undertaken for the design changes, and the revised noise assessment results for the newly identified residential properties are presented in **Chapter 5** of this report.

2.6 Issue – Heritage

2.6.1 Adverse impacts on heritage

Submission number(s)

3, 6, 7, 9, 11, 16, 17, 19, 22, 24, 29, 30, 33-37, 40-42, 45, 47-49, 52, 54, 56-58, 60, 61, 64, 66-69, 71-73, 76-80, 84-88, 91, 93, 94 and 95.

Issue description

Many submissions raised the issue of adverse heritage impacts. The main heritage issues raised were as follows:

- General impacts on the heritage values and heritage character of Windsor.
- Impacts on Thompson Square.
- Impacts on the existing Windsor Bridge.
- Impacts on heritage buildings and structures.
- Impacts on archaeological records.
- Impacts on Aboriginal heritage.
- Impacts on maritime heritage.

A general response to this issue is provided below. Further details of specific issues raised, such as impacts on Thompson Square, are provided in subsequent sections.

Response

The EIS acknowledges that the project would have significant residual adverse impacts on historic heritage, as well as adverse impacts on Aboriginal heritage, and identifies measures to minimise, manage and/or mitigate these impacts to the extent possible. If the project is approved, it would be undertaken in accordance with these measures, as well as any additional measures identified in the conditions of approval. Measures that would be implemented to minimise heritage impacts include (but would not be limited to) the following:

- An archival record of the project footprint and the immediate vicinity would be made in accordance with Heritage Council guidelines for items of State significance, prior to, during and after completion of the construction and demolition works.
- The existing bridge would be dismantled in a manner that allows its construction methods and evolution to be appropriately documented as an archival record prior to, and during its demolition.
- A social record of Thompson Square and the building of the replacement bridge would be undertaken to capture community views on the change to the environment.
- Extensive salvage excavation would be undertaken to recover and record archaeological material within the project footprint prior to construction as detailed in **Appendix B**.
- Urban design and landscape treatments would be applied to Thompson Square and would be designed to be sympathetic with the heritage character of the township and in consultation with the community, Hawkesbury City Council, the Department of Planning and Infrastructure, and the Heritage Council of NSW.

The EIS also 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, including impacts on the form of Thompson Square, demolition of the existing Windsor Bridge, and impacts on historic views and vistas.

2.6.2 Impacts on Thompson Square

Submission number(s)

6, 7, 11, 16, 17, 19, 22, 24, 29, 30, 34, 35, 37, 41, 42, 45, 47-49, 52, 54, 56, 58, 61, 64, 66, 67, 69, 71, 72, 77-80, 84, 85, 87, 88, 91, 92, 93, 94, 95 and the NSW Heritage Council.

Issue description

Many community submissions specifically raised the issue of heritage impacts on Thompson Square. The main issues raised in the submissions included the following:

- Thompson Square is the oldest square in Australia and a place of national significance.
- The project would have significant long term and irrevocable adverse impacts on the heritage values of the Thompson Square precinct, including the form of the Thompson Square parkland, and historic views and vistas.
- The visual impact of a modern road through Thompson Square will have a significant adverse impact on the heritage character of the precinct.
- The arguments provided by RMS about the benefits of the project to Thompson Square treat Thompson Square as just a park rather than correctly treating it as a civic space defined by buildings on three sides and the natural boundary of the river bank.
- The proposed changes to Thompson Square parkland would not be in keeping with Governor Macquarie's vision.
- Consideration needs to be given to preserving the historical integrity of the square for future generations.

One community submission raised the following additional issue:

- Evidence was provided by RMS that Thompson Square is one of only two places in NSW (the other being The Rocks) where the form of the place demonstrates the "larrikin" and "anti-authoritarian" traits that many would consider to be a key factor in the development of our national character. The respondent contended that they were informed by RMS that the early residents of Green Hills were reluctant to comply with Governor Macquarie's orders for a grid pattern to be imposed on the existing settlement and that evidence of this anti-authoritarian stance remains in the existing form of Thompson Square.

In addition to the community submissions, the Heritage Council of NSW raised the following additional issues:

- There has been inadequate recognition that the State Heritage Register listing for Thompson Square includes the open space and all of the buildings that surround it. Thus the entire setting of the square (including the relationship between the open space and the surrounding buildings, and the relationships between the buildings that surround the open space) is important to its heritage value.
- The placement of a new major road along the side of Thompson Square will sever the relationship between the buildings along Old Bridge Street and the square, and also between the buildings along Old Bridge Street and the buildings on the opposite side of the square.

Response

The selected bridge design and southern approach road alignment minimise the potential visual and construction impacts of the project on the Thompson Square parkland. Measures would also be implemented as part of the project to further minimise impacts on Thompson Square, as discussed in **Section 2.6.1** above.

The proposed location for the new bridge maintains the existing, historic linkage between the northern and southern sides of the Hawkesbury River at Windsor and the continuity of Thompson Square as a civic park and link to the river. The adverse impacts of the project on the heritage of Thompson Square would also be balanced to some degree by the removal of the existing 1934 road cutting and consolidating the remaining upper and lower sections of the Thompson Square parkland, which would increase the amount of continuous open space within Thompson Square. Access to the river foreshore from Thompson Square would also be improved, as would pedestrian and cycling access along the southern foreshore and across the river to Macquarie Park. The consolidation of the Thompson Square parkland, combined with improved pedestrian and cycle access, is expected to improve the amenity of the area for the community and visitors.

The State Heritage Register listing for the Square and what the listing incorporates is described in Section 7.1.2 of the EIS and the Historic Heritage Working Paper. The EIS and Working Paper also describe the importance of the relationships between the open space and the surrounding buildings and the impacts that the project would have on those relationships and the setting of the square in general. 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 heritage impacts on Thompson Square, including impacts on its form and historic setting, the associated historic views and vistas, and historic archaeological records.

The EIS proposes an urban design and landscape concept for the square, which includes minor earthworks to improve the physical and visual connection from the park to the river. As discussed in the EIS, however, the final form of this area is subject further consultation and public comment, which could result in changes.

During development of the EIS, urban designers and architects identified a number of possible urban design and landscape opportunities for further consideration. These are discussed in Section 8.2 of Volume 3 of the EIS. Potential opportunities included the possibility of creating an amphitheatre with terracing and formalised seating. These opportunities are not currently proposed by RMS.

The EIS and Heritage Working Paper describe the process leading up to the State heritage listing of Thompson Square and articulate the heritage significance and values of the area and surrounding heritage items. The archaeological resource within Thompson Square was assessed to be of both State and local significance, with a potential for some aspects to be of National significance. It is noted, however, that Thompson Square is not currently listed on any national heritage registers. An emergency nomination for listing under the *Environment Protection and Biodiversity Conservation Act 1999* was not pursued by the Federal Minister. A standard nomination was received from a member of the public. It was not included in the Australian Heritage Committee's priority list for 2012-3, but is eligible for consideration in 2013-4. If not the nomination is not included in the 2013-14 priority list, the nomination will lapse.

2.6.3 Impacts on archaeological evidence

Submission number(s)

29, 33, 70, 80, 87, 91, 93, 95 and the Heritage Council of NSW.

Issue description

Several submissions raised the issue of archaeological impacts, including impacts on historic and Aboriginal archaeological evidence. In summary, the respondents raised the following issues:

- The project will have adverse impacts on State significant archaeological relics from the early settlement period.
- Significant archaeological evidence will be lost and/ or inadvertently destroyed as a result of the earthworks unless salvaged.
- Given the complexity of Thompson Square, there is a need to consider options for how extensive the archaeological investigation should be to maximise information recovery.
- RMS needs to state its commitments in undertaking the archaeological work to a best practice standard.

Response

The EIS acknowledges that the project would have adverse impacts on archaeological remains and archaeological evidence, both historic and Aboriginal, and identifies measures to avoid, manage and mitigate these impacts. If the project is approved, it would be undertaken in accordance with these measures, as well as any additional measures identified in the conditions of approval.

The measures identified for impacts on archaeology include salvaging archaeological information for both Aboriginal and historic heritage. These works would include extensive archaeological excavation and recording and protection of salvaged and *in situ* archaeological material.

For Aboriginal heritage, the salvage works would include two areas of open excavation: i) an area of about 100 square metres at the corner of George and Bridge Streets, extending along the length of the proposed approach road formation to The Terrace; and ii) an area of about 25-50 square metres between Bridge Street, Old Bridge Street and the wharf carpark. These areas have been identified as locations where there is a high probability of finding Aboriginal archaeological

material and as being of sufficient size to obtain the necessary archaeological coverage of the impacted area.

For terrestrial historic heritage, salvage works would cover all areas that would be disturbed by construction of the project. For maritime historical heritage, the salvage works would target the area of the old Windsor wharf, including the river banks and the water immediately around the old wharf, including underwater remains.

Since exhibition of the EIS, the project archaeologists have prepared an options paper that identifies potential archaeological excavation options. Three options were identified in the report, which is included in **Appendix F. Section 3.2** of this report provides an overview of the options identified and outlines RMS proposed strategy for archaeological excavations. The salvage excavation works would take place prior to the start of construction. The timing and cost of salvage excavation works has been accounted for in project planning and cost estimations.

2.6.4 Impacts on maritime heritage

Submission number(s)

29 and 87.

Issue description

Two submissions raised the issue that the project will have adverse impacts on maritime archaeology, including State significant archaeological remains associated with the former circa 1814 wharf.

Response

The EIS acknowledges that the project would have adverse impacts on maritime archaeology and identifies measures to avoid, manage and mitigate these impacts. If the project is approved, it would be undertaken in accordance with these measures, as well as any additional measures identified in the conditions of approval.

The measures identified for impacts on maritime archaeology include salvage excavation and recording and protection of salvaged archaeological material. The salvage works would target the area of the old Windsor wharf, including the river banks and the water immediately around the old wharf. Any archaeological material recovered from the salvage excavation works would be recorded and managed in accordance with heritage legislation and guidelines, and in accordance with the preliminary research methodology approved by the Department of Planning and Infrastructure and the Heritage Council of NSW.

It is likely that the actual impacts on the maritime archaeology would be considerably less than those predicted in the EIS. As discussed in Section 2.7.1, the requirements for scour protection on the southern bank may be considerably reduced or eliminated totally depending upon the results of further geotechnical investigation of the existing gabion scour protection. Also as discussed in Section 5.2, the southernmost bridge pier which directly impacts the maritime heritage site has been relocated further north by about four metres. While this does not eliminate impacts, it may reduce the area impacted, including the potential area requiring salvage.

2.6.5 Impacts on heritage buildings and properties

Submission number(s)

11, 16, 29, 39, 64, 91, 92, 93, 95 and the Heritage Council of NSW.

Issue description

A number of community submissions objecting to the project raised the issue of impacts on heritage buildings and properties. One additional submission, while expressing support for the project, commented on the need for impact mitigation measures to protect heritage buildings and properties. In summary, the respondents raised the following issues:

- The project will impact nearby heritage properties and all reasonable actions should be undertaken to mitigate the impacts.
- The dominance of the proposed replacement bridge will adversely affect the historical significance of the Georgian buildings surrounding Thompson Square.
- The project has the potential to cause vibration impacts on heritage structures by directing increasing volumes of through traffic and heavy vehicles through Windsor.
- Noise and vibration associated with the construction of the project will have adverse impacts on heritage buildings.

The Heritage Council of NSW raised the following additional issue:

- The EIS does not provide adequate information on the architectural treatments for noise mitigation to be applied to State listed heritage items.

Response

No heritage buildings would be demolished or otherwise directly impacted as a result of the project.

The results of the noise and vibration assessment undertaken as part of the EIS indicate that vibration generated by construction and operation of the project would not adversely affect the structure of heritage buildings or the comfort of building occupants. Monitoring would be undertaken during construction to verify the results of the vibration assessment and identify the need for any mitigation measures to prevent vibration impacts.

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 impacts on Thompson Square, including impacts on the form of the square and historic views and vistas both to and from the square.

During preparation of the EIS, specialist heritage advice was sought on appropriate noise mitigation treatments for 10 Bridge Street. The heritage advice is included in Appendix 8 of the Historic Heritage Working Paper appended to the EIS. Since that time, further investigations have been undertaken on a number of additional heritage properties that were incorrectly identified as commercial premises in the EIS. These properties are now recognised as residential properties and qualify for noise mitigation treatments. Follow-up advice on the appropriate noise mitigation treatments for these buildings has also been sought. This issue is discussed further in **Section 5.1.4** and **Section 5.3**.

2.6.6 Impacts on the existing Windsor Bridge

Submission number(s)

48, 72, 77, 86, 91, 93, 95 and the Heritage Council of NSW.

Issue description

The existing Windsor Bridge would be demolished as part of the project. A number of submissions specifically raised the issue of impacts on the existing bridge in their objection to the project. In summary, the respondents raised the following issues:

- The existing bridge is an integral part of the village of Windsor and should be preserved.
- Windsor Bridge has significant heritage value. In the event that the bridge is demolished, the mandatory archival recording of the State significant structure should be augmented by the preservation of at least one of the concrete beams for display and provision of appropriate signage.
- The current Windsor Bridge, in addition to its status as an item of State heritage significance, is an item of National historic and historical engineering significance.
- The demolition of the existing bridge is an assault on Australian engineering history and a heritage landscape icon, one that arguably contributes to the economic wellbeing of businesses in Windsor.

Response

The existing Windsor Bridge is listed on the Hawkesbury Local Environmental Plan 2012 as a local heritage item and on RMS' Section 170 Heritage and Conservation Register. While not listed on the State Heritage Register, the bridge has also been assessed as being of State significance.

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 residual impacts, including demolition of Windsor Bridge. To mitigate the heritage impacts of bridge demolition, the 1874 bridge would be dismantled in a manner that allows its construction methods and evolution to be appropriately documented as an archival record. Additional heritage conservation measures, such as preservation of at least one of the concrete beams and/or cast iron piers for display and provision of interpretive signage, will be investigated during detailed design and implemented where possible.

2.6.7 Aboriginal heritage

Submission number(s)

29, 60, 69, 90, 95, Department of Primary Industries (DPI) Crown Lands division and OEH.

Issue description

Five community submissions specifically raised the issue of impacts on Aboriginal heritage in expressing their objection to the project. In summary, the respondents raised the following issues:

- The area is culturally sensitive in terms of its Aboriginal history.

- The project will have adverse impacts on heritage, including an Aboriginal site of high scientific value.
- The impacts on the Aboriginal archaeology of the Thompson Square area will be irreversible.

Two agency submissions also raised issues in relation to Aboriginal heritage as follows:

- OEH noted that, while, the test excavations undertaken for the EIS were adequate to establish the nature of the archaeological values of the area, the following mitigation measures be considered:
 - Identification and protection of another location (or locations) along the river that support similar significant Aboriginal archaeological and cultural material.
 - Comprehensive salvage of the site to enable 'conservation by record' as proposed in the EIS.
- The DPI Crown Lands division noted that early consultation should be undertaken with the local (Parramatta) Crown Lands office about the existence of Aboriginal Land Claims over the crown land proposed to be acquired.

Response

The Aboriginal heritage assessment undertaken for the EIS involved Aboriginal community consultation and a geoarchaeological and Aboriginal archaeological investigation. The assessment found that the project would impact six known Aboriginal archaeological sites. The assessment also determined, however, that the total impact on Aboriginal archaeology would be minor given that:

- Five of the sites that would be impacted are of low heritage significance.
- The remaining site has high scientific value but is not suitable for conservation due to the existing high level of disturbance within the project footprint.
- A portion of this site would be investigated and subject to salvage excavation works for the recovery of archaeological material prior to construction.

In terms of the integrity of the Aboriginal archaeological resources of the area, the project has been assessed as having a minor impact. Based on discussions with Aboriginal stakeholders, it is clear that the Windsor area has some Aboriginal cultural value because it demonstrates a connection to the (possible distant) past for contemporary Aboriginal people. There are, however, no particular places or items potentially impacted by the project that have high or special cultural significance.

Measures to mitigate impacts on Aboriginal heritage would be implemented as part of the project. These measures include salvage excavation works and recording and protection of salvaged archaeological material at identified archaeological sites prior to construction of the project. Removal of archaeological material from the excavation area would be carried out by hand and machinery until sufficient material has been recovered and recorded. The archaeological material recovered from the salvage excavation works would be used to provide information on Aboriginal culture and heritage within Windsor and the wider region, and guide the future identification, interpretation and management of more intact archaeological deposits that are likely to exist along the Windsor ridge.

It is noted that the additional impact mitigation measure raised by OEH, namely the identification and protection of another location (or locations) along the river that support similar significant Aboriginal archaeological and cultural material, is not practical to implement. It is also noted that the implementation of impact off-setting measures for Aboriginal heritage is not standard practice for infrastructure projects.

The two Crown land lots to be acquired for the project are currently subject to land claims under NSW legislation by the Deerubbin Aboriginal Land Council. These land claims are currently being considered by the Crowns Land office and RMS will continue to consult with the DPI.

2.6.8 Heritage approvals

Submission number(s)

68, 80, 84, 90, 92, 93, 95 and the Heritage Council of NSW.

Issue description

A number of submissions raised concern regarding approval of the project despite significant heritage impacts. In summary, the respondents raised the following issues:

- The Heritage Working Paper of the EIS states that, from a heritage conservation perspective, the most appropriate treatment of Thompson Square and Windsor Bridge is to avoid any further negative impact and take the opportunity identified by the Heritage Council to remove through traffic. The conclusions of the EIS therefore contradict the conclusions of the component Heritage Working Paper.
- The current proposal would not be supported by any responsible heritage consultant, although this factor does not appear to have been part of the decision making process.
- The project is not supported by the Heritage Council of NSW.
- The project has been classified as State Significant Infrastructure (SSI), which means it is exempt from heritage considerations.
- Thompson Square is listed on the State Heritage Register and has potential National significance.
- The EIS confirms that the project area is unique in its historical heritage significance and that the archaeological resource that underlies Thompson Square is potentially of National significance.
- The EIS should not be used as the basis for the NSW Government to over-rule its own Heritage Council advice.
- The National Trust of Australia (NSW) Hawkesbury Branch opposes the current preferred option on the grounds of heritage impact.
- The project should be rejected on the grounds of heritage impacts.

In addition to the community submissions, the Heritage Council of NSW raised the following issues:

- The Heritage Council is opposed to the project on the grounds of the “irrevocable damage” it will do to Windsor and Thompson Square.

- The Heritage Council recommends that the project should be refused on the grounds of heritage impacts.
- Heritage and archaeological resources of State significance are situated within the project area and would be detrimentally affected if the project proceeds.
- It is a long standing Heritage Council position that items of State significance should be retained and conserved. This does not preclude adaptive reuse but it does preclude substantial demolition. The proposed extensive archaeological salvage program is not conservation as it would result in the complete removal of the archaeology from the area (albeit in a professional manner).

Response

Under the NSW approvals process, an EIS is required for the project as it is likely to significantly affect the environment. Consequently the project is classified as SSI under Part 5.1 of the EP&A Act.

While a number of approvals that generally apply under NSW legislation are not required for SSI, including approvals under the *Heritage Act 1997* (Heritage Act), the agencies that administer these approval processes are all actively consulted on the issues within their jurisdiction and form a critical component of the project assessment process. That is, the classification of the project as SSI, while making it exempt from the need for heritage approvals under the Heritage Act, does not exempt it from heritage considerations. To the contrary, heritage impacts have been considered in the EIS to the same degree as they would have been had the project not been classified as SSI.

Detailed heritage assessments have been undertaken by recognised industry specialists in their fields. The historic heritage and archaeological assessment was robust and transparent, and concluded that the project would result in significant adverse impacts on heritage. Comments received from agency and community stakeholders have also been considered in the selection and refinement of the proposed preferred option.

The potential heritage impacts of the project have been minimised in the selection of the design for the replacement bridge. The EIS also identifies additional measures to avoid, manage and mitigate heritage impacts during future stages of the project, including detailed design and construction. If the project is approved, the project would be undertaken in accordance with these measures, as well as any additional measures identified in the Minister's Conditions of Approval. The Heritage Council of NSW would also be involved in providing advice to the Department of Planning and Infrastructure on the Minister's Conditions of Approval.

The EIS acknowledges that, despite minimising impacts on heritage as part of the design process, and implementing additional management measures during detailed design and construction, the project would still have significant adverse residual impacts, including demolition of Windsor Bridge, impacts on the form of Thompson Square, impacts on historic views and vistas, and impacts on archaeological records. The Department of Planning and Infrastructure will carefully consider the conclusions of the EIS and Heritage Working Paper, the heritage significance and values of the area, and any comments made by the community and government agencies (including the Heritage Council) during assessment of the project. The Minister for Planning and Infrastructure will then consider the Department's assessment in deciding whether or not to approve the project, and any conditions that should apply.

The EIS and Heritage Working Paper describe the process leading up to the State heritage listing of Thompson Square and articulate the heritage significance and values of the area and the surrounding heritage items. The archaeological resource within Thompson Square was assessed to be of both State and local significance, with a potential for some aspects to be of National significance.

It is noted, however, that Thompson Square is not currently listed on any national heritage registers. An emergency nomination for listing under the *Environment Protection and Biodiversity Conservation Act 1999* was not pursued by the Federal Minister. A standard nomination was received from a member of the public. It was not included in the Australian Heritage Committee's priority list for 2012-3 but is eligible for consideration in 2013-4. If the nomination is not included in the 2013-14 priority list, the nomination will lapse.

2.6.9 Director General's requirements for heritage assessment

Submission number(s)

84 and Hawkesbury City Council.

Issue description

One community submission contended that the EIS fails to meet the Director General's requirements for heritage, in particular it fails to "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)". In relation to this issue, the respondent raised the following points:

- The NSW Heritage Manual states that the Heritage Council will not consider applications for extensive alterations to an item of major heritage Significance unless it has already approved a Conservation Management Plan.
- Alterations or new works that have a major negative impact on the heritage significance of such items are usually not approved.
- A Conservation Management Plan has not been prepared for either Thompson Square or the existing Windsor Bridge.
- The EIS fails to outline any impact mitigation measures to provide for the ongoing usability of Thompson Square as a civic space.
- The EIS fails to address the landscape design issues associated with the significant changes in the slope.

Hawkesbury City Council noted that:

- A Statement of Heritage Impact (SoHI) should be prepared for the project in accordance with heritage assessment guidelines.
- The final SoHI should consider archaeological findings during construction.
- The final interpretative elements and structures should reflect those findings.

Response

Having reviewed the EIS as submitted, and considered RMS' responses to various matters on which the Department of Planning and Infrastructure required further information, the Department placed the EIS on public exhibition on 14 November 2012. The Department also requested further archaeological investigations to be undertaken. A summary of these investigations appears in **Section 3.1** of this report. It is anticipated that the conditions of approval for the project, if approved, can include requirements for the preparation of conservation management plans or detailed specifications of work and statements of heritage impact to assist in identifying the significance of individual heritage items and the appropriateness of particular conservation strategies and methods. Further, the requirements for conservation management plans will include the need for the plans to be prepared and approved by the Department of Planning and Infrastructure before the start of construction.

The final impact mitigation measures for Thompson Square, including the urban design and landscape treatments to be applied, will be further developed and refined during the detailed design phase of the project, if approved, in accordance with any relevant conditions of approval issued by the Department of Planning and Infrastructure. Additional information relating to the final form of Thompson Square is provided in **Section 2.7.4**.

A Statement of Heritage Impact has been prepared for the project and is attached to the EIS as Working Paper 1. A final SoHI would be prepared once the archaeological investigations are completed and the final design of Thompson Square and parkland and associated elements of the project are agreed in consultation with Council, other relevant agency stakeholders and the community. This will include considering retention of any archaeological remains or additional interpretation prompted through archaeological investigations.

2.7 Issue – Urban design and landscape

2.7.1 Visual impacts

Submission number(s)

24, 48, 70, 72, 92, 93 and 95.

Issue description

Several respondents raised the issue of visual impacts. In summary, the respondents raised the following issues:

- The aesthetic impacts of the project will be substantial, with a 'brutalist' concrete structure being rammed into the gentle fabric of a heritage precinct.
- Putting a modern road through Thompson Square will have an adverse impact on the visual amenity of the area.
- The project will have adverse visual impacts on the area, as the approach road and bridge will be level with or higher than Thompson Square and the sight line between buildings will be adversely impacted.
- The Thompson Square parkland is an established, popular area for picnickers and other recreational users. Instead of enjoying the present vistas, which include mature trees and heritage buildings, visitors will now see the parkland either sitting directly adjacent to a high, wide road carrying large volumes of traffic and heavy vehicles or sitting directly under the shadow of large abutments and retaining walls.
- The new abutment and retaining walls in Thompson Square will become a haven for graffiti.
- The scour protection proposed would be visually intrusive and inappropriate.
- The installation of traffic lights in a historic square (Thompson Square) is not appropriate.
- Visual impacts on 17 Bridge Street are described as “none”. This is incorrect as the cottage has a clear sight of the roundabout and parts of the square where the road and traffic lights are to be installed.
- Visual impacts on 62-64 George Street and 66-68 George Street have been underestimated.

Response

The assessment of bridge design options and selection of the preferred bridge design followed the identification of the preferred option for the river crossing, being a replacement bridge 35 metres downstream of the existing Windsor Bridge (option 1). The assessment of bridge design options took into account road design and safety requirements, visual impacts, direct impacts associated with construction, and engineering and cost constraints.

A range of bridge types were considered. An incrementally launched bridge was selected as the preferred bridge option because of its:

- Lower visual impact and ability to be architecturally enhanced.
- Relatively small number of piers in comparison to some of the other options.

- Ability to be constructed and launched from the northern bank, which would minimise construction impacts on Thompson Square.

The selected bridge design option minimises the potential visual and construction impacts of the preferred option on the Thompson Square parkland, while still satisfying the project objectives for safety, traffic flow, flood immunity and community needs. A Community Focus Group was established to assist in identifying and aiding the project team to mitigate impacts of the preferred option.

The EIS acknowledges that the project would have adverse visual and landscape character impacts as the replacement bridge and road infrastructure would have a greater footprint and scale than the existing infrastructure. The project would also have a substantial impact on some views, particularly viewpoints within open space areas close to the Hawkesbury River and viewpoints within and looking towards Thompson Square. The bridge and southern approach road would be higher than the lower parkland area of the consolidated Thompson Square, however would not be higher than any of the buildings around Thompson Square.

The project would, however, also result in long term benefits to the community as a result of:

- Consolidation of the upper and lower parkland areas of Thompson Square, which would provide a larger area of usable open space for the community and visitors and reinforce the existing connection with George Street.
- Improvements in pedestrian and cycle pathways, which would link previously isolated foreshore and parkland areas and provide improved access from Windsor to Macquarie Park.

The potential problem of graffiti has been considered in the design of the new bridge and road infrastructure. It is proposed that the abutment walls, for example, would be textured with relief features (such as ridges) to disrupt the planar surface (so that they better blend into the environment) and make them less susceptible to graffiti.

The project includes an urban design and landscape strategy that is designed to minimise visual impacts on the town's heritage character. The final scope and form of urban design and landscape treatments will be further investigated and confirmed during the detailed design phase of the project (if approved) in accordance with all relevant conditions of approval. The investigation and confirmation of the urban design and landscape treatments would be undertaken via a formal consultation process involving both community and agency consultation and input.

The design of the scour protection has yet to be finalised – and as with other elements of the project one of the key objectives during the design phase would be to minimise its visual impact. This would be achieved through the minimising the extent of scour protection, the selection of appropriate scour material and possibly planting of vegetation within the scour protection. The extent of the scour protection presented in the EIS was based on conservative assumptions and it is likely that during the detailed design process its extent would be able to be reduced. Scour protection around the bridge piers would not be required and it is likely that scour protection on the southern bank would be able to be reduced substantially or eliminated totally.

However, detailed geotechnical investigations on the gabion walls on the southern bank would be required before the additional scour protection requirements on the southern bank can be determined. Undertaking these investigations are difficult because they would need to be largely completed from a boat and would need to minimise any impacts on maritime heritage areas. The extent of scour protection of the northern bank would be similar to that presented in the EIS as this bank has limited existing scour protection and is composed of highly erodible soils.

The use of traffic lights to control the George Street and Bridge Street intersection would be unavoidable as other forms of intersection control would either not achieve traffic performance objectives (eg give way signs) or impact additional land in Thompson Square (eg a larger roundabout).

2.7.2 Tree removal

Submission number(s)

70, 95 and Hawkesbury City Council.

Issue description

Two community respondents specifically raised the issue of tree removal in Thompson Square. In summary, the respondents raised the following issues:

- The project will result in removal of the majority of the existing trees in the lower parkland area of Thompson Square.
- Even if new trees are planted, they will never reach the size of the current ones in the lifetime of existing residents and community members.

Hawkesbury City Council noted the following additional issues:

- The existing trees within and around Thompson Square have not been used to inform the proposed planting schedule or style of landscape approach, despite being culturally significant.
- Trees should be retained or relocated where possible. If the trees must be removed, the materials should be re-used for timber elements in the final design.
- To inform the species characteristics and overall layout of the final form of Thompson Square, further investigation is required to assess the significance and identify the history and progression of species culminating in the current collection of trees within Thompson Square.
- The landscape consultant should work with Council's landscape specialist and NSW Heritage Office's landscape specialist to determine the final planting design and species composition.

Response

Most of the trees to be removed from Thompson Square are located in the lower part of the parkland, while the majority of the mature trees in the upper part of the parkland would be retained and protected. Based on consultation with Council, RMS understands some of the trees to be removed from the lower parkland would need to be removed in the near future anyway, irrespective of the project, as they are nearing the end of their life and are at risk of falling because of shallow root systems (which have been established by self-seeding in the roadside batters).

Tree relocation would be considered for some younger trees in consultation with an arborist and would be implemented where it is feasible and there is a good chance of success.

New tree plantings would be provided in the lower part of the parkland after the cutting of Bridge Street has been filled in and re-graded. These new plantings would complement the new parkland design by improving visual character and allowing views to the river. Where feasible, semi-mature plantings would be provided in preference to seedlings.

While these new plantings may not reach the size of existing mature trees for 10 to 20 years, the landscape plan will include species similar to those existing in the parkland and would enhance the character while maximising views to the river.

The landscape plan will consider the contribution of trees throughout their growth life, their potential impact on remaining *in situ* archaeological evidence and contribution to reflecting the heritage of Thompson Square. RMS will continue to consult with Council, other stakeholders and the community on the design of Thompson Square, including the final planting design and species composition.

2.7.3 Landscape treatments

Submission number(s)

23, 39 and Hawkesbury City Council.

Issue description

Two community submissions, while expressing support for the project, noted the need for the integration of the works and landscape treatments to minimise impacts of the existing character of Windsor. In summary, the respondents raised the following issues

- The final design of the project should incorporate the following items:
 - Old fashioned looking lighting across bridge and in Thompson Square.
 - Stone gables or sandstone flagging for the bridge walls in the vicinity of Thompson Square.
 - Old fashioned looking fencing along the length of the bridge and around Thompson Square and old fashioned looking hand rails for steps.
 - Picnic tables, seating and recreation areas within Thompson Square.
- The project should include sympathetic finishes to Thompson Square (such as with the use of local sandstone) and existing sandstone gutters in Thompson Square, Bridge Street and George Street should be retained and/or enhanced.
- The bridge approach at the corner of George Street and Bridge Street should be integrated and improved with a town sign and eating area.

Hawkesbury City Council also noted the need for further details on landscape design and treatments as follows:

- The EIS should be providing sustainability principles for re-use of existing materials. For example timber removed from the site should be re-used in the site either in an interpretative way or in street furniture.
- There is insufficient information on urban design and final landscape materials for a number of areas affected by the project.

- The overall design strategy does not appear to encompass Indigenous design, interpretative elements and materials. These should be integral to the design concepts.
- The overall interpretation strategy (including flooding interpretation elements) needs to be developed in a way that reflects Council's adopted 'Interpretative Signage and Public Art Policy'.
- The retaining walls and abutment walls should be compatible with the colour and material of the existing elements of Thompson Square. The generic treatment of bridge elements on the southern bank is not considered appropriate. From the point at which the bridge lands on the southern bank, the materials of the bridge should be compatible with the elements of Thompson Square.
- Lighting, street furniture and other fixtures in Thompson Square and on the bridge elements on the southern bank need to be developed with a suitable architectural style in consultation with Council.
- The pedestrian pavement materials for the project should reflect the materials palette for Thompson Square. This should be identified in consultation with Council and the review of the draft Windsor Master Plan.
- The texture of the road pavement should be differentiated to indicate an arrival point into Windsor and the pedestrian environment.
- All services required for Thompson Square (such as power and water) should be considered and integrated into the design.
- The final road patterns should be agreed upon with Council and the Heritage Council of NSW. The road pattern in front of the Macquarie Arms Hotel should maintain its alignments for historical reasons.
- Council has an adopted Plan of Management for land around Windsor Bridge. The project should respond positively to the Plan of Management.

Response

The project incorporates an urban design and landscape strategy that is designed to integrate the project with the existing landscape and minimise adverse visual impacts on the town's heritage character. This recognises the contribution of the existing palette of materials and finishes, as well as the mix of original, recreated and new additions to the landscape.

Proposed new elements of the project such as lighting and other road and parkland furniture would be refined to integrate with the design and character of the bridge, approach roads and public domain. These integrated design elements would minimise potential visual impacts, as well as impacts on heritage views.

It is also noted that the urban design and landscape treatments presented in the EIS represent a concept stage design. The final scope and form of urban design and landscape treatments will be further investigated and confirmed during the detailed design phase of the project, if approved, in accordance with all relevant conditions of approval. Suggestions made in submissions will be considered as part of that process and further opportunities for community involvement will be identified, should the project proceed. The Council's Plan of Management would be considered in developing the final urban design and landscape plan for the project.

The George Street and Bridge Street intersection will be upgraded to improve traffic flow and pedestrian safety. The key change to this intersection will be the

replacement of the existing roundabout with traffic lights. Urban design and landscape treatments will also be applied to integrate the new intersection with the existing environment.

No changes to Thompson Square Road outside the Macquarie Arms are proposed.

RMS will continue to consult with Council, other stakeholders and the community on the final design of Thompson Square, including the final planting design, materials and finishes, and street and park furniture.

2.7.4 Final form of Thompson Square

Submission number(s)

23, 24, 84, 85, 91, 93, 95 and Hawkesbury City Council and the Heritage Council of NSW.

Issue description

A number of community submissions raised issues relating to the final form of Thompson Square. In summary, the respondents raised the following issues:

- The EIS does not contain sufficient information on the final appearance and layout of Thompson Square.
- The EIS fails to outline any impact mitigation measures to provide for the ongoing usability of Thompson Square as a civic space.
- The EIS fails to address the landscape design issues associated with the significant changes in the slope.
- Additional consultation is required to determine the final appearance and layout of Thompson Square.
- Urban design principles for Thompson Square should be based upon heritage principles rather than recreational principles.
- The look and feel of Thompson Square will be greatly damaged. It will not look like a square anymore – it will be stripped of most of its heritage characteristics and look like a pleasant urban park, just like thousands of urban parks in Sydney.

The Heritage Council of NSW noted that there is no final plan yet for the future consolidation and reinvigoration of Thompson Square and that the outcome for the square is therefore uncertain.

In expressing support for the project, Hawkesbury City Council noted the following:

- The EIS and design concept should explore a range of options to ameliorate negative impacts on Thompson Square.
- The redesigned Thompson Square should be capable of meeting the needs for an event space.
- A nomination request for State Heritage Listing of the conceptual five Macquarie town plans is currently being considered by the Heritage Branch.

Response

A number of submissions noted the current lack of detailed information on the final urban design and landscape features of the project, especially in relation to the Thompson Square parkland. While the EIS contained preliminary concept designs of Thompson Square parkland and conservation area, it was recognised in the EIS that further consultation and preparation of more detailed designs would be required.

The final urban design and landscaping of the Thompson Square parkland and associated areas would need to cater for the current and potential future uses of the area. Current uses include:

- Passive recreation – such as picnicking, sitting and resting.
- Accessing the river bank and the Windsor Wharf.
- Hosting community and tourist events – such as concerts associated with the Annual Blues and Roots Festival.
- Heritage appreciation – There are a number of heritage walks and tours which include Thompson Square and surrounding buildings. The Hawkesbury Regional Museum is also adjacent to Thompson Square.
- Retail, food and services premises – There are a number of premises retailing food, alcohol, services and other products.
- Residential premises – There are a number of residential premises surrounding Thompson Square parkland.

The submissions suggest that there may be different objectives for the design principles that would guide the final design of Thompson Square parkland. The Heritage Council, for example, have indicated that their preference is for the Thompson Square parkland to be a relatively informal space that reflects the history of previous landforms and uses of the area. Hawkesbury City Council, by contrast, has a preference for a more formal space that can cater for community events such as concerts and the annual sand sculpting festival.

While it may be possible to find common ground between the various preferences for the final form of Thompson Square parkland, the selection of the final design needs to be undertaken via a formal consultation and design process following approval of the project (if approved). This consultation process would also include consideration of potential events in the parkland. As noted above, RMS has made a commitment in the EIS to undertake this consultation.

2.7.5 Anti-social activities

Submission number(s)

95.

Issue description

One submission suggested that the design and location of the new bridge would provide an ideal location for anti-social activities.

Response

During the detailed design of the bridge and other adjacent areas, the likelihood and type of anti-social activities would be considered and appropriate mitigation measures included. These would include anti-graffiti coatings on large concrete surfaces and provision of appropriate lighting.

The introduction of this lighting, in addition to general lighting on the new bridge and shared use pathway, would in itself introduce new impacts due to light spill. These new light sources would be designed to strike a balance between illumination for safety and the context of the parkland and its adjoining areas – including minimising potential impacts on adjoining residents and within the parkland. While ensuring that the relevant design standard for roadway lighting (AS:1158) is met as a minimum RMS is also proposing specialist light diffusers such as “aeroscreen” which reduce glare.

2.8 Issue – Traffic and access

2.8.1 Through traffic and heavy vehicles

Submission number(s)

11, 41, 42, 49, 52, 56, 61, 63, 66, 72, 74, 82, 87, 92, 93 and 95.

Issue description

Many submissions raised concerns about increased volumes of heavy vehicles and through traffic passing through Windsor as a result of the project. In summary, respondents raised the following issues:

- The project will direct large volumes of traffic through Windsor and Thompson Square.
- Traffic data show that 70 per cent of vehicles using the bridge comprise 'through' traffic.
- The project will result in an increase in through traffic and heavy vehicles passing through Windsor and Thompson Square.
- The preferred option will promote and 'cement' the existing undesirable situation of having through traffic and heavy vehicles passing through the historic precinct of a small, quiet township that is valued for tourism and recreation.
- There is a need to consider what the traffic volumes through Thompson Square will be like in 20 or 50 years' time.
- The fundamental objective of the proposal appears to be to facilitate the movement of large volumes of traffic through Windsor. Given that plans to increase housing development around Windsor will result in increased traffic volumes, it is totally inappropriate for such traffic to be directed through the centre of such an important heritage area.

Response

The primary aim of the project is to maintain a safe and reliable crossing of the Hawkesbury River at Windsor. Traffic volumes using the crossing of the Hawkesbury at Windsor will increase over time as a result of population growth and regional development to the north. This increase in traffic volumes will occur regardless of the project.

Heavy vehicles contribute about eight per cent of all vehicle movements through Windsor, which is a relatively low proportion compared to other arterial roads. The project would not increase the volume of through traffic or heavy vehicles using the crossing to travel to and from the Hunter region as the length of road comprising the project is less than 0.5 per cent of the total distance between Singleton and Windsor. While the project may reduce travel times through Windsor during peak periods, this time saving would be insignificant in terms of the total time taken to travel between Singleton and Windsor. The project would therefore be very unlikely to generate additional heavy vehicle or through traffic movements. A substantial proportion of heavy vehicle traffic is likely to be generated locally.

The traffic modelling for the project assumed a 25 per cent increase in traffic movements (or an increase of 5000 movements per day) over the 10 year project planning period. The adopted 10 year timeframe for estimating traffic growth is standard practice for traffic impact assessment studies. There are too many variables to accurately estimate traffic growth over greater time periods. A bypass of Windsor may be considered in the future if growth in traffic warrants an alternative route.

2.8.2 Growth in traffic volumes

Submission number(s)

16, 62, 66, 70, 72, 92, 93, 95 and the Heritage Council of NSW.

Issue description

A number of submissions raised the issue of traffic growth and the impact of this growth on the project. In summary, the respondents raised the following issues:

- Project does not take account of the future Jacaranda Ponds development. This development would result in an increase of at least 1160 vehicle movements per day over the bridge (based on a single return trip from each dwelling per day). The traffic modelling does not seem to have included the impact of this traffic increase on the Macquarie Street/ Bridge Street intersection.
- Project does not take account of future development at Grose Vale Road, North Richmond.
- The project takes very little account of future traffic increases and needs.
- The proposed replacement bridge is inadequate even for existing traffic, let alone future traffic that will be generated by new development.
- The project is a short-term fix that does not address longer term traffic problems.
- The proposed replacement bridge does not have sufficient capacity to cope with future traffic increases. Ninety per cent of the traffic on the Bridge Street approach to the existing bridge is through traffic.

The Heritage Council of NSW noted the following:

- With the updated and wider bridge and its associated major heritage impacts, traffic congestion in Windsor is likely to remain. Once built, the new bridge is only likely to alleviate traffic flow problems for 10-15 years. A separate new Hawkesbury River crossing will still be needed in the future. Refusal of the current proposal and retention of the existing bridge would allow for a more comprehensive investigation of other options.

Response

As discussed in Section 3.1 of the EIS, the Jacaranda Ponds development involves construction of up to 580 additional dwellings at Glossodia. It would be at least 10 years, however, before this development is completed as:

- It has yet to receive full planning approval.
- Services for the new dwellings - such as roads, wastewater, stormwater, drinking water and power - would need to be designed, approved and constructed before the dwellings are occupied.
- Land releases would be staged based upon demand.

As discussed in **Section 2.8.1** above, the traffic modelling for the project assumed a 25 per cent increase in traffic movements (or an increase of 5000 movements per day) over the 10 year project planning period. This would easily cover the Jacaranda Ponds development and other traffic generating development. This traffic growth estimate has been used in the latest network modelling, including an additional assessment of the intersection. New information on the performance of the Macquarie Street/ Bridge Street intersection is presented in **Section 2.8.5**.

It is noted that the primary aim of the project is to maintain a safe and reliable crossing of the Hawkesbury River at Windsor. An additional specific project objective is to improve traffic and transport efficiency. In comparison to other options available, the project offers the most cost effective solution for maintaining a safe and reliable crossing, as well as providing some improvement to traffic and transport efficiency.

The project would provide a new bridge, approach roads and intersections to current road design standards. The project design would improve the level of flood immunity to match that of the surrounding approach roads, and provide a safer crossing for vehicles, cyclists and pedestrians. The proposed intersection improvements and an initial two lane bridge configuration would provide acceptable traffic performance immediately and into the future. The proposed new traffic lights at the George/Bridge Street intersection will be synchronised with the existing lights at the Macquarie Street/Bridge Street intersection to give priority to through traffic on Bridge Street during peak periods. This will contrast with the current situation where vehicles from George Street have equal priority at the roundabout. The bridge has also been designed so that it can be subsequently reconfigured to a three lane bridge (with two southbound lanes and one northbound lane) to meet future traffic demands, as required.

It is recognised that the project is not a long term solution to traffic congestion in Windsor. An alternative route around Windsor may be considered in the future depending on growth in traffic numbers and local congestion.

2.8.3 Right turn from Bridge Street north into George Street west

Submission number(s)

70, 24 and 95.

Issue description

Three submissions raised the issue of changes in access from Bridge Street north to George Street west for southbound traffic in the evening peak. In summary, the respondents raised the following concerns:

- The EIS states that the right turn from Bridge Street north into George Street west may be banned in the evening peak at some stage in the future when traffic numbers have increased. Once this occurs, southbound traffic on Bridge Street north would need to use Macquarie Street and Kable Street to access the town centre.
- This will place further stress on the Macquarie Street intersection. It will also prevent drivers from making a right hand turn into George Street. Southbound drivers currently access Windsor town centre without traffic lights. With the proposed project in place, they would have to go through three sets of lights. This may have impacts on George Street hospitality businesses.

Response

A right turn movement for southbound traffic on Bridge Street north to George Street west would initially be permitted, with a shared turning lane provided. This would allow southbound traffic to directly access the Windsor town centre via George Street. Banning of this right turn movement during the evening peak may, however, be considered if the Level of Service of the intersection becomes poor as a result of traffic growth. The number of southbound vehicles undertaking this movement during the evening peak is currently relatively low. Before the right hand turn movement is banned in the evening peak in the future, additional traffic monitoring and community consultation would be undertaken to confirm the level of impact and the need for impact mitigation.

2.8.4 Right turn from Bridge Street into Court Street

Submission number(s)

70 and 95.

Issue description

Two submissions raised concerns about the provision of a dedicated right turn bay for northbound traffic on Bridge Street turning right into Court Street. The respondents contend that the inclusion of this right hand turn lane would cause the loss of a lane on Bridge Street, safety risks and result in traffic delays, especially in the evening peak. One respondent also raised the issue that diagrams of the proposed intersection arrangement are not included in the EIS.

One respondent also raised the issue that this would further encourage the current “rat run” through east Windsor.

Response

The final design and layout of the Court Street/ Bridge Street intersection has yet to be determined. As such, layouts of the intersection were not presented in the EIS. Further assessment is required to determine whether a dedicated right turn bay would be required as the number of vehicles undertaking this movement is very low, even in the evening peak. The low number of vehicles making this turning movement may not justify a dedicated right turn bay and would be unlikely to cause substantial delays to northbound traffic on Bridge Street.

The use of Court Street and other streets in east Windsor by vehicles wanting to avoid congestion along Bridge Street would be reduced rather than increased with the project. While vehicles would still be able to turn right from George Street east to cross the bridge, they would no longer have priority over northbound traffic along Bridge Street as the roundabout would be replaced by traffic lights. The traffic lights would give priority to northbound traffic along Bridge Street and therefore any benefits from using streets in east Windsor streets to turn right from George Street east would be eliminated or greatly reduced.

2.8.5 Performance of the Macquarie Street intersection

Submission number(s)

70, 90, 92, 93 and 94.

Issue description

Three submissions raised the issue of the performance of the Macquarie Street intersection and its contribution to traffic congestion in Windsor. In summary, the respondents raised the following issues:

- The project does very little to address the Bridge Street/ Macquarie Street intersection, which causes most of the traffic problems in Windsor.
- The project relocates a problem from one intersection (George Street/ Bridge Street), to a second, busier and more important intersection (Macquarie Street and Bridge Street). The EIS completely disregards the impact of the Macquarie Street/ Bridge Street intersection on its modelling and does not consider the need for signal co-ordination between the Macquarie Street/ Bridge Street intersection and the George Street/ Bridge Street intersection.
- While the EIS provides Level of Service (LoS) information for existing conditions at the Bridge Street/ Macquarie Street intersection (which indicates that it is currently operating at maximum capacity), it does not provide equivalent LoS information for future (post project construction) conditions. It is questioned if this information has been omitted from the EIS because the LoS at this intersection will decline to unacceptable levels despite construction of the proposed project.
- The EIS notes that the existing Freemans Reach Road/ Wilberforce Road intersection has an unacceptable LoS in the morning peak but fails to state that this is often the result of traffic at the Macquarie Street intersection banking up across the bridge.
- The evening peak queue lengths at the Macquarie Street/ Bridge Street intersection for existing conditions (as presented in the appendix of the Traffic and Transport Working Paper) do not represent the actual lengths of traffic queues experienced.

Response

The LoS for major turning movements at the Bridge Street/ Macquarie Street intersection with the project in 2016 and 2026 is provided later in this report in **Table 4-1**. The EIS modelling supersedes the traffic modelling undertaken for the preliminary options report.

In 2016, the LoS for all turning movements at the Bridge Street/ Macquarie Street intersection in both peak periods would be good to fair with the project in place. There is likely to be an improvement over existing conditions as the traffic lights at the George Street/ Bridge Street intersection and the Macquarie Street/ Bridge Street intersection would be synchronised to provide priority to the peak movements depending upon the time of the day. The LoS in the 2026 morning peak would be also acceptable and the traffic queues that currently extend across the bridge to the intersection of Freemans Reach Road and Wilberforce Road would largely be eliminated. In the evening peak, however, the performance of the intersection would be poor, with an overall LoS of E for 2026, indicating the intersection would be operating at capacity. The project has never claimed to solve all traffic problems in this area, although some improvement (especially in the morning peak) would occur.

The queue lengths presented in Appendix A of the Traffic and Transport Working Paper for existing conditions in the evening peak at the Macquarie Street/ Bridge Street intersection were a by-product of the outputs of the SIDRA modelling. SIDRA modelling considers the performance of a single intersection and does not consider the interactions between different intersections. Consequently, queue lengths from VISSIM network modelling were quoted and used in the main bodies of the EIS and Traffic and Transport working papers as VISSIM modelling is more accurate for this purpose. The SIDRA modelling was used to compare the relative performance of different intersection options.

Also it is noted that there were some minor inconsistencies between Tables 7-17 and 7-18 in the main EIS document and Tables 5-3 and 5-4 in the Traffic and transport working paper. The tables in the working paper were correct. The minor inconsistencies do not change the outcomes of the impact assessment.

2.8.6 Performance of the Freemans Reach Road/ Wilberforce Road intersection

Submission number(s)

13, 53, 85 and 95.

Issue description

Four submissions raised the issue of the performance of the Freemans Reach Road/ Wilberforce Road. In summary, the respondents raised the following issues:

- Clarification is required regarding arrangements for the Freemans Reach Road/ Wilberforce Road intersection. If Freemans Reach comes into the roundabout as dual lanes, the left lane should be left turn only so that traffic on Wilberforce Road can get onto the roundabout.
- Vehicles coming together on the single lane bridge approach from the two lane roundabout at Freemans Reach Road will cause blockages, stopping flow in both directions and possibly causing collisions.
- The operation of the northern roundabout will be problematic if it funnels two lanes into one across the bridge. The result could be an increase in accidents.

Response

Traffic safety and merge issues for southbound vehicles at the northern roundabout and on to the bridge have been recognised and further investigations into the configuration of traffic lanes in this area of the project are currently ongoing. A road safety audit would be undertaken on the detailed design to ensure that the design and operation of the roundabout and merge meets current road safety requirements.

The project would open with an initial two lane bridge configuration which would provide acceptable traffic performance immediately and into the future. The bridge has also been designed so that it can be subsequently reconfigured to a three lane bridge (with two southbound lanes and one northbound lane) to meet future traffic demands, as required. The number of lanes provided on the new bridge at opening (ie either two or three lanes) would be decided closer to the opening date based on traffic numbers and road safety requirements, however traffic modelling undertaken as part of the EIS indicates this will not be required.

2.8.7 Safety at the George Street and Bridge Street intersection

Submission number(s)

70 and 95.

Issue description

Two submissions raised concerns about pedestrian and vehicle safety issues associated with the installation of traffic lights at the George Street/ Bridge Street intersection. In summary, the respondents raised the following issues:

- Rather than improving pedestrian and driver safety as stated in the EIS, the installation of traffic lights will allow the traffic to go over the crest of the hill at higher speed than the roundabout currently does, which will cause new safety problems, particularly given (as stated in the EIS) that the existing sight distances for vehicles at the intersection do not comply with current safety standards.
- There will also be a safety risk to vehicles turning right into Macquarie Street and vehicles turning left into George Street east as a result of vehicles speeding through the intersection.
- The configuration of the intersection would result in additional crash risks.

Response

As part of the project, the gradient of the bridge exit/ approach road between the new bridge and the George Street/ Bridge Street intersection would be reduced from around nine per cent to six per cent and the intersection would be lowered slightly with the removal of the elevated roundabout. This would improve visibility and sight lines to a point where they comply with current standards. The proposed speed limit for the project would be 50 kilometres per hour, which would further improve pedestrian and vehicle safety.

The vehicle crash risks identified apply to all signalised intersections. Given the improved sightlines and lower speed limits, it is anticipated that there would be a reduction in crashes at this location. New pedestrian crossing facilities would also be provided as part of the upgrade, improving crossing opportunities and pedestrian safety.

Similarly, the new traffic lights at the George Street/ Bridge Street intersection are not anticipated to increase safety risks for vehicles turning right into Macquarie Street and vehicles turning left into George Street east given the improved sightlines and lower speed limits.

2.8.8 Traffic performance of the project

Submission number(s)

6, 15, 24, 32, 34, 60, 62, 70, 85, 92, 93, 94 and 95.

Issue description

Several submissions raised the issue of the traffic performance of the project. In summary, the respondents raised the following issues:

- The project will not improve traffic congestion in Windsor.

- The new bridge will still only be two lanes for the foreseeable future.
- The project will not solve current traffic problems on the approaches to and through Windsor.
- The project will not improve traffic flow in the long term.
- Increased traffic delays will be caused by the no right turn from Bridge Street to George Street for southbound traffic and reducing Bridge Street to one lane between Fitzroy Bridge and Macquarie Street for cars travelling north.
- The additional set of traffic lights will cause traffic delays.
- Lights will not be coordinated for cars travelling east along Macquarie Street.

Response

While the project would not solve all existing traffic congestion issues in Windsor, the proposed intersection improvements and an initial two lane bridge configuration would provide acceptable traffic performance immediately and into the future. The proposed new traffic lights at the George Street/ Bridge Street intersection will be synchronised with the existing lights at the Macquarie Street /Bridge Street intersection to give priority to through traffic on Bridge Street during peak periods. This will contrast with the current situation where vehicles from George Street have equal priority at the roundabout.

Additionally, the bridge has been designed so that it can be subsequently reconfigured to a three lane bridge (with two southbound lanes and one northbound lane) to meet future traffic demands, as required. Northbound traffic flow is controlled by the George Street/ Bridge Street intersection, which has only one through northbound lane. Traffic modelling has been undertaken to compare the performance of a three lane bridge with varying contra-flow arrangements (ie two southbound lanes and one northbound lane in the morning peak and one southbound lane and two northbound lanes in the evening peak). The results of this modelling indicated that there was only a marginal improvement in travel times with two northbound lanes in the evening peak, even with the predicted traffic growth to 2026.

This marginal improvement in travel times does not warrant the provision of an additional northbound lane. An extra lane on the bridge would also be undesirable due to additional visual and flooding impacts. The number of lanes provided on the new bridge at opening (ie either two or three lanes) would be decided before opening, based upon traffic numbers and road safety requirements, however traffic modelling undertaken as part of the EIS indicates this will not be required.

2.8.9 Traffic speed and benefit cost ratio

Submission number(s)

27.

Issue description

One submission raised the issue of traffic speed and the benefit cost ratio (BCR) analysis. In summary, the respondent raised the following issue:

- Average traffic speeds with the project appear to be high, unachievable and unduly influencing the BCR analysis.

Response

The average traffic speeds identified in the EIS (and those used for the EIS BCR) included large sections of the network modelled with an 80 kilometre per hour speed limit. These areas were not considered for the original BCR in the options report. Being external to Windsor and strategic, these tend to be the busiest links on the network. Consequently, average model speeds are higher than if the network area focussed on only the town centre and Windsor Bridge areas.

A BCR analysis was also undertaken for option 6 using the same assumptions and network model for the project. The BCR for this option also increased compared to the original BCR for option 6 undertaken in 2011 although it was still lower than the BCR for the project.

2.8.10 Design speed of the project

Submission number(s)

95.

Issue description

One submission raised the issue that the design speed of 50 kilometres per hour may be a breach of traffic guidelines and is not appropriate for an arterial road.

Response

The design speed of a new section of road is primarily determined by road safety requirements. This includes considering the sightlines along the road alignment, the types of intersections, the speed limit of surrounding roads, and pedestrian and cyclist traffic. The 50 kilometre per hour design speed for the project was adopted to enable the height of the replacement bridge to be lowered while still meeting road safety guidelines and to reflect the speed limits of the surrounding streets.

2.8.11 Upgrade of the McGraths Hill section of Windsor Road

Submission number(s)

4.

Issue description

One submission raised the issue of the need to upgrade the McGraths Hill section of Windsor Road. In summary, the respondent raised the following issue:

- The project will not achieve the stated traffic objectives without an upgrade of the McGraths Hill section of Windsor Road.
- The McGraths Hill section of Windsor Road should be upgraded to avoid a bottle neck on the approach to the new bridge.

Response

This would involve widening the section of Windsor Road between Pitt Town Road, McGraths Hill, and Macquarie Street, Windsor including the South Creek Bridge.

While this would improve traffic flow through Windsor it is outside the scope of the project and would be significantly more expensive. It would also lead to a number of other issues such as potentially necessitating a widening of Windsor Bridge and the approach roads through Thompsons Square. It would also further impact heritage properties between George and Macquarie Streets, and also most likely the Jolly Frog Hotel.

The need for future upgrades to the surrounding road network would be considered separately and subject to a separate environmental assessment process. The need for such work would be based development drivers and other changes to transport infrastructure, such as a potential upgrade to Richmond Bridge.

2.8.12 Construction traffic impacts

Submission number(s)

39, 85 and 95.

Issue description

Three submissions raised the issue of construction traffic impacts. In particular, respondents raised the following issues:

- Parking for all construction personnel should be restricted to the parking area near the wharf or on the western side of the river to minimise impact on the businesses around Thompson Square.
- The EIS statement that the impacts of construction work on local traffic would be 'negligible' is optimistic at the extreme and most likely a reckless underestimation.
- The construction work will cause huge disruption to an already congested area for many months if not years.

Response

Parking for construction personnel would be limited to the site compound on the northern bank and the Wharf car park on the southern bank. Construction parking areas would be detailed in the project induction process and any workers found parking outside designated areas would be disciplined.

As all the bridge and the majority of the approach roads are off-line from the existing road network, their construction would not result in substantial road closures or changes in the road network. The only roads that would be closed initially are Old Bridge Street and The Terrace east of the existing bridge. These roads would be closed to general traffic but access would be provided for the occupiers of Number 4 and Number 6 Old Bridge Street and for service vehicles to the wharf. Overall, the impact of these road closures would be minor as the affected roads are not used by general or through traffic.

The traffic impacts during the initial stage of construction would mainly be related to the delivery of materials and earthworks. As discussed in the EIS, the increase in traffic movements from construction vehicles would be relatively small in comparison to average daily vehicle movements. Environmental management measures as detailed in the EIS would be implemented to minimise any impacts.

The greatest potential for traffic impacts would arise during the construction of the tie-ins of the new bridge approach roads to the existing network. These works would require temporary and partial road closures. Due to the high traffic volumes, any closures would be restricted to low traffic periods, which would mainly be during the night and weekends. While this would result in noise impacts, scheduling the works outside peak traffic periods would reduce construction impacts on traffic.

2.8.13 Impacts on access to properties

Submission number(s)

24, 92 and 95.

Issue description

Three submissions raised the issue of adverse impacts on property access. In summary, the respondents raised the following issue:

- The project will have significant adverse impacts on access for two properties.
- A pedestrian strip will be removed to make way for the left hand turn into George Street from Bridge Street. This will make it impossible for cars to turn into and out of the car park for 17 Bridge Street and 62-68 George Street (which is accessed via a driveway between the buildings on Bridge Street).

Response

Under the new bridge approach arrangements, vehicles would no longer be able to turn right into (or out of) two existing properties on the eastern side of Old Bridge Street (Number 4 and Number 6 Old Bridge Street). However, alternative access arrangements have been provided to ensure access is maintained to these properties.

Vehicle access to the properties would be available via the southbound carriageway of the southern approach road through 'left-in'/'left-out' turning movements. Drivers travelling from the south would need to cross the bridge, circle the roundabout and re-cross the bridge from the northern side to gain access to these properties. Drivers exiting these two properties and wanting to travel north would first need to turn left and make a right turn into George Street and make their way to Macquarie Street before turning left into Bridge Street and travelling north.

As explained in the EIS, if the bridge is remarked to three lanes in the future, the right turn from Bridge Street north into George Street west may be banned in the evening peak. This would require drivers from Numbers 4 and 6 to continue down Windsor Road past the Macquarie Street intersection, turn left into Court Street, then turn left at Arndell Street, left again at George Street, then right into Bridge Street and travelling north. This would be a comparable distance compared to the situation where the right turn to George Street west is permitted.

2.8.14 Coach access to Windsor Wharf

Submission number(s)

27, 50, 95 and Hawkesbury City Council.

Issue description

Four submissions raised concerns or requested clarification on coach access to Windsor Wharf via The Terrace. The respondents raised the issue that clearance under the bridge on The Terrace needs to be sufficient to allow access for large coaches.

Two submissions contrarily raised concerns that the increase in bridge clearance over The Terrace would render the assessment presented in the EIS as invalid and would increase the significance of impacts on sightlines between buildings in Thompson Square and would be a broken promise by RMS. This issue is responded to in **Section 2.5.4**.

Response

During the development of the project, the vertical alignment of the new bridge and approach road through Thompson Square was lowered to minimise impacts on heritage views and vistas. The alignment was lowered while maintaining a 3.6 metre clearance over The Terrace to allow small coaches, service vehicles and emergency vehicles to access Windsor Wharf.

In consultation with Hawkesbury City Council and in response to submissions received during the exhibition of the EIS, RMS has now increased the proposed clearance of the new bridge over The Terrace from a minimum of 3.6 metres to a maximum of 4.6 metres to allow large coaches to directly access Windsor Wharf. This is discussed in further detail and assessed in **Section 5.1**.

2.8.15 Loss of maritime navigational area due to scour protection

Submission number(s)

95.

Issue description

One submission raised a concern that the scour protection provided as part of the project would reduce the navigational area of the river.

Response

The banks and river bed where scour protection would be installed would be excavated before placement of the scour material. The final surface of the scour material would have a similar profile to the existing bed and banks, with no reduction in navigational area. The proposed scour protection around the piers is unlikely to be required based upon the latest design of the project. Overall, the project would result in an increase in navigational area as the new bridge would have less piers and a greater clearance over the river compared to the existing bridge.

2.9 Issue – Noise and vibration

2.9.1 Operational noise impacts

Submission number(s)

7, 11, 17, 18, 24, 31, 41, 42, 47, 52, 56, 66, 72, 85, 92, 93, 94, 95 and the Heritage Council of NSW.

Issue description

Several submissions raised the issue of operational noise impacts. The main issues raised were as follows:

- The project would increase traffic noise and congestion in the area, which will have adverse impacts on the ambience and amenity of the town.
- The increase in through traffic and heavy vehicles resulting from the project will lead to an increase in traffic noise impacts.
- Raising of the road level will result in increased noise levels in adjacent areas.
- It is impossible to draw comparisons between the current situation and the proposed situation on the basis of the EIS investigations. A basic topographic analysis reveals that the existing road dives down below the parkland, directing traffic into a sound-attenuating cutting well below the level of the parkland. It is this topographical relationship that currently provides enough attenuation to make the parkland useable.
- Noise generated by the project, will have adverse impacts on:
 - Thompson Square.
 - Restaurants, cafes and other eateries surrounding Thompson Square.
 - Residences above commercial premises.
- With the new roadway at the same level as the parkland, noise impacts on Thompson square parkland will be intolerable, as will noise impacts on outdoor dining areas.
- The full impact of the proposed road on Thompson Square's visitors is yet to be determined, as noise studies have not included the parkland of the square. If the square becomes an undesirable place for visitors, the flow on effect will be a downturn for local business owners in George Street.

Response

Seven residential properties may require architectural treatment to reduce traffic noise from 2026 traffic levels. Impact mitigation options for these properties would be investigated during the detailed design phase of the project and implemented where feasible and reasonable. Other residential properties in the vicinity of the project are predicted to experience a reduction in traffic noise due to improvements in the road surface and changes in the alignment of the southern bridge approach road.

The noise model used for the noise impact assessment has been developed for both the existing “no build” scenario and the “build” scenario to provide a comparison of the noise impacts between the two. This methodology of developing a noise model, which is then used for assessing noise impacts, is standard industry practice and is supported by the relevant approval agencies and authorities.

The model uses three dimensional data sets that take account of the existing terrain within the study area, including the current road cutting.

The results of the noise assessment indicate that there would be no significant changes in traffic noise levels within the Thompson Square parkland as a result of the project. Future (2026) noise levels in the parkland are predicted to exceed noise criterion for recreational use both with and without the proposed bridge replacement project as a result of increases in traffic volumes with population growth and development in the region. With the proposed replacement bridge in place, however, noise levels in the northern area of the parkland near the river would decrease slightly because the new southern approach road to the bridge would run along the eastern side of the parkland, rather than through the parkland.

The project would generally result in little change to noise levels experienced by commercial and entertainment premises around Thompson Square, except for those on the eastern side where the new alignment of the road is closer than the existing alignment. These premises would experience an increase in noise levels.

The proposed bridge replacement would not increase traffic congestion in Windsor. As noted in the EIS, there would be an increase in traffic volumes using the river crossing at Windsor as a result of regional development north of the Hawkesbury River, irrespective of the implementation of the project. The project is unlikely to encourage additional heavy vehicles and through traffic to use the Windsor Bridge as a route to the Hunter region as the length of road comprising the project is less than 0.5 per cent of the total distance between Singleton and Windsor. While the project would reduce travel times through Windsor during peak periods, the overall improvement in travel time between Singleton and Windsor would be negligible.

While growth in traffic volumes would result in an increase in noise levels over time, the project has the following design features that would reduce noise levels in comparison to the existing conditions:

- The grade of the southern approach road for the project would be considerably less than the existing bridge approach road, which would reduce engine noise generated by vehicles climbing to the George Street/ Bridge Street intersection.
- The replacement bridge and approach roads would have a new smooth asphalt surface, which would generate less noise than the different pavement types and the failed joints on the existing bridge and approach roads.

The project would also result in traffic flow improvements at the George Street/ Bridge Street intersection, which may help to alleviate traffic noise.

Additionally, the project is anticipated to result in long term benefits to the amenity of Thompson Square as a result of consolidation of the existing upper and lower parkland areas. The upper and lower parklands are currently dissected by the existing bridge approach road and would be amalgamated as a result of the project. The consolidation of the parkland would provide a larger area of usable open space for the community and visitors, while reinforcing the existing connection of the Square with cafes and restaurants on George Street. This would improve the amenity of the Thompson Square and river foreshore area for community and visitor use.

The current NSW Government and RMS policies and guidelines for road noise assessment and mitigation apply only to residential land uses and other uses defined as being noise sensitive, such as schools and hospitals. The current NSW Government and RMS policies and guidelines for road noise assessment and mitigation do not apply to commercial premises. For this reason, commercial premises were not specifically targeted in the noise assessment. Noise impacts on the Thompson Square parkland area were, however, specifically assessed using the NSW Government's noise criteria for open space areas.

2.9.2 Operational vibration impacts

Submission number(s)

11, 92 and 93.

Issue description

Three submissions raised the issue of operational vibration impacts. The main issues raised were as follows:

- The project has the potential to cause vibration impacts on heritage structures by directing increasing volumes of traffic and heavy vehicles through the town.
- The vibration impacts of the project may result in historic buildings becoming redundant or no longer being suitable for their existing or other compatible uses.
- The potential for vibration impacts has been identified yet no dilapidation reports have been prepared.

Response

Based on assessment of existing vibration levels and prediction of future vibration levels with the new road alignment and the increase in traffic volumes with growth and development, vibration resulting from operation of the proposed replacement bridge and approach roads would not impact any building structures or the comfort of building occupants. Vibration generated by the project would not affect the structure of any heritage buildings.

The project itself would not result in an increase in the volumes of through traffic or heavy vehicles passing through Windsor. Rather, there would be an increase in traffic volumes using the river crossing at Windsor as a result of regional development north of the Hawkesbury River, irrespective of the implementation of the project. The project is unlikely to encourage additional heavy vehicles and through traffic to use the Windsor Bridge as a route to the Hunter region as the length of road comprising the project is less than 0.5 per cent of the total distance between Singleton and Windsor. While the project would reduce travel times through Windsor during peak periods, the overall improvement in travel time between Singleton and Windsor would be negligible.

2.9.3 Construction noise and vibration impacts

Submission numbers

29 and 93.

Issue description

Two submissions raised the issue of construction noise and vibration impacts. In summary, the respondents raised the following issues:

- Noise and vibration associated with the construction of the project will have adverse impacts on heritage buildings.
- The EIS acknowledges that vibration levels from vibratory compaction would exceed the human comfort criterion at adjacent sensitive residential receivers and would be just below the structural damage criterion for heritage structures at all sensitive heritage receivers. Yet the EIS provides neither remedy nor strategy to deal with vibration in excess of human comfort levels and there is no evidence to suggest Dilapidation Reports have been obtained for all sensitive heritage receivers.
- The effect during the construction phase of 'pile driving' appears to be understated. While most of the equipment used is of a relatively continuous nature, the pile driving is a series of short, sharp sounds. Using a $L_{Aeq,15min}$ noise descriptor for the pile driving would underestimate the impact of this noise source.

Response

The EIS and the Noise and Vibration Working Paper provide an assessment of the potential construction noise and vibration impacts, and identify appropriate management and mitigation measures in accordance with the EPA's *Interim Construction Noise Guideline* (DECC, 2009). The *Interim Construction Noise Guideline* (ICNG) is considered the appropriate guideline for assessing construction activities in NSW and identifying the impact mitigation requirements.

The noise criteria in the ICNG are expressed as $L_{Aeq,15min}$, with no criteria for L_{Amax} values. An assessment of L_{Amax} in Section 4.3 of the ICNG is only in reference to sleep disturbance. This relates to construction works undertaken at night where a high maximum noise level is more likely to disturb restful activities and sleeping patterns. The project would not involve undertaking high noise activities such as piling during night time periods.

Up to 30 sensitive receivers are anticipated to experience noise levels in excess of construction noise objectives at some point during the construction period (excluding the site establishment and early works phase of construction). Of these receivers, eight would be exposed to noise levels of 75dB(A) or greater during the later phases of construction (construction of the southern approach road and construction of the southern tie-in) and are therefore considered to be 'highly noise affected' in accordance with the ICNG. The implementation of noise mitigation measures during the construction period would be considered for all receivers where construction noise objectives are exceeded, with additional consideration given to 'highly noise affected' receivers. It should be noted that the construction noise assessment presented in the EIS is conservative and assumes the worst-case scenarios in terms of construction methodology and periods of impact. For example, based on the latest information on construction, pile driving would not be undertaken, rather piles for the bridge piers would be bored which has a considerably lower noise impact.

To assess the impact of construction vibration, activities that are known to cause substantial vibration were identified. For the project, these activities were identified as rock breaking (jack hammering) and vibratory rolling. The location where these activities would take place and the proximity of sensitive receivers and structures was then examined to estimate vibration impacts in the context of relevant criteria.

Rock breaking would be undertaken in close proximity to sensitive receivers, especially along the southern approach road, and the associated vibration levels generated would exceed the human comfort criterion at one sensitive receiver and the structural damage criterion at one heritage structure (the heritage wall at Number 4 Bridge Street) and one underground services corridor along Bridge Street (Receiver C2 – which is not shown on the Figure 7-30 of the EIS). Vibration levels from vibratory compaction would exceed the human comfort criterion at all adjacent sensitive residential receivers and would be just below the structural damage criterion at all potentially impacted heritage structures.

The heritage retaining wall at 4 Bridge Street has been recognised as particularly at risk from construction vibration impacts. If potential vibration impacts are not appropriately management during construction this could lead to damage of the heritage wall, as well as other heritage items. Specific mitigation measures would be detailed in the Construction Noise and Vibration Management Plan to minimise the risk of impacts and could include:

- Development of buffer zones where construction activities that may cause vibration are not permitted.
- Vibration monitoring.
- Pre and post construction dilapidation reports.
- Physical protection of the wall – For example where similar heritage walls have been encountered on other projects, one method used to protect them has involved constructing a temporary plywood enclosure around the wall and filling the void with sand. When construction works are complete, the plywood enclosure and sand are carefully removed.

The exact construction methods and construction locations for infrastructure projects, such as the Windsor bridge replacement project, are not typically defined in detail at the EIS stage. Rather, the construction methods and locations are typically subject to changes during detailed design and need to be confirmed prior to construction. The results of the construction noise and vibration assessment presented in the EIS are therefore considered to be indicative only and need to be confirmed during detailed design. In recognition of this, the EIS recommends that further detailed assessment is undertaken at sensitive receivers prior to the commencement of works. This would typically include confirming the types of construction equipment to be used and quantifying the associated noise and vibration impacts.

A Construction Noise and Vibration Management Plan would be prepared for the project and will contain detailed assessment methods for high-risk works, consultation protocols, and details of impact mitigation and monitoring requirements. Details of the proposed mitigation measures are provided in the EIS. With the proposed mitigation and monitoring measures in place, there would be no adverse impacts on heritage structures.

2.10 Issue – Socio-economic impacts

2.10.1 Severance of the town

Submission number(s)

17.

Issue description

One submission raised the issue of town severance. In particular, the respondent contended that:

- The project will split the town in half and completely alter the experience of visiting the town.

Response

The project will result in changes to access arrangements for some residents and properties but there will be no significant changes in access between the western and eastern sides of the township. If anything, the project will improve connectivity between the eastern and western sides of Windsor by reconnecting The Terrace to provide continuous access along the southern foreshore and by providing a pedestrian crossing at the intersection of George and Bridge Streets. Under the current situation, access along The Terrace is disrupted by the existing southern approach road to the bridge, and pedestrian access across Bridge Street is difficult due to the lack of pedestrian crossings facilities.

The proposed location for the replacement bridge minimises changes to the location of the Hawkesbury River crossing at Windsor and the associated bridge approach roads. The project will remove the existing road cutting that bisects Thompson Square and amalgamate Thompson Square's existing upper and lower reserves into one continuous open space area. It will also result in improvements to access between Thompson Square and the river foreshore and improvements in pedestrian and a cyclist access across the bridge. These benefits are expected to improve public amenity within Thompson Square and along the river foreshore. It will also assist in meeting Hawkesbury City Council's objectives for their Mobility Access Plan and Plan of Management for the Windsor Foreshore Parks Incorporating the Great River Walk.

2.10.2 Impacts on tourism

Submission number(s)

3, 17, 18, 38, 42, 45, 52, 56, 72, 88, 92, 93, 94, 95 and the Heritage Council of NSW.

Issue description

Several submissions raised the issue of adverse impacts on tourism in Windsor. In summary, the respondents raised the following issues:

- Rather than enhancing the economic potential of existing assets, the project will erase yet another part of our historic narrative and further reduce Windsor to a standard, banal outer ring suburb, indistinguishable from any other part of western Sydney.

- The project will adversely affect Windsor's heritage tourism potential and have significant adverse impacts on the tourism industry.
- The construction of a high-level motorway adjacent to Thompson Square will significantly reduce the appeal of the area to visitors and have a severe negative impact on the local economy.
- Heritage tourism is a significant component of the town's economic viability and will be significantly adversely affected by the project.
- The EIS did not properly consider the role of around 21 existing businesses in Thompson Square in contributing to tourism.
- One business, the Hawkesbury Paddle Wheeler, has been singled out by RMS for special attention to the detriment of all other businesses in Thompson Square. It is noted that the patrons of the Paddle Wheeler generally arrive at and depart from Windsor Wharf without having visited the town, and are therefore unlikely to contribute to tourism within the project area or be affected by impacts on the heritage precinct.

Response

Impacts on tourism are described in Section 7.8 of the EIS, with further detail provided in the Socio-economic Working Paper. The Socio-economic Working Paper identifies existing tourist attractions and facilities (Section 3.3 of the Working Paper), impacts on local businesses, including tourism businesses (Section 4.4) and impacts on tourism (Section 4.5.1). This includes assessment of the potential impacts of project construction and operation on tourism and tourist businesses that may occur as a result of changes in amenity (including visual amenity), access, connectivity, the visibility of local businesses, and expenditure by project workers. The socio-economic impact assessment recognises the importance of Windsor's heritage values to tourism in the region and notes that tourists are attracted to the region due to its heritage values, as well as its natural environment and lifestyle.

The working paper indicates that some temporary impacts on tourism in Thompson Square may be experienced during construction, which may result in a temporary reduction in patronage of Thompson Square, the Macquarie Arms Hotel and surrounding areas. Restrictions on access to Thompson Square during construction were also identified as a possible impact. Measures identified in the EIS to minimise impacts on tourism during construction include limiting construction activity during the peak tourist times (ie weekends) and implementing measures to mitigate dust and noise impacts. Consultation and communication with potentially impacted businesses, community groups and the Hawkesbury City Council would be undertaken during construction to allow businesses, community groups and the Hawkesbury City Council to plan around unavoidable construction impacts and to provide information to enable the construction contractor to minimise impacts. For example, during the Blues and Roots Festival, which is an important local event for attracting tourists, major construction works may cease.

The socio-economic working paper also identifies the potential for impacts on tourism from changes to the heritage vistas of Windsor and Thompson Square. However, it is recognised that there are many factors that influence the attraction and experience of visitors to Windsor and that it is unlikely that visitors would choose to not go to Windsor due to the project impacts. In the long term, the project also supports the ongoing viability of tourism in Windsor by providing improved access and connectivity to the region. The project will also provide a safe and efficient crossing for tourists

involved in various regional cultural tourism activities, such as the Hawkesbury Harvest, tourist drives, and heritage walks promoted in the area.

The impact of limiting coach access to the Hawkesbury Paddle Wheeler has been further considered in **Section 5.1** of this report.

The proposed location for the replacement bridge would maintain the existing, historic linkage between the northern and southern sides of the Hawkesbury River at Windsor and the continuity of Thompson Square as a civic park and a link to the river. The selected bridge design and southern approach road alignment also minimise the potential visual and construction impacts of the preferred option on the Thompson Square parkland.

The project is also expected to improve the amenity of the Thompson Square parkland by removing the 1934 approach road to the existing bridge, which currently dissects the parkland and divides it into two separate reserves. The project will unify the two separate reserves of Thompson Square, creating a larger area of consolidated open space. Additional improvements to pedestrian amenity and safety will be gained from:

- Improving pedestrian and cycle access between Thompson Square and the river foreshore.
- Providing a three metre wide shared pedestrian and cycle pathway across the new bridge, linking Thompson Square with Macquarie Park.
- Reconnecting The Terrace to provide continuous access along the southern foreshore.
- Providing a signalised pedestrian crossing at the intersection of George and Bridge Streets.

The increase in consolidated parkland area, combined with the proposed improvements to pedestrian and cycling pathways, will improve the amenity of the Thompson Square precinct for public use. This in turn is expected to enhance the existing connection between Thompson Square and businesses on George Street, which would provide additional potential opportunities to further develop the area's cultural, recreational and tourist uses.

The potential adverse impacts of the project have been minimised in design and would be further mitigated and/or managed with the proposed urban design and landscape strategy identified in the EIS. The strategy, which will be finalised during detailed design, includes urban design and landscape treatments to integrate the new bridge and road infrastructure with the existing environment. The local community including tourism based businesses and stakeholders groups would have the opportunity to contribute to the urban design and landscaping strategy to maximise any benefits to tourism from the project.

2.10.3 Impacts on local businesses

Submission number(s)

24, 45, 66, 72, 66, 69, 82, 85, 87, 92, 93, 95 and the Heritage Council of NSW.

Issue description

Several submissions raised the issue of the potential for adverse impacts on local businesses. In summary, the respondents raised the following issues:

- The project would have negative impacts on business around Thompson Square and within Windsor.
- Local businesses will be severely impacted by the construction process and permanently disadvantaged by the new traffic arrangements, which will limit access to shops and businesses in the area.
- There will be adverse impacts on George Street retailers if southbound traffic coming from the bridge can no longer turn right into George Street.
- The full impact of the proposed road on Thompson Square's visitors is yet to be determined. If the square becomes an undesirable place for visitors, the flow on effect will be a downturn for local business owners in George Street.
- Tourism and hospitality businesses in Thompson Square are already reporting a marked decrease in business over the last five years due to the increases in traffic through the square.

Response

The potential adverse impacts of the project have been considered in design and would be further mitigated and/or managed using the measures identified in the EIS and any additional conditions of approval. The project is not expected to have negative impacts on local business trade for the following reasons:

- The retention of the river crossing in the centre of Windsor will maintain the flow of traffic into the township.
- The project will improve the amenity of the Thompson Square parkland for community and visitor use, which will strengthen existing connections to businesses on George Street.

Vehicles travelling south on Bridge Street after crossing the bridge would initially be able to turn right into George Street west via a dedicated right hand turn lane. This would allow southbound traffic to directly access the Windsor town centre via George Street. At some point in the future, however, the banning of this right turn movement during the evening peak may need to be considered if the performance of the intersection drops below acceptable levels.

The number of southbound vehicles undertaking the right hand turn movement from Bridge Street north to George Street west during the evening peak is currently relatively low. Nevertheless, before any future evening peak ban is placed on this right hand turn movement, additional community consultation and traffic monitoring and modelling would be undertaken to confirm the level of impact and the need for impact mitigation.

Vehicles travelling north on Bridge Street towards the new bridge would be able to turn left into George Street west via a dedicated left hand turn lane, maintaining the existing level of access to businesses on George Street for northbound traffic.

Southbound vehicles under nine metres in length would be able to turn left into George Street east. Northbound vehicles would not, however, be permitted to turn right into George Street east as this would reduce the performance of the intersection to an unacceptable level. This movement according to traffic counts is also relatively low. For vehicles wanting to access east Windsor and Governor Phillip Park from the south, a dedicated right turn bay or alternative method would be provided at the intersection of Bridge Street and Court Street about 170 metres south of the George Street/ Bridge Street intersection. The staging and design of this intersection has yet to be confirmed.

As all the bridge and the majority of the approach roads are off-line from the existing road network, their construction would not result in substantial road closures or changes in the road network. The only roads that would be closed initially are Old Bridge Street and The Terrace east of the existing bridge.

These roads would be closed to general traffic but access would be provided for the occupiers of 4 and 6 Old Bridge Street and for service vehicles to the wharf. Overall, the impact of these road closures would be minor as the affected roads are not used by general or through traffic.

Parking for construction personnel would be limited to the site compound on the northern bank and the Wharf car park on the southern bank. Construction parking areas would be detailed in the project induction process and any workers found parking outside designated areas would be disciplined.

2.10.4 Impacts on the road freight industry

Submission number(s)

60.

Issue description

One submission raised the issue of impacts on the road freight industry. In summary, the respondent contended that the project will have long-term adverse impacts on the road freight industry as it will do nothing to improve the current traffic problems and does not provide a long-term solution for road transport.

Response

The preferred option satisfies the primary aim of the project, which is to maintain a safe and reliable crossing of the Hawkesbury River at Windsor. The project would provide a new bridge, approach roads and intersections to current road design standards. The project design would improve the level of flood immunity to match that of the surrounding approach roads, and provide a safer crossing for vehicles, cyclists and pedestrians.

The proposed intersection improvements and initial two lane bridge configuration would provide acceptable traffic performance immediately and into the future. The bridge has also been designed to meet current designs to accommodate freight so that it can be subsequently reconfigured to a three lane bridge (with two southbound lanes and one northbound lane) to meet future traffic demands, as required.

Alternative route options were explored during the options development phase of the project and an alternative route option raised by the community during the EIS display period (the Rickabys Line option) has also since been evaluated (refer to Chapter 3). The available alternative route options have several disadvantages in comparison to the preferred option. As discussed above, an alternative route around Windsor may be considered in the future depending on growth in traffic numbers and local congestion.

2.10.5 Impacts on agriculture

Submission number(s)

DPI (Agriculture NSW).

Issue description

Agriculture NSW noted that the retention of agricultural lands, including turf farming land, should be maximised through detailed attention to the overall design and rehabilitation measures following construction.

Response

The project would require acquisition of two rural commercial properties and part of two additional rural commercial properties on the northern bank of the river. These properties are currently used for turf farming. While it is acknowledged that they could also be suitable for higher value horticultural enterprises (such vegetable production) flooding risks would limit the viability of these alternatives. In summary, as discussed in Section 7.8 of the EIS, the acquisition of the turf farm land would be expected to have a minor impact on land use in the region given:

- The area of land acquired would be relatively small;
- There are other opportunities for turf farming and horticulture in the region;
- The land is flood prone (about the level of the three year flood event), which limits its potential uses and value to agricultural and horticultural enterprises.

The retention of agricultural lands would be maximised to the extent possible during detailed design. Due to the final configuration of the new roads in this area, however, it would not be practical to return any excess land to agricultural or horticultural production. Appropriate compensation in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991* would be provided for all land acquired as part of the project.

2.11 Issue – Flooding, hydrology and climate change

2.11.1 Flood immunity of project

Submission number(s)

8, 24, 69, 70, 93 and 95.

Issue description

A number of submissions specifically raised the issue of flood immunity. In summary, the respondents raised the following issues:

- The project would not improve flood immunity of the crossing.
- In August 2011 the options report stated that the option 1 bridge would have a one in five year flood immunity but the EIS states that the new bridge would only have about a one in three year flood immunity.
- The project does not meet the stated objectives for flood immunity and questions the claim that the project would improve the flood immunity of the crossing.
- RMS has made many promises regarding the flood immunity of the new bridge. These promises have now been revised.
- The road to Wilberforce and the flats between Windsor and McGraths Hill will continue to be affected by flooding, restricting access to Windsor from the northern side.

Response

The option 1 bridge presented in the August 2011 options report and associated community information was substantially higher than the bridge now proposed for the current preferred option (as described in the EIS). As described in Section 4.3 of the EIS, further design development was undertaken following the release of the 2011 options report to reduce the visual impact of the bridge on Thompson Square and the heritage character of Windsor. This further design development resulted in lowering the height of the proposed replacement bridge.

The decision to lower the bridge to reduce visual impacts was also made in consideration of the flood immunity issue, recognising that there was no benefit in providing a bridge that had a substantially higher flood immunity than Wilberforce Road and/or Freemans Reach Road. The flood immunity of the proposed replacement bridge is now consistent with the flood immunity of Freemans Reach Road. The lowest point on the new bridge and approach roads (about 9.8 metres AHD) is similar to the level where Freemans Reach Road is closed due to flooding. Raising the level of the existing bridge approach roads to increase their flood immunity is outside the scope of project.

As discussed in Section 7.9 of the EIS, the replacement bridge would still be higher than the existing bridge and would therefore have a higher level of flood immunity. The flood immunity of the existing bridge is below the one in two year flood level, whereas the flood immunity of the new bridge would be around the one in three year flood level (likely slightly lower than one in three). The flood immunity of the existing bridge is lower than that of Freemans Reach Road and Wilberforce Road, which sometimes results in these roads being open to traffic while the existing bridge is closed due to flooding.

It should be noted that the flood immunity of the bridges expressed in terms of recurring flood events (such as a one in three year flood level) would change over time due to inherent limits in the precise accuracy of the flood modelling process which includes the provision of additional and more accurate flooding data as it becomes available. Consequently the information presented on the flood immunity of the project in terms of recurring flood events is indicative and is intended to convey a typical inundation frequency based upon the data available. Also the exact flood immunity of the project in terms of recurring flood events has not been calculated as it would require modelling of a large range of flood events to produce a flooding frequency that would change over time. The most important consideration in the flood immunity for the project would be the difference in height between the existing Windsor bridge and the project. As the project would be about 2.8 metres higher than then existing bridge, this would reduce the frequency and duration of bridge closure due to flooding. As discussed in Section 7.7.4 of the EIS, using historical flood level data from 1987 to 2011 if the new bridge had been in place, the number of bridge closures would have been three instead of eight and the average duration of closures would have decreased from 43 hours to 19.5 hours.

2.11.2 Flood impacts of the project

Submission number(s)

24, 70 and OEH.

Issue description

Two community submissions raised the issue of the flood impacts of the project. In summary, the respondents raised the following issues:

- 360 land lots will suffer increased flooding as a result of the project, which is not a good outcome for the affected property owners.
- The EIS states that the project would potentially increase flood levels upstream on the flood plain, particularly in a one in five year flood. It is therefore possible there will be little or no improvement in flood immunity.
- Will the stated increase in flood levels upstream on the floodplain reduce the flood immunity of the North Richmond bridge?

In addition, the OEH raised the following issues in relation to the flooding impacts of the project:

- The potential increases in flood levels are of concern, especially in the five year ARI flood event and for those additional properties affected by over-floor flooding.
- Consultation should be undertaken with Hawkesbury City Council and State Emergency Services to develop a communication and mitigation strategy to minimise flooding impacts and risks.

Response

The flood modelling undertaken for the EIS, while suitable for assessing the potential impacts of the project, was conservative and is therefore considered to have provided an over-estimate of the potential flood impacts. Specifically, the flood impact assessment was based on:

- A one dimensional flood model that did not account for the full complexity of the river immediately upstream of the project and therefore had a tendency to over-estimate flooding impacts.
- An earlier design for the replacement bridge, comprising a larger superstructure and five in-stream piers (compared with the current proposal for four in-stream piers), giving it a larger cross-sectional area and greater potential to impede flood flows and cause increases in upstream flood levels.

A revised flooding assessment using a two-dimensional flood model and the updated bridge design has been undertaken and is discussed in **Section 3.2**. The revised modelling indicates that the project would result in no or negligible increases in flood levels upstream of the bridge and no additional flood mitigation works or investigations would be required.

2.11.3 Development on the floodplain

Submission number(s)

72.

Issue description

One submission raised the issue of development on the Hawkesbury Floodplain. In summary, the respondent raised the following issue:

- The State Government's infrastructure strategy recognises that the floodplain is already over-developed and yet more inappropriate sites are being contemplated by developers and the construction of the proposed replacement bridge will encourage and justify even more development in areas unsuited for housing.

Response

The issue of development on the floodplain is beyond the scope of the project and is a matter for Hawkesbury City Council and the Department of Planning and Infrastructure.

2.11.4 Hydrological impacts

Submission number(s)

DPI (Fisheries NSW).

Issue description

Fisheries NSW noted that the EIS has not adequately addressed the potential changes in flow direction arising from an increased area of bank scour protection. Once the scour protection design has been finalised, the designs should be referred to Fisheries NSW to allow an assessment of potential impacts due to flow refraction and/or reflection.

Response

Further consideration of the impact of the proposed scour protection works on flows and bank scour would be undertaken during detailed design. This would include detailed hydrological modelling on the final design of the replacement bridge and detailed design of the extent and type of scour protection. The final design for the scour protection works would be provided to the DPI - Fisheries for their comment.

2.11.5 Climate change considerations

Submission number(s)

OEH.

Issue description

OEH noted that, while the EIS should ideally have considered information on historical and projected future sea level rise with reference to the NSW Government's sea level rise benchmarks, the majority of the tasks for the EIS were completed before the announcement of the NSW Government's Coastal Management Reforms and the potential impacts of sea level rise were therefore assessed based on the sea level rise projections from the 2009 NSW Sea Level Rise Policy Statement.

OEH acknowledged that the assessment of the potential impacts of sea level rise in the EIS was based on the best available information at the time.

It is noted that the NSW Government announced its Stage One Coastal Management Reforms in September 2012. As a consequence of these reforms, the NSW Government no longer recommends State-wide sea level rise benchmarks for use by local councils, with councils having the flexibility to consider local conditions when determining local future hazards.

Response

While more up to date data on sea levels rise are now available, the inherent design features of the bridge allow it to cope with regular submersion under fast flowing flow waters.

2.12 Issue - Impacts on riparian vegetation

2.12.1 Impacts of the replacement bridge on riparian vegetation

Submission number(s)

DPI (NSW Office of Water).

Issue description

The NSW Office of Water noted that the bridge design should incorporate design features that improve riparian connectivity. The agency also made a number of recommendations regarding riparian zone rehabilitation:

Response

Historical land clearing has completely removed all original native riparian vegetation communities at Windsor. Existing riparian vegetation within the project footprint comprises a narrow strip along the southern bank of the Hawkesbury River bordered by the footpath of The Terrace, and a narrow strip along the northern bank of the river both east and west of the bridge. The existing riparian communities are in relatively poor condition, with the understorey and ground layers either absent or dominated by exotic species.

About 0.5 ha of riparian vegetation would require clearing for the project. As part of the project, all disturbed areas outside the road corridors will be stabilised and rehabilitated through a progressive planting and landscaping program that takes advantage of optimal growing conditions and is appropriate to the final land use. This would include planting within the riparian zone where possible and removal of weed species. Riparian zone rehabilitation will include appropriate native species where possible. However, some non-native tree species will also be considered as the replacement bridge would form part of the gateway to the existing historic township of Windsor. Overall, the condition and habitat value of the newly planted areas would be an improvement on the existing vegetation communities.

The area directly beneath the bridge is unlikely to be suitable for planting due to shading, lack of moisture, and the potential for scouring impacts during floods. Modifying the bridge design to improve growing conditions beneath the bridge would not be possible due to the height and width constraints resulting from the need to minimise visual impacts.

2.12.2 Riparian plantings for the water quality basin

Submission number(s)

DPI (NSW Office of Water).

Issue description

The NSW Office of Water noted that the perimeter of the proposed water quality basin should be planted with native riparian species in accordance with relevant guidelines.

Response

The water quality basin on the northern bank would be planted with native riparian species. A detailed landscape plan containing all details of planting including type of plants and their monitoring and maintenance would be prepared in consultation with relevant stakeholders. While rehabilitation of the riparian zone would be one of the objectives of the plan, other important objectives would include maintaining the historic vistas to and from Windsor and providing gateway and departure point from Windsor to the north.

2.13 Issue – Community consultation process

Many submissions raised concerns about the consultation process. In summary, the respondents raised issues in relation to the:

- Timing of the community consultation process.
- Integrity of the community consultation process.
- Scope of the community consultation process.
- Quality of responses to community correspondence.
- Statutory requirements of the consultation process.
- Quality of display material used in community displays for the project.
- Time allowed for submissions on the EIS.

One submission also raised concerns about the Design and Heritage Focus Group.

Further details of and responses to these issues are provided in the following sections.

2.13.1 Timing of the community consultation process

Submission number(s)

6, 54, 66, 77, 84 and 93.

Issue description

Several submissions raised concerns about the timing of the consultation process, in particular the timing of the start of consultation in relation to selection of the preferred option. In summary, the respondents raised the following issues:

- Decisions about the preferred option pre-dated the consultation process.
- Decisions about the preferred option were made as early as 2008, before the start of community consultation. RMS told land owners in Thompson Square as early as 2008 that option 1 would go ahead.
- The EIS states that it was not until 24 August 2011 that notification of the project was advertised in the local press. The project should have been advertised earlier and also advertised in the larger daily newspapers prior to the project decision being made.

Response

RMS has undertaken extensive consultation and followed an appropriate consultation process in line with the requirements specified by the Director General of the Department of Planning and Infrastructure. The consultation process has involved using a wide range of activities to provide information about the project to the community and stakeholders and obtain their input and feedback. Details of the consultation activities undertaken are provided in Chapter 6 of the EIS.

Section 2.16 of this report responds in detail to questions raised about the project development process. As discussed in **Section 2.16.1**, while the replacement of the existing bridge was identified by RMS asset managers as the preferred option to address identified structural issues, this option had not at that point received broader RMS consideration and was therefore not RMS' preferred option at that time. It was not until late 2008 and early 2009 that the project received wider consideration by other sections of RMS and the need for more thorough consideration of options for the bridge was identified. As a result, RMS considered a range of options to refurbish or replace the existing bridge. These options were subsequently presented to the community in July 2009 for feedback. A report documenting community and stakeholder feedback on the options was published in November 2009.

An assessment of the identified alternative options was subsequently undertaken and the community's comments considered. In August 2011, an options report was published, accompanied by various technical investigations used to inform the options selection process. The replacement of the existing bridge was confirmed as the preferred option. RMS used a range of consultation tools and activities to enable the community to be actively involved in the options selection process. This included consideration of additional options identified by the community.

Consultation continued on the preferred option to allow community issues to be considered in the design of the bridge, Thompson Square and surrounding project elements. RMS will continue to provide opportunities for the community to participate in the detailed design of Thompson Square and in further reducing project impacts.

2.13.2 Integrity of the community consultation process

Submission number(s)

47, 54, 66, 74, 87 93, 94 and 95.

Issue description

Many submissions contended that community opposition to the project has been ignored and that the consultation process was never intended to influence decisions on the project. In summary, the respondents raised the following issues:

- There were 12,000 people who signed a petition against the project.
- Community concerns about the project have been ignored.
- Statements made by RMS staff during the consultation process that followed the selection of the preferred option indicated that it was just a 'token' process that was never intended to influence decision-making.
- The consultation process has been deceptive and misleading rather than "clear and transparent" as claimed by RMS.

Additionally, one submission contended that RMS has not satisfied its own consultation process, as set out in *Community Involvement and Communications - A Resource Manual for Staff* or the protocols of the International Association for Public Participation (IAP2) *Public Participation Spectrum* document, which provides a promise to the public that "We will deliver what you decide".

Response

RMS has undertaken an appropriate level of consultation and followed an appropriate consultation process in line with the requirements specified by the Director General of the Department of Planning and Infrastructure. The consultation process has involved using a wide range of activities to provide information about the project to the community and stakeholders and obtain their input and feedback. Details of the consultation activities undertaken are provided in Chapter 6 of the EIS.

Throughout the consultation process, community expectations and concerns have been addressed in project planning and design to the greatest extent practicable. Ultimately, the selection of the preferred option takes into account transport needs, heritage impacts, environmental impacts and engineering and cost constraints.

RMS' Community Involvement and Communications - A Resource Manual for Staff (the Resource Manual) was developed to provide staff with a theoretical and practical guide to planning and managing community involvement activities for RMS projects. It includes a guide to relevant policies and plans with reference to community involvement and advice on developing a community involvement plan. The principles of the Resource Manual were applied throughout the community consultation process and were used to identify the various community participation activities adopted for the project.

The IAP2 Public Participation Spectrum was designed to assist with the selection of the level of participation that defines the public's role in any public participation process. The Spectrum shows that differing levels of participation are legitimate and depend on the goals, time frames, resources, and levels of concern in the decision to be made. The level of public participation applied to the Windsor Bridge replacement project is considered appropriate.

It is recognised that, despite the consultation undertaken, there are still people who oppose the project.

2.13.3 Scope of the community consultation process

Submission number(s)

12, 18, 66, 84, 91, 92 and 93.

Issue description

Several submissions contended that not all relevant local community members and business owners had been consulted and that the geographical area covered by the consultation process was not sufficient. In summary, the respondents raised the following issues:

- There was a lack of consultation with local residents and business owners.
- Local property and business owners directly impacted by the project were not consulted until late in the process.
- Some business owners have not been specifically consulted.
- The community consultation process failed to notify residents in Glossodia, Kurmond, Blaxland Ridge, Kurrajong, Kurrajong Heights, Kurrajong Hills and Colo Heights. These areas, which have been experiencing high population growth, contribute to traffic in Windsor and use of Windsor Bridge and it would

have therefore been appropriate to seek input from these areas. The EIS fails to acknowledge or address why these areas were excluded from consultation.

- RMS should have consulted more widely given the heritage significance of the project area. The project is a concern not only to the local residents of Windsor and the Hawkesbury region, but also to people outside of this area.
- The Community Involvement Plan excluded representative groups that may have an interest in the project, such as business operators, road users, people living in the vicinity of the project and the wider community.

Two submissions raised issues regarding the level of consultation undertaken for building owners in Thompson Square. These submissions contended that:

- The owners of three heritage buildings that are part of the Thompson Square heritage precinct (namely 62-64 George Street, 66-68 George Street, and 17 Bridge Street):
 - Have never been personally consulted or identified as key stakeholders at any stage of the project, even though the project will have a detrimental effect on the heritage, fabric, curtilage and economic value of the buildings.
 - Were not consulted prior to the identification of the 10 RMS options in 2008/2009 or when option 1 was declared the preferred option.
 - Were not informed about the Design and Heritage Focus Group meetings.
- The property owners in Thompson Square who were not residential owner occupiers, apart from not being personally consulted, did not receive the initial Community Update Newsletter outlining the options and inviting community comment.
- The owners of Number 4, Number 6 and Number 10 Bridge Street were informed in person of the preferred option in early 2009 (before information was provided to the wider community) but only because RMS was forced to inform them because the original option 1 severely restricted their property access. These owners were told that option 1 was the preferred option, that other options would be offered but this was “just part of a process” and that there were only sufficient funds for option 1.
- Given the above, the consultation undertaken for the EIS does not comply with the Director General's requirements.

Response

RMS has undertaken an appropriate level of consultation and followed an appropriate consultation process in line with the requirements specified by the Director General of the Department of Planning and Infrastructure. The consultation process has involved using a wide range of activities to provide information about the project to the community and stakeholders and obtain their input and feedback. Details of the consultation activities undertaken are provided in Chapter 6 of the EIS.

A number of community involvement plans were prepared for the project, with each applying to a different phase. This is because different stakeholder groups need to be involved depending on the phase of project development. The community involvement plans were developed in accordance with RMS' Resource Manual. The stakeholder groups identified in the community involvement plans included local residents and businesses, the local and broader community, commuter communities, and a range of others.

As part of the consultation process, various community updates were distributed to around 12,000 properties on both the northern and southern side of the Hawkesbury River. This included the Windsor Downs, Windsor, South Windsor, McGraths Hill and parts of Berkshire Park, Wilberforce, Pitt Town Bottoms, Freemans Reach, Glossodia and Ebenezer. The reason only parts of some areas were included in the distribution is due to their rural and, often, more remote nature, although attempts were made to cover as broad an area as possible.

The owners of a number of the properties identified above have been registered stakeholders since November 2011, receiving project material by mail. They have also been consulted individually on the project. Consultation activities undertaken during earlier stages of project development included shopping centre displays and a community workshop. These were advertised in local newspapers and advised in community updates distributed to 12,000 local residents, businesses and other interested parties. The Community Focus Group established in November 2011 was also advertised in local newspapers and advised in community updates.

In addition to direct community consultation, RMS held community displays, placed advertisements in local newspapers and provided a project website to raise awareness of the project during the early stages and encourage involvement in the options selection process.

RMS has attempted to consult with all affected business owners potentially directly impacted by the project, however, recognises that all business owners may not have had the opportunity to provide input during the options assessment phase. Subsequent to the selection of the preferred option, RMS has endeavoured to consult with all potentially impacted business and property owners around Thompson Square. In some cases, property and business owners have preferred not to engage with RMS and due to their opposition to the project. It is also possible that business owners and tenants may not have passed on community updates and letters. As detailed above, there have also been numerous forums and opportunities for business and property owners to engage with RMS.

2.13.4 Quality of responses to community correspondence

Submission number(s)

93 and 94.

Issue description

Two submissions referred to examples of what they believed to be inadequate responses provided by RMS officers to community correspondence and questions raised. They had anticipated that the responses or answers provided by RMS would have been accurate, precise, complete and written in a manner that was easy to read. Instead, they assert that the officers who provided the responses were either careless, incompetent, or deliberately attempting to conceal information.

Response

Throughout the development of the project, members of the project team responded to a significant volume of community correspondence, which often included detailed and complex questions. At all times, the project team endeavoured to respond as quickly and accurately as possible to the numerous requests for information. At times, however, the requested information may not have been immediately available to the RMS officer.

On many occasions this necessitated an interim response advising the respondent that further information would be provided in the future when available.

2.13.5 Statutory requirements for the consultation process

Submission number(s)

84 and 93.

Issue description

Two submissions questioned whether or not the statutory requirements for communication activities had been met.

Response

The Director General's requirements for the project include an appropriate and justified level of consultation with relevant parties during the preparation of the EIS.

Having reviewed the EIS as submitted and considered RMS' responses to various matters on which the Department of Planning and Infrastructure required further information, the Department placed the EIS on public exhibition on 14 November 2012.

The options development and selection process for the project has involved a comprehensive community and stakeholder participation process, with feedback included in the development of the design wherever possible. Details of the consultation process and communication activities undertaken for the project can be found in Section 6.2 of the EIS. Further opportunities to provide input to the final form of Thompson Square parkland will be provided in future project phases, should the project be approved.

2.13.6 Quality of display material used in community displays for the project

Submission number(s)

93.

Issue description

One submission questioned why a 3D model was provided instead of a scale model for the project, and suggests that a scale model would provide a more accurate representation of the project and its impacts.

Response

A variety of visual aids were used to assist the community in understanding the project and the potential impacts. A number of 3D models were presented, in addition to detailed concept design drawings, photomontages, artist impressions and schematic representations. These were provided variously on the project website, in community updates, in the EIS and working papers, and at a variety of community information sessions and presentations. RMS believes this provided a comprehensive and accurate representation of the project and its potential impacts.

2.13.7 Time allowed for submissions on the EIS

Submission number(s)

3.

Issue description

One submission contended there was insufficient time allowed for the public to make submissions on the EIS.

Response

The time provided for the public to make submissions during the EIS display period complied with the timeframe requirements established under NSW planning legislation. This Submissions Report also responds to issues raised in submissions received as late as 14 February 2013.

2.13.8 Design and Heritage Focus Group

Submission number(s)

93 and 94.

Issue description

Two submissions raised concerns about the Design and Heritage Focus Group. In summary, the respondents raised the following issues:

- Notes or records of the meetings were made public without agreement of participants, which breached the code of conduct for the group.
- The group appeared to be created and operated to meet RMS process, rather than as a forum for consultation and development of the project.
- The group was abruptly closed down in June 2012 with little explanation provided to participants.
- The information provided by RMS was not accurate or timely as per the code of conduct.

Response

The Design and Heritage Focus Group first met in late 2011 after selection of option 1 as the preferred option. The focus group was established on the following grounds:

The principal aim of the community focus group will be:

- *To work closely with the RMS project team and contribute to the concept design development and environmental assessment of the preferred option.*

The group will achieve this aim by:

- *Providing input into the concept design of the preferred option (option one), including areas such as urban design, landscape, archaeology, heritage and traffic.*
- *Ensuring transparent and effective communication arrangements are established with all interested and affected residents, businesses, interest and industry groups.*

- *Ensuring that individuals and groups affected by the project but who are not able to attend meetings still have opportunities to participate in its development.*
- *Providing a local perspective on project issues, particularly in relation to minimising impact on heritage.*

The group is an advisory group and does not have a final decision making or approval role.

The focus group included a wide cross-section of the Windsor community including members of a local community action group called Community Action for Windsor Bridge (CAWB). The objective of the Design and Heritage Focus Group was to further develop option 1 and obtain feedback about alternatives within option 1. The group was established on the understanding it would conclude following the winding up of this development input. Accordingly, RMS decided to conclude the Design and Heritage Focus Group in June 2012 as the EIS and concept design had progressed sufficiently to not require any additional feedback from the Design and Heritage Focus Group. This was explained to the participants in detail at the Design and Heritage Focus Group meeting and in correspondence. The following is an extract from correspondence sent to all members of the Focus Group:

"The information gathered through the focus group meetings has been used to inform the concept design and the development of the Environmental Impact Statement (EIS), which is due to go on public exhibition later this year.

Roads and Maritime Services appreciates the time you have taken to participate in these meetings.

The concept design has developed to a point where it can be taken through the remainder of the Environmental Assessment process and therefore, the formal focus group meetings no longer need to be conducted.

This does not mean the end of consultation for the project however. Consultation will continue throughout all stages of the project and we would encourage you to continue to stay involved in the next steps of the planning process."

As discussed in **Section 2.13.4**, the project team endeavoured to respond as quickly and accurately as possible at all times to the numerous requests for information. Occasionally, however, the requested information may not have been immediately available to the RMS officer. On many occasions this necessitated an interim response advising the respondent that further information would be provided in the future when available.

2.14 Issue – Accuracy and adequacy of information

Several community submissions raised the issue of the accuracy and/or integrity of information provided in the EIS and/or in community consultation publications or forums. The Heritage Council of NSW also contended that the EIS was not based on comprehensive and adequate assessment information and is therefore inadequate for decision-making. Hawkesbury City Council noted that the EIS did not provide sufficient detail regarding factors such as site stabilisation and remediation, and management and maintenance obligations during and following construction. The issues raised are identified in the following sections.

2.14.1 Accuracy and adequacy of information – Flooding

Submission number(s)

24, 66, 70, 77 and 84.

Issue description

A number of submissions raised concerns regarding the accuracy and integrity of information on flood immunity and flooding. In summary, the respondents raised the following issues:

- The information in the hydrology specialist report is not accurate.
- RMS has made many promises regarding the flood immunity of the new bridge. These promises have now been revised.
- The community consultation was undertaken with a commitment to improve flood immunity to the 1 in 5 year flood level. This commitment was re-iterated in the August 2011 community update. This criterion is not being met.

Response

The validity and accuracy of the hydrology specialist report has been questioned due to the type of model used in the analysis. It is noted, however, that the particular model used, combined with the assumptions applied, have resulted in conservative predictions of flooding impacts. As such, the flood impacts identified in the EIS are likely to be greater than the actual impacts that will be experienced during flood events. In line with standard RMS pre-construction processes, further flood modelling will be undertaken as part of the detailed design phase of the project, if approved.

The option 1 bridge presented earlier in the August 2011 options report was substantially higher than the bridge now proposed and therefore had a higher level of flood immunity. As described in Section 4.3 of the EIS, further design development was undertaken subsequent to the 2011 options report to reduce the visual impact of the bridge on the heritage character of Windsor. This resulted in lowering the height of the proposed replacement bridge. Note also that the decision to reduce the height of the bridge was made in consideration of the flood immunity issue, and recognised that there was no benefit in providing a bridge with a substantially higher flood immunity than that of the surrounding approach roads. The flood immunity of the proposed replacement bridge is now consistent with the flood immunity of Freemans Reach Road. Raising the level of the existing bridge approach roads is outside the scope of the project. The new bridge will still be higher than the existing bridge and will therefore provide a higher level of flood immunity.

As discussed in further detail in Section 5.1, the height of the southern end of the new bridge has been increased by about one metre to provide access for large coaches to Windsor Wharf. This increase in height of the southern end of the bridge does not change the flood immunity of the project as the lowest point is at the northern bank and is still substantially below the height of the bridge presented in the 2011 options report.

Further responses to issues raised in relation to flood immunity and flooding are provided in **Section 2.11**.

2.14.2 Accuracy and adequacy of information – Heritage

Submission number(s)

54, 92, 93, 94 and the Heritage Council of NSW.

Issue description

Four community submissions raised concerns regarding the accuracy and integrity of information on heritage. In summary, the respondent raised the following issues:

- The claim that the preferred option follows a historical alignment and "there has always been a road there" is not true, as is the claim that Bridge Street is the historic route to the river. Bridge Street was named after the bridge across South Creek and no one ever used the road known as "Old Bridge Street" to access the river.
- RMS is incorrectly claiming that the project re-instates an historical alignment between Old Bridge Street/ Bridge Street and a crossing of the Hawkesbury River and is using this claim to justify or gain support for the project.
- There is no evidence of an historical alignment between Old Bridge Street/ Bridge Street and a crossing of the Hawkesbury River and the claim that the project re-instates an historical alignment is false.
- Even if the claims regarding the historical alignment were true, the re-instatement of an historical alignment would not provide sufficient justification for the project.
- The presence of a wharf before 1815 is disputed.

The submission from the Heritage Council of NSW raised the following additional issue:

- The Heritage Branch of OEH has advised the Heritage Council Sub-Committee that the Heritage Branch was recently contacted by RMS to advise that further archaeological testing may be needed within Thompson Square to assess impacts. This implies that the current EIS has not been based on a comprehensive and adequate assessment and as such, is inadequate for decision-making.

Response

The Historic Heritage Assessment and Statement of Heritage Impact (Working Paper 1) was informed by substantial research, sourcing historic surveys, historical illustrations and photographs, and newspaper articles. As identified in the Working Paper, a survey record from 1842 (Armstrong's survey) provides the only evidence of a previous road running through Thompson Square.

The survey shows a curving road or track that led to the punt on the river and provided a connection to the path through the Government Domain. In contrast to Evans' 1809 image, which shows a track adjacent to the Government domain, the road to the river now commenced from the western side of the Square at the corner of George Street and the Macquarie Arms Hotel.

Evans' 1809 image shows a track going straight down the hill from the current location of the George Street/ Bridge Street intersection, although it should be noted that this is an illustration rather than an official plan. It is also shown on historic photographs dated 1923 and plans dated as early as 1855. There are also records of complaints about the state of Bridge Street down to the river.

Based on consideration of research by the heritage specialists, it was concluded that a single alignment crossed George Street and continued straight down the slope to the wharf and bridge from about 1855. What condition it was in, and whether this access was used regularly or if alternative routes such as Baker Street were preferred, is not known.

The heritage information on which the EIS is based is adequate for the purpose of assessing the potential significance of impacts of the project and the required impact mitigation and management measures, including the need for further archaeological testing. Having reviewed the EIS as submitted, and considered RMS' responses to various matters on which the Department of Planning and Infrastructure required further information, the Department placed the EIS on public exhibition on 14 November 2012. The Department also requested that further archaeological investigations be undertaken. A summary of the outcomes of these investigations, is provided in **Section 3.1** of this report.

2.14.3 Accuracy and adequacy of information – Restoration of Thompson Square

Submission number(s)

24, 66, 77 and 93.

Issue description

A number of submissions raised concerns regarding the accuracy and integrity of information on the restoration of Thompson Square. In summary, the respondents raised the following issues:

- The claim made in the EIS that the project will achieve a gentle slope from Thompson Square down to The Terrace needs to be questioned.
- Claims that the current bridge replacement proposal will improve Thompson Square are false.
- Statements made by RMS that Thompson Square will be restored to the form envisaged by Governor Macquarie over 200 years ago are false and misleading.

Response

While RMS presented a preferred option for the proposed urban design and landscape works for Thompson Square in the EIS, the design and landscape works that would be applied have yet to be finalised. The scope and final form of the urban design and landscape works for Thompson Square will be further investigated following planning approval (if approved) with input from Hawkesbury City Council, agency stakeholders and the community. The final form of the urban design and landscape works for Thompson Square will also be influenced by any conditions of approval that may apply to the project.

The statements relating to improvements of Thompson Square relate to improvements in the public amenity of the parkland area. The project is predicted to improve the amenity of Thompson Square by removing the existing road cutting that dissects the Thompson Square parkland and thereby increasing the amount of continuous, useable parkland within the square. The improvement in amenity resulting from consolidation of the Thompson Square parkland area will be further enhanced by improvements in pedestrian and cycling facilities.

Section 4.1.2 of the EIS outlines the assessment of options against the project objectives. As part of that assessment, the EIS states that the preferred option would increase the area of consolidated open space within Thompson Square and provide an opportunity to reinstate the typical Macquarie era grid street layout. It noted, however, that it would have a significant impact on historic heritage as it would directly impact the Thompson Square Conservation Area and remnants of the 19th century Windsor Wharf.

The EIS does not claim to restore Thompson Square to the form envisaged by Governor Macquarie. However, the extension of Bridge Street into a more parallel/straight configuration is consistent with Macquarie's approach to street grid designs. This order was very important to his town plans. Hence the statement that the preferred option would extend the typical Macquarie era grid street layout asserted in the EIS is consistent with Macquarie's approach to street grid designs.

2.14.4 Accuracy and adequacy of information - Noise and vibration impacts

Submission number(s)

24, 92 and 93.

Issue description

Three submissions raised concerns about the methods and criteria used to assess noise impacts. In summary, the respondents raised the following issues:

- The noise impact assessment did not cover commercial premises.
- Open space criteria have not been adequately assessed.
- The EIS fails to consider the impact of noise on the businesses that operate alfresco dining areas within the Heritage Precinct. These areas should be regarded as "Open Space" and the corresponding Road Noise Policy (RNP) criteria applied.
- The EIS failed to physically monitor current noise levels in the Heritage open space of the Thompson Square reserve. Instead it modelled a mere two points within the reserve.

- The EIS ignores the existing situation where noise levels in Thompson Square are already too high.
- There are five heritage buildings currently used as residences in Thompson Square. The EIS fails to monitor three of these residential heritage buildings and address potential impacts on these residences.
- The noise assessment, including the application of the Road Noise Policy, fails to take into account that the majority of buildings in Thompson Square were constructed well before traffic noise intrusion was a consideration and that the glass used in these buildings is therefore much thinner than that used in modern buildings. These structures are therefore more vulnerable to noise impacts and this should be considered in the noise assessment.

Response

The current NSW Government and RMS policies and guidelines for road noise assessment and mitigation apply only to residential land uses and other uses defined as being noise sensitive, such as schools and hospitals. The current NSW Government and RMS policies and guidelines for road noise assessment and mitigation do not apply to commercial premises. For this reason, commercial premises were not specifically targeted in the noise assessment. Noise impacts on the Thompson Square parkland area were, however, specifically assessed using the NSW Government's noise criteria for open space areas (see Section 7.5.1 of EIS). Where exceedances of the noise criteria are predicted, appropriate and practical mitigation measures have been discussed within the EIS. The NSW Government's Road Noise Policy recommends that where a 'mixed use development' exists, the criteria for each individual type of receiver is used for operational assessment. This assessment methodology has been adopted for the project.

The current NSW Government and RMS policies and guidelines for road noise assessment and mitigation do not differentiate between heritage and non-heritage structures or premises for the purpose of operational or construction noise. For the vibration assessment, the heritage nature of structures has been taken into account, in line with the NSW *Assessing Vibration: A technical Guideline*. The EIS (including the Noise and Vibration Working Paper) identifies Thompson Square as a sensitive receiver and provides a discussion on noise mitigation options for this area in accordance with the NSW Government's policy. The noise impact mitigation options identified for the project specifically consider the heritage significance of the area.

Since completion of the EIS, it has been brought to the attention of RMS that four of the properties identified as 'commercial' in the EIS may actually be used for residential purposes. These four properties have since been re-assessed as residential properties as part of an additional noise assessment carried out during the preparation of this Submissions Report. This additional noise assessment:

- Addresses the proposed design change to increase the clearance of the bridge over The Terrace (refer to **Section 5.1** and **Section 5.1.4**).
- Takes into account the identified corrections in property use, re-assessing the four newly identified residential properties against the relevant residential criteria of the Road Noise Policy.

The results of the additional noise assessment indicate that there will be little or no change in operational noise levels at sensitive receivers as a result of the proposed design change to increase the clearance of the bridge over The Terrace.

The newly identified residential properties will, however, qualify for noise mitigation treatments, in addition to those properties already identified for noise mitigation in the EIS. Residents will be contacted separately to discuss mitigation treatments in accordance with RNP requirements.

Baseline noise monitoring is not required to be undertaken at all receivers within a project study area, Monitoring is undertaken at a sufficient number of representative locations to allow the project noise model to be validated. The monitoring data obtained within the study area for the project is considered to provide a good representation of noise levels for receivers within the area. Two locations representative of different areas within the Thompson Square parkland were selected to represent indicative noise levels with the park.

2.14.5 Accuracy and adequacy of information - Traffic

Submission number(s)

24, 66, 70, 85, 93 and 95.

Issue description

A number of respondents raised concerns relating to the accuracy of traffic data and modelling. In summary, the respondents raised the following issues:

- There is an apparent discrepancy in information on vehicles numbers within the EIS. For example, the EIS states that there are around 13,000 vehicles per day on Wilberforce Road, 7,000 vehicles per day on Freemans Reach Road and 19,000 vehicles per day on the bridge. If there are 13,000 vehicles per day on Wilberforce Road and 7,000 vehicles per day on Freemans Reach Road, why are there only 19,000 vehicles per day using the bridge?
- The traffic flow improvement claims in the EIS seem strange given the pre EIS documents provided by RMS.
- RMS and politicians continue to make misleading statements about the project. Misleading claims made include that the project will solve the traffic issues associated with the current bridge.
- The EIS states that "Beyond the roundabout, traffic in both directions on Bridge Street generally travels at a slow speed, constrained by the narrow and steep road alignment and poor sight lines. Vehicle speeds do not substantially vary during peak and non-peak periods due to these road conditions and the narrow bridge configuration." The submission contends that this is incorrect. In particular, northbound traffic speed actually increases after it leaves the roundabout and crosses the bridge. Conversely, during peak periods, traffic is very slow due to the banking up across the bridge from the Macquarie Street intersection.
- The predicted traffic outcomes presented in the EIS are questionable. The Blues Festival shows that a slight increase in local traffic can cause serious bankups.
- The traffic data and modelling is suspect and should not be used as a basis for supporting the project.
- There appears to be inconsistencies in the EIS about permitted traffic movements to George Street west and east from Bridge Street.

Response

The apparent discrepancy in vehicle numbers arises because not all cars using Freemans Reach Road and Wilberforce Road cross the bridge. There is local traffic using Freemans Reach Road and Wilberforce Road to access properties along these roads, as well as cars going into Macquarie Park from Freemans Reach Road and Wilberforce Road.

Detailed traffic numbers for each road are presented in Section 3 of the Traffic and Transport Working Paper. The numbers presented in the Traffic and Transport Working Paper are the ones used in the traffic modelling.

The primary aim of the project is to maintain a safe and reliable crossing of the Hawkesbury River at Windsor. An additional specific project objective is to improve traffic and transport efficiency. The project would provide a new bridge, approach roads and intersections to current road design standards. The project design would improve the level of flood immunity to match that of the surrounding approach roads, and provide a safer crossing for vehicles, cyclists and pedestrians. While the project would not solve all existing traffic congestion issues in Windsor, the proposed intersection improvements and initial two lane bridge configuration would provide acceptable traffic performance immediately and into the future. The proposed new traffic lights at the George/Bridge Street intersection would be synchronised with the existing lights at the Macquarie Street/Bridge Street intersection to give priority to through traffic on Bridge Street during peak periods. This would contrast with the current situation where vehicles from George Street have equal priority at the roundabout. The bridge has also been designed so that it can be subsequently reconfigured to a three lane bridge (with two southbound lanes and one northbound lane) to meet future traffic demands, as required.

One submission disputed a statement in EIS that suggested that traffic speeds on Bridge Street after leaving the roundabout were slow. This statement was contained in the visual impact and landscape section and was based on visual observations of the traffic at the time of visiting Windsor. It was not a statement in the Traffic and Transport assessment section.

The traffic modelling does not use events such as the Blues Festival as a basis for the assessment - rather it is focussed on the daily peak commuting periods. The consideration of infrequent events such as the Blues Festival would be addressed through event traffic management plans and assessments prepared by Council and RMS if warranted.

The modelling and determination of future vehicle numbers conformed to RMS policies and procedures. Similar modelling and future traffic estimates would be used for any assessment of alternative options. As noted in the EIS, the estimated increase in traffic growth is considered conservative (ie an over-estimation rather than an under-estimation) and is based on a number of reputable sources (eg Sydney Strategic Travel Model).

At the George Street/ Bridge Street intersection, the right turn into George Street east for northbound vehicles on Bridge Street would be banned. For southbound vehicles on Bridge Street, the right turn into George Street would be permitted. This turning movement may, however, be banned at some stage in the future during the evening peak period only. Before this occurs, further consultation with the community and additional traffic assessments would be undertaken.

2.14.6 Accuracy and adequacy of information – Socio-economic impacts

Submission number(s)

92, 93 and 95.

Issue description

Three submissions contended that the socio-economic assessment undertaken for the project was deficient and flawed. In summary, the respondents raised the following issues:

- The information in the EIS on domestic tourist visitors is incorrect. Tourism Australia figures show an average of 363,000 people visited the Hawkesbury Region for the purposes of holiday or leisure, while approximately 198,000 were visiting friends or relatives. The EIS figures state a higher proportion of people were in the Hawkesbury region to visit family and friends.
- The method of data collection was inadequate, as directly affected commercial properties within the Thompson Square precinct were not consulted or surveyed, surveys were not undertaken on a Sunday (the area's busiest day for shoppers and tourists) and survey times were limited to between 9am and 5pm, which did not capture commuters.
- The survey data is not reliable because the person responding to the local business survey may not have had a clear grasp of the issues.
- The survey findings regarding business owners and attendants may not be objective or useful. These findings should not be used for decision making purposes.
- The assessment takes no real account of the opinions and plans of businesses.
- The level of assessment in the report does not meet the standards of other road projects with Goulburn, Gunning and Tarcutta quoted as examples.
- The Hawkesbury Regional Gallery is not located adjacent to Thompson Square as stated in the EIS.

Response

The tourism data presented in the EIS are correct. The information is from Destination NSW (a statutory authority established by the NSW Government) and is based on the National Visitor Survey and International Visitor Survey undertaken by Tourism Research Australia (a branch of the Australian Government Department of Resources, Energy and Tourism). The data presented in the EIS is the same as the information provided in the submission, although, the EIS presents data for the four years to September 2011, whereas the submission presents data for the three years to June 2007. The figure of 32.5 per cent of visitors visiting family and friends presented in the EIS relates to domestic overnight travellers. The figure for domestic daytrip travel is 28.6 per cent. In relation to holiday travellers, 50.5 per cent of overnight travellers visit the Hawkesbury Local Government Area for holidays, while holiday makers comprise 55.6 per cent of day trippers.

The outcomes of the surveys of local business and business patrons within the Windsor town centre were one input to the socio-economic impact assessment. The assessment was also informed by a range of other quantitative and qualitative information, such as:

- Data from the Australian Bureau of Statistics.
- Other relevant sources on population, demography, business and tourism.
- A visual survey of land uses and business near the existing bridge.
- Outcomes of community consultation undertaken by RMS for the project.

Community consultation for the project was undertaken between July 2009 and June 2012. This provided several opportunities for business owners and community members to provide input into the project development and EIS preparation. Community consultation included:

- Public information displays in August and September 2011, and September 2012.
- A community information session in August 2011.
- A community workshop in August 2012.
- An online discussion forum, in May-June 2012.
- Seven community focus group meetings, between November 2011 and 30 May 2012.

The socio-economic impact assessment was also informed by the findings of other technical studies, such as traffic and transport, heritage and urban design studies. The socio-economic impact assessment complied with RMS' guidelines for these types of assessments and met the Director General's requirements. The other road projects quoted as examples involved rural communities that were impacted by a highway bypass. Windsor is not being bypassed and is a peri-urban township that does not significantly rely on through traffic.

The decision making process for the project was based on a range of criteria, including those relating to the condition of the existing bridge, value for money, engineering standards and safety, flood immunity and community needs.

It is recognised that the single reference to the Hawkesbury Regional Gallery being located adjacent to Thompson Square is incorrect and that the correct reference should have been to the Hawkesbury Regional Museum.

2.14.7 Accuracy and adequacy of information - Project need

Submission number(s)

6, 24, 54, 66, 72, 77, 90 and 93.

Issue description

Many submissions raised concerns regarding the accuracy and integrity of information that has been provided in statements about project need. In summary, respondents expressed concern about the accuracy of information on:

- The condition and safety of the existing bridge.
- The cost of refurbishing the existing bridge.
- The cost of providing a bypass instead of the project.

The respondents contended that RMS and politicians have continued to make misleading statements about the project, including claims that the current Bridge is in danger of collapsing.

Response

As discussed elsewhere in this Submissions Report, RMS has acted with transparency and integrity throughout all stages of project planning and community consultation, from options development through to preparation and public display of the EIS.

The data presented in the EIS are accurate to the best of current knowledge. The data presented in the EIS are based on the best available information, including the results of studies carried out specifically for the analysis of project options and environmental impacts.

Further justification for statements made about the condition of the existing bridge is provided in **Section 2.15.3**. Further assessment of alternative bridge rehabilitation and bypass options is provided in **Chapter 4**.

2.14.8 Accuracy and adequacy of information - Project description

Submission number(s)

6, 70 and Hawkesbury City Council.

Issue description

Two community submissions raised concerns relating to information on the project presented in the EIS. In summary, the respondents raised the following issues:

- EIS does not contain adequate drawings of the proposed bridge.
- Figure 7-18 on page 237 of the EIS does not match the intersection configuration shown in the photomontage on the front page of the EIS. This is one of many examples on how the pictures provided by the RMS have the potential to mislead the public.

Hawkesbury City Council raised the following additional issues:

- The EIS contains conflicting information on the concept design alignment and footprint. As an example of this issue, Council noted that the concept design footprint depicted in Figure 7-39 of Volume 1 excludes some parts of the project (such as the existing bridge approach road through Thompson Square).
- The alignment of Thompson Square Road shown in Figure 8-1 of Volume 3 does not match the current road alignment outside the Macquarie Arms. The logic of re-positioning this section of road does not seem to have been justified.

Response

The EIS contains sufficient engineering drawings, photomontages and other diagrams to describe the project at its stage of development and to enable the assessment of environmental impacts. The level of detail in the EIS on the bridge and approach roads is greater than that presented in most other environmental impact assessments for similar projects.

The photomontage is correct and shows a dedicated left turn lane from George Street west to Bridge Street north. Figure 7-18 represents a simplified plan of the intersection for the purposes of the traffic assessment. Including the left turn lane in the traffic assessment would not have changed the results of the intersection analysis.

It is recognised that the project footprint shown in Figure 7-39 of the EIS is incorrect. This does not, however, change the conclusions of the assessment.

There are no proposed changes to Thompson Square Road outside the Macquarie Arms. This road will not be repositioned.

2.14.9 Accuracy and adequacy of information - Manipulation of data

Submission number(s)

3.

Issue description

One submission raised the concern that the data presented in the EIS have been manipulated. In summary, the respondent raised the following issues:

- The data presented in the EIS have been altered to achieve the desired outcomes.
- Members of the public are unable to access the raw data.

Response

The data presented in the EIS are accurate to the best of the current knowledge of RMS and the EIS consultant. The data presented in the EIS are based on the best available information, including the results of studies carried out specifically for the analysis of project options and environmental impacts. The data have not been altered in any way to present false or misleading information. Where relevant, raw data are contained in the technical working papers in Volume 2 of the EIS.

2.14.10 Areas of insufficient information

Submission number(s)

Hawkesbury City Council.

Issue description

Hawkesbury City Council expressed support for the project but noted that the EIS lacked detail in a number of areas. The specific issues raised by Hawkesbury City Council were as follows:

- The EIS contains insufficient details to make adequate comment about embankment stabilisation, materials, planting schemes and remediation following completion.
- The EIS provides insufficient details about the maintenance and transfer of acquired land back to Council including financial assistance and the period of time prior to handover.

- The EIS provides insufficient detail about the proposed water basin, the use of the wharf area during construction, and management and maintenance obligations following completion.

Response

The details presented in the EIS for rehabilitation and remediation works are at the concept stage only. These details would be further developed and finalised during the detailed design phase in consultation with Council and other relevant stakeholders. The details of the use of the wharf area during construction would also be confirmed in consultation with Council during detailed design.

All land outside the arterial road boundary would be handed over to Council at the completion of construction. Details of the land hand over process and the management obligations for the water basin would be confirmed during detailed design.

2.15 Issue - Project need

Many submissions questioned the statements made within the EIS regarding the need for the project. The main issues raised related to the following elements of the existing bridge:

- Lane widths and design standards.
- Load limits.
- Structural condition.
- Maintenance history.

Further details of and responses to the specific issues raised are provided in the following sections.

2.15.1 Lane widths and design standards of the existing bridge

Submission number(s)

24, 54, 69, 93 and 94.

Issue description

A number of submissions raised the issue that failure of the existing historic bridge to meet current design standards is not sufficient justification for project need or bridge demolition. In summary, the respondents raised the following issues:

- The current bridge has lane widths that are as wide or wider than those of many other bridges and roads in NSW.
- The lanes of the existing bridge are as wide or wider than those on the Harbour Bridge, ANZAC Bridge and Gladesville Bridge, and considerably wider than those on the Buttsworth Creek Bridge on Wilberforce Road, and yet none of these bridges have been described as requiring replacement in the interests of safety. Furthermore, truck widths have not increased over the past 25 years and newer trucks are easier to drive than older trucks.
- The proposed option 1 bridge, when configured for three lanes, also does not meet the current design standards. The EIS shows the traffic lanes will be 3.3m wide with no median strip (EIS Volume 1, Figure 5-4b).

Response

It is recognised that there are many other bridges and roads in Sydney with lane widths less than the design standard. Generally, this has resulted from the need to create additional lanes in congested road corridors or install concrete medians to prevent head on collisions. Apart from the Buttsworth Creek bridge, all other examples quoted in the submissions are roads or bridges with multiple lanes in each direction and therefore there is a less dangerous refuge in the adjoining outside lane to avoid head-on collisions or there are concrete medians crash barriers. For a two lane bridge such as Windsor Bridge, there are no outside lanes, road shoulders or median safety barriers to avoid head on collisions and breaching of the outside safety barrier would result in the vehicle going to the Hawkesbury River.

While they are generally unreported, RMS has been advised by Hawkesbury City Council of numerous minor accidents on the bridge involving trucks, such as mirror clippings.

Narrow lane width was one of the issues raised by the community and reported in local media as justification for RMS to replace the existing bridge. However, the substandard lane widths are only one of the reasons why RMS is proposing to replace the existing Windsor Bridge.

Road geometry, including lane widths, is only one component of a range of current engineering standards that a bridge must comply with to make it safe. The primary driver for replacing Windsor Bridge is because of other engineering standards such as structural integrity, load carrying capacity, durability and maintainability.

A number of extensive inspections, assessments and evaluations have concluded that the bridge requires replacement, as discussed in further detail in **Section 2.15.3**. In regards to its deck structure, inspection reports have identified cracking, spalling and corrosion of the reinforcement on the underside of the deck. Condition inspections have identified approximately 250 square metres of the bridge surface area affected by spalls, delamination or cracking, and exposed longitudinal reinforcement exhibits significant corrosion. In regards to its piers, underwater inspection reports have identified significant deterioration of the cast iron piers due to graphitisation, with measured effective wall thickness ranging from 27 millimetres to as low as two millimetres. Circumferential cracking has also been identified in both columns of pier 5 and the downstream column of pier 6. As a result of this structural deterioration, the safety factor for the bridge in its current condition is less than what is required by Australian Standards.

2.15.2 Load limits of the existing bridge

Submission number(s)

6, 24, 27, 69 and 93.

Issue description

A number of submissions raised issues regarding the load limits of the existing bridge, arguing variously that the load limits, or lack of load limits, were at odds with information provided by RMS on the structural condition of the bridge and the need for the project. In summary, the respondents raised the following issues:

- The existing bridge has had the weight limit increased to 68 tons, indicating that there is no danger of it falling down.
- RMS has stated that the existing bridge is in poor condition. This is at odds with the current situation, in particular that the existing bridge does not have a load limit and RMS has approved the crossing of the bridge by B-Doubles with heavy loads. There does not appear to be an urgent need to do anything.
- There is no load limit current on the bridge, suggesting that there is no immediate danger of the bridge falling down and thus no need to undertake the work immediately.
- The significance of statements made in the EIS regarding the structural integrity of the bridge are diminished by the absence of a current load limit.

Response

A number of submissions raised the issue that the load limits allowed on the existing bridge have increased in recent years and this is evidence that the existing bridge is in good condition and is suitable for use into the future. The granting of approval for various heavy vehicle types to use the existing bridge was provided as evidence that load limits have increased.

Since July 2006, Higher Mass Limits have been approved in NSW for certain road networks. Higher Mass Limits allow eligible vehicles to operate with loads in excess of statutory limits. The examples of increased load limits quoted in submissions include:

- In 2008, a 50 tonne 19 metre B-Double was approved to use the route that includes Windsor Bridge.
- In 2011, a 62 tonne 25 metre B-Double was approved to use the route that includes Windsor Bridge.

It is important to note that the load limits were not increased explicitly on the existing Windsor Bridge, rather higher mass and length vehicles were permitted on certain approved routes that included Windsor Bridge. Approval of B-Doubles to use certain approved routes does not mean the load safety factor or limits on the bridge have increased as:

- The load capacity and limits of a bridge are generally based upon the weight of the load on each axle of a heavy vehicle in relation to span length of the bridge – not the overall weight or length of the vehicle. The weight carried by each axle and stress transmitted by each axle when braking are key components in assessing the load capacity of the bridge. A 25 metre 62 tonne B-Double with eight axles, for example, applies less stress to the existing bridge than a typical 32 tonne semi-trailer with only four axles. For Windsor Bridge, semi-trailers are the heavy vehicle type that causes the greatest stresses on the bridge (see **Section 2.15.3** for a further discussion of load safety factors).
- Where the use of semi-trailers is already permitted, the approval of B-Doubles routes is generally based upon the road design and geometry of the route, rather than the load capacity or limits. B-Doubles have greater turning circles and require additional road pavement and therefore their safe approved use is limited by the design of existing road and intersections rather than weight.

The approval of B-Doubles on a route that included Windsor Bridge does not mean that the load limits or safe carrying capacity of the bridge has been increased.

2.15.3 Structural condition of the existing bridge

Submission number(s)

6, 24, 27, 54, 69, 84, 87, 90, 93 and 94.

Issue description

Many submissions contended that the poor condition of the existing bridge had been over-stated by RMS to support the claimed need to demolish the existing bridge and provide a replacement bridge. In summary, the respondents raised the following issues:

- Statements made by RMS that the existing bridge is in poor condition are at odds with the current situation, in particular the existing bridge does not have a load limit and RMS have approved the crossing of the bridge by B-Doubles.
- If the existing historic bridge is unsafe as stated in the EIS, why has nothing been done to make it safe as a matter of urgency and why has the bridge, an item of State significance, been allowed to deteriorate the extent where it is reported as being unsafe?
- Investigations into the condition of the existing bridge in 2011 concluded that "the bridge in its present condition and loading will be safe for some time", which indicates that there is not an urgent need to have the bridge replaced on the grounds of safety. This information is at odds with statements made by RMS and statements made in the EIS.
- The existing bridge has had the weight limit increased to 68 tonnes, indicating that there is no danger of it falling down.
- RMS has stopped maintaining the existing bridge to allow its condition to deteriorate and thereby justify the need for its replacement.

Response

Many submissions disputed RMS' claim that the existing bridge is in poor condition and is substandard for the current loads and uses. This includes the alleged increase in the load limits for the existing bridge, which is discussed in **Section 2.15.2**.

As discussed in Section 3.2.1 of the EIS, the existing Windsor Bridge is rated as poor and, while the bridge is suitable for current use, would need extensive rehabilitation works if it was to be used and maintained into the future. A number of bridge condition investigation reports were also included in **Appendix C** of the EIS, demonstrating the significant deterioration of the structure.

In response to submissions questioning the condition of the existing bridge, RMS has included a more detailed chronology of investigations undertaken between 2003 and 2013 in **Appendix G** of this Submissions Report in addition to the information provided in the EIS. This more detailed information describes the investigations undertaken, the findings of the investigations, and the decisions made on the basis of these findings. These numerous reports and studies on the existing bridge include investigations to determine:

- The realistic load capacity of the bridge.
- The condition state of the bridge superstructure, in particular, the extent of carbonation of concrete and corrosion of steel along with short term and long term repair options.
- The condition of the cast iron piers and extent of their graphitisation.
- The rehabilitation options to restore the substructure capacity.
- Repair cost estimate and Life Cycle Cost Analysis of various rehabilitation options for the bridge to carry current legal loads.
- The performance of the bridge under the RMS test vehicle and ambient traffic for two weeks.

In 2002 the condition rating for the bridge identified increasing deterioration of precast concrete girders. In response to this condition rating a more detailed “Level 3” inspection was carried out (the output of which is included on the RMS website, in the EIS and summarised in **Appendix G**). The report recommended remediation of a number of deficiencies and also proposed the possibility of a bridge replacement.

In 2005 RMS Bridge Branch was commissioned to prepare a cost estimate to rehabilitate the bridge. The estimate to rehabilitate the bridge including project management and design was \$13,041,975 (in 2005 dollars). As the rehabilitation cost was high, RMS Senior Bridge Engineers and the Sydney Asset Manager agreed the more cost effective solution was to replace the bridge.

At the time this decision was made the expected timeframe for replacement of the bridge was within the next five years and accordingly the condition of the bridge could be managed without significant repairs provided a regime of routine monitoring was undertaken that include six monthly survey measurements and weekly walk through inspections by experienced inspectors.

This program of monitoring has been maintained since 2005 and has been supplemented with additional investigation reports including, underwater inspections, load assessments, and review of all reports and reassessment of the bridge. As discussed in **Section 2.13.1**, the consideration of alternative bridge crossing locations commenced some time later, following broader consideration on the project within RMS.

With regards to weight limit changes, as discussed in **Section 2.15.2** above, the approval of B-Doubles on a route that included Windsor Bridge does not mean that the load limits or safe carrying capacity of the bridge has been increased.

The load factor of a bridge is the primary performance measure of a bridge's safe carrying capacity. The load factor is related back to a heavy vehicle type. Currently the heaviest vehicles allowed to use Windsor Bridge are 44.5 tonne semi-trailers, 62.5 tonne B-Doubles carrying general freight, and 68 tonne B-Doubles carrying livestock. A 44.5 tonne semi-trailer imposes the greatest stress on the bridge because they have a higher weight per axle compared to B-Doubles.

As required by rating section of the bridge code (AS5100.7), bridge structures are required to have a load factor of 2 for the stress applied by heavy vehicles. That is, the bridge should be capable handling two times the stress imposed by the largest legal heavy vehicle. This is to provide a margin of safety for illegal overweight loads, for occasional approved overweight loads and in case the bridge is damaged.

The load factor of a bridge is calculated using:

- The type of vehicles (ie weight, length and number of axles) using the bridge.
- The design of the bridge including span length and pier, superstructure and abutment design.
- Performance of the various elements of bridges when exposed to different types of loadings.

The existing bridge in its current condition has a load factor of about 1.5 for a 44.5 tonne semi-trailer. This indicates that the existing bridge can generally carry legal loads without risk, however, there is a considerably reduced margin of safety for illegal overweight loads or for events that cause stress or damage to the bridge (eg large flood events). Illegal overweight heavy vehicles are particularly a risk for Windsor Bridge as there is some evidence that overweight heavy vehicles travelling to and from the Hunter use Putty Road to avoid the heavy vehicle inspection station at Mount White on the F3.

As the load factor of the existing bridge is below 2 and does not meet the required rating for the bridge code, RMS has been required to implement the following measures:

- Weekly inspections by an experienced bridge inspector.
- More detailed, six-monthly monitoring of the deck profile by survey measurement.
- Intermittent monitoring of the bridge with strain gauges.
- Higher mass limit vehicles using the bridge must have low impact air suspension systems fitted and be enrolled in the Intelligent Access Program (involving compliance, monitoring and tracking technology).
- Speed limit for heavy vehicles has been reduced to 40 kilometres per hour.

As detailed in **Appendix G**, there have also been numerous reports and studies on the existing bridge over the past 10 years that drew initial attention to the bridges deteriorating condition and what measures were to be introduced to manage the potential risk including recommendation for replacement. The findings of these investigations led to conclusions about the deteriorating condition of the bridge.

In summary, these investigations concluded that rehabilitation would only restore the bridge to its original capacity with an assumed 25 year lifespan. The cost estimates for rehabilitation or strengthening did not take into account the community impact resulting from the closure of the bridge required during the process, or the ongoing maintenance cost that would be significantly higher than a new bridge. They also concluded that, with the original capacity, the bridge would only be capable of Higher Mass Limits (HML) subject to a stringent risk management strategy involving comprehensive monitoring by instrumentation and inspection, and only in the short-term until the bridge is replaced.

2.15.4 Maintenance history of the existing bridge

Submission number(s)

93.

Issue description

One submission contended that RMS has not been undertaking maintenance of the existing bridge, which has contributed to its deterioration and created risks to public safety. To support their argument that maintenance of Windsor Bridge has been lacking, the submission provided an example of another RMS heritage bridge that has been the subject of maintenance activities, arguing that the maintenance activities that have been applied to this example bridge do not appear to have been applied to Windsor Bridge.

Response

It is important to distinguish between regular and ongoing maintenance activities and major refurbishment works. The activities that have been undertaken on the other RMS heritage bridge described in the CAWB submission include replacing piles, cross girders, trusses and bridge decks. These are major refurbishment activities, not maintenance activities, and would be subject to a formal approval process. Some of the other activities described for the example bridge, such as painting and rot treatment, would be classified as maintenance activities.

In 2005, the need to replace the bridge was identified by RMS Asset Management Branch based on a number of bridge condition assessments, as discussed in **Section 2.15.3** above. (As discussed in **Section 2.16.1**, however, while the bridge replacement was favoured by the asset managers, it had not received broader RMS consideration at that time and did not form part of a more thorough consideration of options until later). At that time, it was also decided that major maintenance activities on the bridge would cease as an alternative crossing was anticipated to be open within five years. Minor maintenance activities and more regular inspections and assessments of the bridge were undertaken to ensure that the bridge remained safe for public use.

The cessation of major maintenance activities in 2005 did not contribute substantially to the current structural condition of the bridge and has not resulted in the existing bridge deteriorating beyond repair. The two major problems that have been identified on the existing bridge are:

- Corrosion, graphitisation and cracking of the cast iron bridge piers.
- Spalling of the concrete deck girders, headstocks and other concrete elements.

No regular maintenance activities would have prevented deterioration of the piers as they are cast iron, have been submerged for over 100 years and have reached the end of their design life. The alternative bridge refurbishment methodology proposed by the ex-RMS bridge engineers recognises these issues and suggests that the piers be encased in steel jackets. This would duplicate the existing damaged sections of the piers and would be considered a refurbishment activity rather than a maintenance activity.

The spalling of concrete elements is a result of some of the inherent historical design features and construction methodologies of the bridge (eg drainage from the deck was directed on to the deck girders), as well as the age of the bridge. The current extent of spalling of the concrete elements of the bridge could have been addressed to some degree by regular maintenance activities, although by 2005 it was recognised that the extent of spalling was so significant that only a refurbishment of the bridge could fully remedy and halt further spalling. The alternative bridge refurbishment methodology proposed by the ex-RMS bridge engineers suggests an approach to remedy the spalling, which has been further developed as described in **Section 4.3** of this report. In summary, while the extent of spalling may have increased due to the cessation of major maintenance activities, this could be remedied and halted through refurbishment of the affected concrete elements.

2.15.5 Need for demolition of the existing Windsor Bridge

Submission number(s)

16, 48, 54, 70, 72, 77, 86 and 93.

Issue description

Many submissions contended that the existing bridge should be retained and questioned the need for its demolition as part of the project. In summary, the respondents raised the following issues in relation to retaining the existing bridge:

- The existing bridge should be retained on the grounds of its State heritage significance.
- The existing bridge should be retained for light traffic and pedestrians to continue to serve the needs of the local community. A bypass should be constructed to cater for through traffic and heavy vehicles.
- The argument that the existing bridge might fail during a flood and consequently damage the new bridge is not sufficient justification for its demolition. This risk could be resolved by not building the new bridge so close to the existing bridge.
- A failure to meet current road design standards is not sufficient justification to demolish an historic bridge. No historic bridge would meet the most current road design standards.

Response

As discussed in the EIS, refurbishment of the existing Windsor Bridge was assessed as an alternative option to bridge replacement but was not selected as the preferred option due to the estimated substantial cost and construction phase impacts. The costs of bridge refurbishment have been further considered in this report in response to submissions on the alternative refurbishment proposal put forward by the ex-RMS bridge engineers. Responses to this issue and the results of additional costing carried out for the bridge refurbishment option are presented in **Section 4.4**.

Additionally, there are several reasons why retaining the existing Windsor Bridge does not form part of the preferred option for bridge replacement. Firstly, there are a number of issues associated with retaining the existing bridge that would apply to all alternative bridge replacement options, including the current preferred option and alternative bridge locations:

- If a replacement bridge is built and the existing bridge retained, the existing bridge would no longer be classified as an arterial road. As a non-arterial or local road, the bridge would be the responsibility of Hawkesbury City Council rather than RMS.
- Hawkesbury City Council have indicated that they will not take on responsibility for maintaining the existing bridge as future maintenance costs would be significant.
- While heritage trusts have been used in other locations to maintain bridges, they are costly and run into issues when founding members leave.
- The combined flooding impacts of two bridges would be greater than one bridge and may have significant impacts on existing properties on the floodplain.

For the current preferred bridge replacement option, there is the additional risk that the existing bridge could cause damage to the new bridge in the event of future damage or collapse during a large flood.

As discussed in responses above, a number of extensive inspections, assessments and evaluations have concluded that the bridge requires replacement. The primary driver for replacing Windsor Bridge is to meet engineering standards such as structural integrity, load carrying capacity, durability and maintainability.

2.15.6 Crash history

Submission number(s)

69.

Issue description

One submission raised the issue that the majority of traffic accidents in the project area have occurred on the approaches to the bridge, rather than on the bridge, and that the need to replace the bridge is therefore not justified on the grounds of crash history.

Response

The need for bridge replacement is not driven by crash history. The existing bridge requires extensive rehabilitation work if it is to be used and maintained into the future. The remaining safe life of the bridge cannot be accurately predicted due to ongoing deterioration, heavy use and risk of flooding. In addition to deteriorating with age, the existing bridge does not meet current engineering and road safety standards. Furthermore, the intersections on the existing bridge approach roads cause traffic delays and congestion, and have a number of safety issues, such as lack of safe crossing locations for pedestrians and poor vehicle sight distances. A further limitation of the existing bridge is that it is below the one in two year flood event level while the surrounding approach roads have a higher level of flood immunity. RMS has identified that the most effective solution to address these deficiencies is to replace the existing bridge.

2.16 Issue - Project justification

Many submissions raised concerns relating to project justification, including the claims made by RMS to justify the selection of the preferred option. The issues raised in these submissions related to the:

- Project development process.
- Director General's requirements for assessment of alternatives.
- Use of stated aims and objectives to justify the project.
- Cost effectiveness of the selected preferred option.
- Weighting given to heritage impacts in the assessment of alternatives.
- Weighting given to cost in the assessment of alternatives.
- Accuracy of cost estimates provided by RMS.
- Project objectives and benefits.
- Sustainability.
- The approval process and right to appeal the EIS.

2.16.1 Project development process

Submission number(s)

3, 6, 80, 92, 93 and the Heritage Council of NSW.

Issue description

Several community submissions questioned the transparency and integrity of the project development process, including the integrity of the EIS and the information conveyed to the community. One submission specifically criticised the project development process, arguing that option 1 was identified before community consultation began. This submission also questioned the merits of the alternative options that had been presented to the community and the message communicated about the bridge having deteriorated to the point where it could be closed at any time.

The Heritage Council of NSW contended that there is evidence to suggest that not all options were thoroughly considered prior to the selection of option 1 as the preferred option.

Response

RMS has acted with transparency and integrity throughout all stages of project planning, from options development through to preparation and public display of the EIS. The preferred option was selected following a robust process of identifying and assessing alternative options in consultation with the community and agency stakeholders. The EIS was prepared in consultation with agency stakeholders, has been reviewed by the Department of Planning and Infrastructure, and is considered to meet the Director General's requirements.

The data presented in the EIS are accurate to the best of current knowledge. The data presented in the EIS are based on the best available information, including the results of studies carried out specifically for the analysis of project options and environmental impacts.

Section 2.15.3 of this report discusses the condition of the existing bridge, including the various inspections undertaken, and the decisions made based on investigation findings. Responsibility for maintenance of RMS bridges and other structures lies with the Asset Management branch of RMS. As described in **Section 2.15.3**, the asset managers identified significant structural issues with the bridge that required action. Rehabilitation of the existing bridge was considered but was costed at around \$18 million and identified as requiring significant works, including the need for temporary bridge closures. At that time, the cost of a new bridge was estimated to be around \$25 million.

The replacement of the bridge was subsequently identified by Asset Management Branch as the preferred option to address the structural issues. However, while the bridge replacement was favoured by the asset managers it had not received broader RMS consideration at that time and was therefore not RMS' preferred option.

In late 2008 and 2009, the project received wider consideration by other sections of RMS and the need for more thorough consideration of options was subsequently identified. As a result, RMS considered a range of options, which were presented to the community in July 2009 for feedback. The nine options presented were considered appropriate at that time. Consideration of an exhaustive list of all potential options is simply not feasible. A report documenting community and stakeholder feedback on the options was published in November 2009.

An assessment of the identified alternative options was subsequently undertaken and the community's comments considered. In August 2011, an options report was published, accompanied by various technical investigations used to inform the options selection process. The replacement of the existing bridge was confirmed as the preferred option and the subject of the EIS. The process is discussed in detail in Section 4.1 of the EIS.

An assessment of various alternative options proposed by the community, including three options proposed by the ex-RMS bridge engineers, was presented in Section 4.2 of the EIS based on the information available at that time. Further detail on the Rickabys Line option proposed by the ex-RMS bridge engineers was provided during the exhibition of the EIS. Based on the additional available information on this option, a more detailed examination of the Rickabys Line option is presented in **Chapter 4** of this report.

2.16.2 Director General's requirements for assessment of alternatives

Submission number(s)

84.

Issue description

One submission contended that the Director General's requirements regarding project development and alternatives have not been met. In particular, the respondent contended that alternative options proposed by the community, including the Rickabys Line option developed by the ex-RMS engineers, were not rigorously assessed in the EIS.

Response

Having reviewed the EIS as submitted, and considered RMS' responses to various matters on which the Department of Planning and Infrastructure required further information, the Department placed the EIS on public exhibition on 14 November 2012.

A range of options were considered during the options selection process, including a number of options identified by the community. The options assessment process took into account transport needs, heritage impacts, environmental impacts and engineering and cost constraints.

The EIS included a brief assessment of the Rickabys Line option. It was not possible to provide a more detailed description of this option in the EIS as a clear description of the option was not presented to RMS during the EIS preparation period. As shown in Figure 4-1 in the EIS, three different routes of the Rickabys Line option were identified by the ex-RMS bridge engineers before a final route was selected and costed.

Based upon the information provided by the ex-RMS bridge engineers, a preliminary concept design of the Rickabys Line option has since been developed to enable a more detailed impact assessment and costing in response to submissions. The detailed impact assessment and cost estimates of the Rickabys Line option is presented in **Chapter 4**.

2.16.3 Use of stated aims and objectives to justify the project

Submission number(s)

93.

Issue description

One submission contended that the project aims and objectives, as stated in the EIS, have predetermined the selection of the project as the preferred option. In summary, the respondent raised the following issues:

- The overall project aim *to provide a safe and reliable crossing of the Hawkesbury River at Windsor* precludes consideration of a bypass.
- There was no benchmarking of project objectives or quantitative measurement of project performance against the objectives.
- The objectives are open to subjective interpretation and were changed to suit the project.
- Many of the objectives and associated criteria identified lack any objective measure of achievement. This is particularly problematic for an objective such as "minimises impact of noise" where existing noise levels in Thompson Square already exceed acceptable levels.
- The objective of minimising impact on heritage and the character of the local area fails to recognise the possibility of eliminating impacts altogether.
- No single solution could ever meet all of the objectives and cost was the overriding factor in option selection.

- Finally the failure to define 'cost effective' is a significant omission. If cost effective simply means 'cheapest option' there is little point in having any other objectives, as the cheapest project must in such a situation, always be the preferred option, regardless of the consequences.

Response

The overall project aim did not limit the consideration of a bypass option. As discussed in Section 4.2 of the EIS, a number of bypass options were considered but were discounted for various environmental and economic reasons.

It was recognised during the options assessment phase that the six project objectives did not provide sufficient scope or detail to assess the different options. In response, more detailed project criteria were developed for each objective. These criteria were used to compare the relative performance of each option. While it may have been possible to benchmark some of the project criteria, other criteria are difficult to benchmark as they are either largely qualitative measures or complex criteria with a large number of possible outcomes that cannot be summarised into a single quantitative figure (eg noise). Additionally, on other route options assessments, criteria or objectives have not been benchmarked.

The project criteria define attributes of an option that are highly desirable and it would not be expected that any specific option would fully satisfy all criteria. They have therefore been used to assess and compare the relative performance of the different options.

Cost was an important consideration in selecting a preferred option, especially given the cost differential between the project and a bypass option. Additionally, the project is not the cheapest option. There are a number of even cheaper options that could have been selected, including:

- Refurbishment of the existing bridge - this would not have resulted in the traffic benefits that the proposed option would provide the community and road users.
- Construction of a pre-cast plank bridge instead of an incrementally launched bridge. An incrementally launched bridge costs substantially more than a pre-cast plank bridge but was selected as the preferred bridge type as it would have less piers, less visual impact, and could be constructed predominately from the northern bank, avoiding more considerable construction impacts on Thompson Square.

2.16.4 Cost effectiveness of selected preferred option

Submission number(s)

69.

Issue description

One submission raised the following issues in relation to the cost effectiveness of the project:

- As project does not serve the needs of the community and road users in the long-term, it is not cost effective.

- The EIS suggests that the heritage impacts of the project are reversible because the replacement bridge and approach roads could be removed at a later date. This would not be cost-effective or affordable and does not represent responsible long term planning.

Response

The preferred option is the most cost effective way of achieving the primary aim of the project, being to maintain a safe and reliable crossing of the Hawkesbury River at Windsor. Parts of the existing bridge are over 130 years old and are substantially deteriorated due to age, flooding and heavy use. The existing bridge requires extensive rehabilitation work if it is to be used and maintained into the future. Despite ongoing maintenance, the bridge structure continues to deteriorate and the remaining safe life of the bridge cannot be accurately predicted. In addition to deteriorating with age, the existing bridge does not meet current engineering and road safety standards and the approach roads and intersections have a number of safety issues, such as lack of safe crossing locations for pedestrians and poor vehicle sight distances. A further limitation of the existing bridge is that it is below the one in two year flood event level while the surrounding approach roads have a higher level of flood immunity. RMS has identified that the most effective solution to address these deficiencies is to replace the existing bridge. In comparison to other options available, the preferred option for the project performs best in terms of value for money and satisfies the majority of project objectives.

Section 11.1.3 of the EIS states that conceivably the impacts on views and vistas are not fully irreversible as the replacement bridge and approach roads could be removed from the square at a later date, as has been demonstrated by the numerous redevelopments and reconfigurations of Thompson Square over the past 230 years. However, demolition of the existing bridge, which contributes to the heritage views and vistas, would be an irreversible impact.

2.16.5 Weighting given to heritage impacts in the assessment of alternatives

Submission number(s)

11, 16, 17, 24, 29, 44, 54, 66, 70, 80, 84, 85, 87, 88, 93, 95 and the Heritage Council of NSW.

Issue description

Many submissions suggested that the significant adverse impacts on heritage that would result from the project were not given sufficient weighting in the selection of the preferred option, and that the long-term and irreversible impacts on heritage are not justified given the project's minor benefits. In summary, the respondents raised the following issues:

- The location and scale of the proposed replacement bridge and southern approach road is totally inappropriate for such a significant heritage precinct.
- Sufficient weighting was not given to impacts on the heritage values of Thompson Square when assessing the cost effectiveness of the project.
- The heritage impacts of this project are not justified by its minor benefits and short-term traffic improvements.
- The heritage impacts of the project seem a high price to pay, especially given that the project will provide very few benefits and viable alternatives exist.

- The project as proposed is not supported by the Heritage Council of NSW or the National Trust of Australia (NSW) Hawkesbury Branch.
- The fundamental objective of the proposal appears to be to facilitate the movement of large volume of traffic through Windsor. Given that plans to increase housing development around Windsor will result in increased traffic volumes, it is totally inappropriate for such traffic to be directed through the centre of such an important heritage area.
- The disruption to the historic precinct of Thompson Square is proposed merely for the purpose of facilitating freight vehicles to pass through the town on the way to the Upper Hunter region. There is no reason for any of these vehicles to come anywhere near Thompson Square when their journeys begin and end far from Windsor.
- To claim that the option 1 site for the replacement bridge is the best site because it is the historical river crossing site is ridiculous. The option 1 site is only suitable for a small bridge, not one that accommodates heavy vehicles and meets current design standards. A bridge large enough to meet traffic requirements cannot be accommodated in Thompson Square without significant impacts on heritage.
- The historic value of Windsor to NSW and Australia will be realised in future years. Something of inestimable value will be lost if we look at this from a purely financial level today.
- The adverse heritage impacts of the project will constitute a significant and irretrievable loss of the heritage of Australia's most historic colonial town.
- Hawkesbury residents being given a half-baked, wasteful project that fails to provide any benefits while at the same time destroying one of the most precious areas of historic heritage.
- Probably the most disturbing aspect of the costings involved in this project is that at no time has the RMS placed a value on the heritage it is going to destroy. Heritage has value. This value is quantifiable. By not valuing Heritage the RMS and the Government is in breach of its commitment to the Burra Charter.

The Heritage Council of NSW also noted that the cost versus benefit analysis in the EIS does not adequately address or weight the value of the listed items in Thompson Square and Windsor as a unique and irreplaceable heritage asset for the State of NSW.

Response

The potential heritage impacts of the project have been minimised in the selection of the design for the replacement bridge. The EIS also identifies additional measures to avoid, manage and mitigate heritage impacts during future stages of the project, including detailed design and construction.

The EIS acknowledges that, despite minimising impacts on heritage as part of the design process, and implementing additional management measures during detailed design and construction, the project would still have significant adverse residual impacts, including demolition of Windsor Bridge, impacts on the form of Thompson Square, impacts on historic views and vistas, and impacts on archaeological records. The Department of Planning and Infrastructure will carefully consider the conclusions of the EIS and Heritage Working Paper, the heritage significance and values of the area, and any comments made by the community and government agencies (including the Heritage Council) during assessment of the project.

If the project is approved, the project would be undertaken in accordance with the impact mitigation and management measures identified in the EIS, as well as any additional measures identified in the Minister's Conditions of Approval. The Heritage Council of NSW would also be involved in providing advice to the Department of Planning and Infrastructure on the Ministers Conditions of Approval.

The decision regarding the preferred option was based on the outcomes of a detailed options assessment process, which involved engineers, urban designers and architects working collaboratively with environmental and heritage specialists and taking into account input from the community and stakeholders. The options assessment process took into account transport needs, heritage impacts, environmental impacts and engineering and cost constraints. The preferred option has been selected as the best option, on balance, to achieve the primary aim of the project, being to maintain a safe and reliable crossing of the Hawkesbury River at Windsor. In comparison to other options, the preferred option for the project performs best in terms of value for money and satisfies the majority of project objectives.

The cost benefit analysis in EIS is based upon the traffic performance and the whole of life cost of the project. While the economic analysis considers certain environmental impacts it does not include costs associated with heritage impacts. However, potential heritage impacts of the project were considered in the assessment of options against the project objectives and criteria.

2.16.6 Changes in the Benefit Cost Ratio methodology

Submission number(s)

95.

Issue description

One submission raised the issue that the methodology for the Benefit Cost Ratio (BCR) had changed between the options report and the EIS, and that this change was made to provide a more favourable outcome for the project.

Response

The EIS clearly states that the methodology for the BCR assessment changed between the options assessment phase and the EIS. One of the reasons for this is that more detailed information on traffic performance was available for the EIS in comparison to the options phase. The BCR for the options phase also assumed that, for the base case, the existing bridge would fail and all traffic would need to travel via Richmond. This scenario was considered unrealistic during the preparation of the EIS and the base case for the EIS BCR assessment therefore assumed that the existing bridge would be maintained. It is recognised that, with these changes in data availability and the base case, the BCR for alternative options to the project would also change and more than likely increase. **Section 4.5.1** of this report provides a BCR assessment for the project compared to the Rickabys Line option. This shows that, while the BCR for a bypass would be higher than that presented in the options report, it would still be considerably lower than the BCR for the project.

2.16.7 Weighting given to cost in the assessment of alternatives

Submission number(s)

24, 17, 68 and 93.

Issue description

A number of submissions contended that the selection of the preferred option was based largely on cost, with the preferred option being the cheapest option. There was also concern that predicted cost of the preferred option has risen. In summary, the respondents raised the following issues:

- The historic value of Windsor to NSW and Australia will be realised in future years. Something of inestimable value will be lost if we look at this from a purely financial level today.
- The selected preferred option is not the best available option. "It's all about a cash-strapped State Government looking for the cheapest possible option, without any regard for their responsibilities to the community they serve, or future generations"
- Financial costs have been used to eliminate alternatives to option 1 regardless of the social, environmental and historic and heritage costs imposed by option 1.
- Cost was the overriding factor in the selection of option 1 as the preferred option and has been given a higher weighting than any other selection criteria in the options selection process.
- The predicted cost of the preferred option has risen from \$23 million to \$60 million.

Response

In comparison to the other options considered, the project provides value for money and, while it does not address the project objectives of minimising heritage and visual impacts as well as other options that were considered, mitigation measures have been proposed to reduce these impacts to the extent possible. It is noted, however, that the impacts would not be eliminated.

It is also recognised that the cost of the project has increased since first proposed, however remains substantially less expensive than other options considered and provides the best value for money based on economic analysis.

2.16.8 Accuracy of cost estimates provided by RMS

Submission number(s)

6, 11, 66, 84, 93, 94 and 95.

Issue description

Several submissions raised concerns about the cost estimate provided by RMS for the refurbishment of the existing Windsor Bridge and the use of this cost estimate by RMS to dismiss the refurbishment option. In summary, the respondents raised the following issues:

- RMS have over-estimated the cost of refurbishing the existing bridge to justify the project.

- Independent bridge engineers say the existing bridge can be fixed for \$4 million and will last 100 years. This is substantially lower than the cost estimate provided by RMS (\$18 million).
- The discrepancy in the cost estimates for bridge refurbishment provided by RMS and the independent bridge engineers is grounds for a re-evaluation of all costing information provided to the public in relation to selection of the preferred option.
- Selection of the project is not justified when the existing bridge could be maintained and a bypass built for the same cost.
- There was no breakdown of costings for accurate comparison of options in the EIS.

Response

As discussed in the EIS, refurbishment of the existing Windsor Bridge was assessed as an alternative option to bridge replacement but was not selected as the preferred option due to the estimated substantial cost and construction phase impacts. The costs of bridge refurbishment have been further considered in this report in response to submissions on the alternative refurbishment proposal put forward by the ex-RMS bridge engineers. The results of additional costing carried out for the bridge refurbishment option are presented in **Section 4.4**.

2.16.9 Project objectives and benefits

Submission number(s)

2, 24, 32, 51, 54, 66, 68, 69, 72, 80, 84, 85, 86, 92, 93, 94, 95 and the Heritage Council of NSW.

Issue description

Many submissions contended that the benefits of the project were minimal and did not provide sufficient justification for the project to go ahead. In summary, the respondents contended the following:

- The project will benefit no one.
- The like for like replacement of the bridge is a waste of money.
- There has been little clarity as to what the project will achieve. Stated objectives and outcomes seem to keep changing and seem to be no more than public relations spin.
- The project will not substantially improve traffic flow or flood immunity so there is no practical reason for the project to go ahead.
- The preferred option is being promoted as the solution that best meets community needs and project objectives, although it will have little or no benefit for the community and have a permanent and highly detrimental impact on Thompson Square and surrounds.
- The impacts of the project on heritage are not justified as the project does not meet RMS' claimed project objectives.
- The EIS displays a lack of understanding of local community needs. It does not adequately reflect the loss of commercial, tourism, traffic improvement and flood management opportunities that would be caused by the project.

- The project will not meet the stated project objective to minimise impacts on heritage and the character of the local area.
- The project will not meet the stated project objective to improve safety and traffic efficiency for motorists, pedestrians and cyclists.
- The project will not meet the stated project objective to meet long term community needs.
- The “star” comparisons in Table 4-2 of Volume 1 of the EIS allocates option 1 (the preferred option) two stars for pedestrian safety and two stars for design codes. This is misleading because the hazardous roundabout at George Street would remain until Stage II (in the indeterminate future). These entries should therefore be zero stars.
- The assessment of the project against the objectives and criteria presented in the EIS is biased and incorrect.

The Heritage Council of NSW also noted that the project will not meet the stated project objective to minimise impacts on heritage and the character of the local area.

Response

In comparison to other options, the preferred option for the project performs best in terms of value for money and satisfies the majority of project objectives. The project would provide a new bridge, approach roads and intersections to current road design standards. The project design would improve the level of flood immunity to match that of the surrounding approach roads, and provide a safer crossing for vehicles, cyclists and pedestrians. The proposed intersection improvements and an initial two lane bridge configuration would provide acceptable traffic performance immediately and into the future. The bridge has also been designed so that it can be subsequently reconfigured to a three lane bridge (with two southbound lanes and one northbound lane) to meet future traffic demands, as required.

The existing bridge requires extensive rehabilitation work if it is to be used and maintained into the future. The remaining safe life of the bridge cannot be accurately predicted due to ongoing deterioration, heavy use and risk of flooding. In addition to deteriorating with age, the existing bridge does not meet current engineering and road safety standards. The intersections associated with the existing bridge approach roads cause traffic delays and congestion, and have a number of safety issues, such as lack of safe crossing locations for pedestrians and poor vehicle sight distances. These intersections cannot be upgraded to the same degree as proposed for the project without also constructing the proposed replacement bridge. A further limitation of the existing bridge is that it is below the one in two year flood event level while the surrounding approach roads have a higher level of flood immunity. RMS has identified that the most effective solution to address these deficiencies is to replace the existing bridge.

The adverse impacts of the project have been considered in design and options development, and would be further mitigated and/or managed using the measures identified in this EIS. These include detailed management and conservation measures to avoid, minimise and mitigate impacts on historic heritage, as well as urban design and landscape treatments to integrate the new bridge with the existing environment. The proposed consolidation of Thompson Square, combined with the new pedestrian and cycle facilities, would improve the amenity of Thompson Square and its connection to the river.

Staging of the project was considered during the project development phase and it is recognised that some initial project information stated that the project would be delivered in two stages. The first stage was to consist of the replacement bridge and northern intersection and the second stage the upgrade of the Georges Street/ Bridge Street intersection and the widening of the Fitzroy Bridge over South Creek. During the preparation of the concept design and EIS, and community consultation and feedback regarding the lack pedestrian safety in this area, RMS decided to incorporate the signalised intersection into the project so that the benefits of the upgraded George Street/ Bridge Street intersection would be realised and to minimise cost and construction impacts on the community.

2.16.10 Benefits to pedestrian and cyclist safety

Submission number(s)

69, 93 and 95.

Issue description

Three submissions argued that greater improvements in pedestrian and cyclist safety would be achieved by minor intersection modifications and by removing heavy vehicles and through traffic from the main tourist area of Windsor, rather than through the proposed bridge replacement project. For this reason, the respondents felt that the improvements in pedestrian and cyclist safety did not justify the project.

Response

The need for bridge replacement is not driven by the need to improve pedestrian and cyclist safety. This is just one of the benefits that would be achieved through the preferred option.

As discussed in **Section 2.4.7**, the intersection upgrades proposed as part of the project could not be undertaken without the replacement bridge also being constructed. This is because the levels and alignments of the approach roads to the existing bridge would not allow a roundabout to be constructed at the northern intersection or traffic lights to be installed at the Bridge Street/ George Street intersection. The only intersection upgrade that would be feasible would be the installation of traffic lights at the Freemans Reach Road/ Wilberforce Road intersection. This would provide some minor benefits to pedestrians accessing Macquarie Park but, without the construction of additional paths, it would not address any other issues with pedestrian and cyclist movements in and around Thompson Square or across the river.

Additionally, as noted in **Section 2.4.7**, if the project was not to proceed the options for the upgrade of the intersections at George Street/Bridge Street and Freemans Reach Road/Wilberforce would be limited due to the levels and location of the approach roads to the existing bridge. There would be no upgrade possible to the George Street/ Bridge Street intersection and only traffic lights would be feasible at the intersection of Freemans Reach Road and Wilberforce Road. Most of the benefits for pedestrians and cyclists that would be provided by the project would not be realised with alternative options.

Additional benefits include:

- A three meter wide shared path across the bridge.
- Relocation of the shared path to the upstream side of the bridge allows a better connection between Thompson Square/George Street and the Macquarie Park reserve, which is becoming more popular with tourist and the local community. This connection allows pedestrians and cyclist to enjoy both parklands on either side of the river without having to cross the road.
- An underpass will also be provided on the northern side where pedestrians and cyclist who have Wilberforce as a destination also make the connection without crossing a road or negotiating the dual lane roundabout.

2.16.11 Benefits of removing the 1934 road cutting

Submission number(s)

54, 70, 93 and the Heritage Council of NSW.

Issue description

Three community submissions refuted the claims made in the EIS that the adverse impacts of the project on heritage would be mitigated to some degree by the removal of the existing 1934 road cutting through Thompson Square and the consolidation of the upper and lower parkland areas. In summary, the respondents raised the following issues:

- The existing road cutting through Thompson Square was constructed by the RMS equivalent in the 1930s despite protests by the people and the Mayor on the grounds of impacts on Thompson Square. The current proposal is history repeating itself in terms of destruction of heritage by the roads authority.
- The claim that the consolidation of the upper and lower parkland areas would increase the area of usable open space within Thompson Square and improve access to the waterfront dismisses the following issues:
 - Extensively regrading the ground levels within the square will result in destruction of its heritage.
 - The existing 1934 road cutting also works well in Thompson Square, in that it hides the traffic from the view of people sitting in the upper parkland and absorbs most of the noise from the road making the area more attractive.
 - The bisection of Thompson Square by Bridge Street gives it an interesting character that will be lost with the new road and consolidation of the parkland. The upper parkland area has a close connection to George Street and is a focal point for the community, while the lower section of the park has an open feel and is a great area for people to stop and enjoy views of the river. Views to the river from the proposed consolidated parkland would not be as good as those currently provided by the existing lower parkland.

The Heritage Council of NSW raised the following additional issue:

- The contours, shape, appearance and layout of Thompson Square have altered over time, with various changes occurring over its 200 year life reflecting its role as a key public space in Windsor. It is therefore an incorrect argument to suggest that removing the existing road cutting provides an opportunity to 'reinstate' the square in a single and most 'correct' configuration.

Response

The EIS states that the benefits of the project would include removal of the existing bridge approach road through Thompson Square and subsequent unification or amalgamation of the upper and lower parkland areas that are currently dissected by this road. The EIS describes this component of the project as a benefit to community amenity, not a benefit to heritage values. The EIS describes the removal of the existing bridge approach road through Thompson Square as “reinstating” this area of land as part of the square. It also states that it provides an opportunity to reinstate the typical Macquarie era grid street layout and improve the relationship between the open space and the river. It does not state that unifying the upper and lower reserves reinstates the square in its 'correct' configuration. However, interestingly the SHR listing for Thompson Square states in relation to the cutting:

“The centre of Thompson Square is spoilt by a main road which slices diagonally through it and into a cutting, destroying the visual integrity of the space as was originally intended.”.

The existing diagonal cutting of Bridge Street through Thompson Square results in a strong physical split of the open space into two disconnected triangular shaped reserves. The division creates a distinct upper open space area adjacent to George Street (the upper parkland) and a lower open space area adjacent to The Terrace and river foreshore (the lower parkland). The existing road cutting and connection to the southern bridge abutment also severs The Terrace at the point where The Terrace meets Bridge Street. This prevents pedestrian, cycle and vehicle access along The Terrace between the main area of Windsor and the wharf. Not only does the existing road cutting and connection to the southern bridge abutment sever The Terrace, pedestrians have to use a dark passageway with a set of timber stairs to go under the existing bridge. Additionally, pedestrians wanting to access the river from George Street currently have the choice of either:

- Crossing the road at the roundabout without pedestrian crossing facilities and traveling down Old Bridge Street, which does not have a dedicated pedestrian path.
- Taking the long detour via Thompson Square Road, The Terrace, and the stairs under the bridge.

On these grounds it is concluded that the removal of the existing 1934 road cutting through Thompson Square, the corresponding consolidation of the upper and lower parkland areas, and the provision of new pedestrian and cyclist facilities would improve the amenity and safety of the area for community and visitor use.

2.16.12 Sustainability

Submission number(s)

6, 16, 42, 52, 56, 72, 74, 85, 86, 87 and 93.

Issue description

Many submissions contended that the project is not sustainable. In summary, the respondents raised the following issues:

- The current proposal is short-sighted and is not sustainable.

- The current proposal is a short-term solution - it will be an expensive and irreparable quick fix with long-term impacts on Windsor.
- Leaving the route through the Square area, at very best, can only postpone problems for future generations.
- The traffic modelling indicates that the new bridge will reach capacity by 2026. By the time the new bridge is constructed and opened to traffic, it would therefore be viable for only around 10 years. To spend such a considerable amount of money on a project that will only be suitable for a decade does not seem to be in the best interests of the local community or NSW taxpayers.
- At no time has RMS placed a value on the heritage it is going to destroy. Heritage has value that is quantifiable. By not valuing Heritage, RMS and the Government is in breach of its commitment to the Burra Charter.

Response

Section 11.1.3 of the EIS discusses the principles of Ecologically Sustainable Development, including the principle of intergenerational equity, which requires that the present generation should ensure the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations. Apart from heritage, the project would at a minimum maintain the health, diversity and productivity of the environment while also enhancing the amenity of the environment by increasing the area of continuous open space within Thompson Square and improving pedestrian and cyclist access, both between Thompson Square and the river, and across the river.

Where possible, the assessments of impacts from the project have taken into account future growth in traffic thereby determining whether the project would impact future generations. Based on these impact assessments, apart from the loss of heritage vistas and values, the project would not have significant additional impact on future generations. For heritage, a comprehensive archaeological investigation and salvage program would be undertaken before construction to enable archaeological recording of the historical development of the area for future generations.

Growth in traffic volumes is discussed further in **Section 2.8.2** of this report.

2.16.13 The approval process and right to appeal the EIS

Submission number(s)

3, 93 and 95.

Issue description

One submission contended that there is no right to appeal the EIS and two others challenged the declaration of the project as State Significant Infrastructure (SSI).

Response

The definition of what constitutes SSI is provided under Section 115U of the EP&A Act. In general terms, a development is declared SSI under Section 115U of the Act if one of the following two conditions apply:

1. The development on the land concerned is, by the operation of a State Environmental Planning Policy (SEPP), permissible without development consent under Part 4 of the EP&A Act, and the development is specified in Schedule 3 of the State and Regional Development SEPP.
2. The development is specified in Schedule 4 of the State and Regional Development SEPP.

The project is declared SSI because the first of the above-listed conditions apply. To explain further, the development specified in Schedule 3 of the State and Regional Development SEPP includes (but is not limited to) general infrastructure or other development by public authorities (other than a council or county council) that (but for Part 5.1 of the Act and within the meaning of Part 5 of the Act) would be an activity for which the proponent is also the determining authority and would, in the opinion of the proponent, require an EIS to be obtained under Part 5 of the Act.

The classification of the project as SSI under the EP&A Act, while making it exempt from the need for heritage approvals under the Heritage Act does not exempt it from heritage considerations. Heritage impacts have been considered to the same degree as they would have been had the project not been classified as SSI.

Judicial review proceedings are available under the EP&A Act.

2.16.14 Justification of the project using local and NSW plans and policies

Submission number(s)

95.

Issue description

One submission contended that the justification of the project using various local and NSW plans and policies was disingenuous as most of these plans and policies did not directly reference the project.

Response

One of the Director General's requirements issued by the Department of Planning and Infrastructure for the EIS was an assessment of the project against relevant local and NSW Government plans and policies. To provide a complying EIS, an assessment of the project against these plans and policies within the EIS document was required. These plans and policies were not used as a justification for the project, rather the project was assessed to largely meet some of the objectives of these plans and policies. It is recognised that the project is not explicitly mentioned in many of the NSW plans and policies but this does not negate the requirement to assess the project against their general objectives.