



CAMBRAY consulting
Traffic Engineering and Transp



Windsor Bridge Replacement Project
*Traffic Review and Information Provided by the Applicant (Roads and
Maritime Services)*

FINAL REPORT

*Prepared for NSW Department of Planning and Infrastructure
15 August 2013*

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APPENDIX A

Traffic Information Request (Cambray Consulting)

22 April 2013

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Cambray Consulting Traffic Information Request

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Background Count Data provided by

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Ray Wedgewood



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Roads and Maritime Services (RMS) is seeking project approval from the NSW Department of Planning and Infrastructure for the Windsor Bridge replacement project. RMS has prepared an Environmental Impact Statement (EIS) and a number of technical reports to support their application for this project.

Cambray Consulting was engaged by NSW Department of Planning and Infrastructure to assist in the assessment of the application information provided by RMS, focussing specifically on the issues relating to the proposal.

1.1 Scope of Services

Our review was included the following tasks:

- (a) Two site visits to Windsor to observe current road conditions, constraints, and opportunities;
- (b) A review of the relevant publicly available project documentation, including:
 - i. The Options Report (August 2011);
 - ii. The Traffic Modelling and Evaluation of Options Preliminary Report (August 2011);
 - iii. The Community Issues Report (October 2011);
 - iv. The Traffic and Transport Chapter of the Project Environmental Impact Statement (EIS), and the Traffic and Transport Working Paper with EIS (November 2012);
 - v. The Submissions Report prepared by RMS in response to issues raised in submissions (April 2013);
 - vi. Various other documents such as meeting minutes, presentations, community updates and information sheets
- (c) Meeting with representatives NSW Department of Planning and Infrastructure
- (d) Preparation of a preliminary list of additional information which we suggest sought from the applicant to enable more thorough and informed consideration of the information (see Appendix A)
- (e) A broad review of additional information prepared by RMS in response to the above, received on 16 May 2013. (see Appendix B)
- (f) Sensitivity / option testing modelling for key intersections;
- (g) A broad review of additional information provided by RMS provided by NSW Department of Planning and Infrastructure to Cambray Consulting (29 July 2013);
- (h) High level consideration of some potential alternative to the currently preferred option
- (i) Recommendations on clarifications to be sought from RMS on identified issues, as well as suggested

This report provides a summary of the results of the above tasks investigations

1.2 Limits of Report

This report takes into account the particular instructions and requirements of our client. Cambray Consulting care in the preparation of this report, however it neither accepts liability nor responsibility whatsoever in re

- < Any use of this report by any third party;
- < Any third party whose interests may be affected by any decision made regarding the contents of this report and/or
- < Any conclusion drawn resulting from omission or lack of full disclosure by the applicant or any other parties.

The information in this report focuses on traffic and transport related issues, and suggestions and recommendations have been made accordingly. We recognise the importance of achieving a balance between the needs, social and heritage impacts, ecological engineering and cost constraints, and the suggestions and recommendations we have made should be considered by decision makers with reference to representatives from the relevant disciplines as well as the local community.



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A number of documents and reports addressing traffic and transport related issues prepared by RMS throughout the various stages of this project. The documents which we have reviewed, and which are publicly available on the RMS Road Projects website, are listed in the table below. A link to each of the documents is also provided in this table.

Further information which has been provided to us under strict confidentiality and is not currently publicly available, has been appended to this report. References to these appendices are provided in the relevant sections of this report.

Table 2.0: List of Documents Reviewed and Links to Documents

Document / Information	Date	Link to Document
The Options Report	August 2011	http://www.rta.nsw.gov.au/roadprojects/projects/sydney_region/windsor_bridge/documents/windsor_bridge_report_aug2011.pdf
The Traffic Modelling and Evaluation Options Preliminary Report	August 2011	http://www.rta.nsw.gov.au/roadprojects/projects/sydney_region/windsor_bridge/documents/tech_reports_aug_c_modelling_and_evaluation_options_preliminary_report_aug2011.pdf
The Community Issues Report	October 2011	http://www.rta.nsw.gov.au/roadprojects/projects/sydney_region/windsor_bridge/documents/windsor_bridge_community_issues_report_oct2011.pdf
The Project Environmental Impact Statement (EIS), Assessment of key issues - Traffic and transport (Chapter 7.3)	November 2011	http://www.rta.nsw.gov.au/roadprojects/projects/sydney_region/windsor_bridge/documents/eis/volume_1/windsor_bridge_eis_chapter_7_3_traffic_transport_nov2012.pdf
The Project Environmental Impact Statement (EIS), Traffic and Transport Working Paper (Working Paper 4)	November 2011	Part 1: http://www.rta.nsw.gov.au/roadprojects/projects/sydney_region/windsor_bridge/documents/eis/volume_4/windsor_bridge_traffic_and_transport_working_paper_part_1_nov2012.pdf Part 2: http://www.rta.nsw.gov.au/roadprojects/projects/sydney_region/windsor_bridge/documents/eis/volume_4/windsor_bridge_traffic_and_transport_working_paper_part_2_nov2012.pdf Part 3: http://www.rta.nsw.gov.au/roadprojects/projects/sydney_region/windsor_bridge/documents/eis/volume_4/windsor_bridge_traffic_and_transport_working_paper_part_3_nov2012.pdf



Document / Information	Date	Link to Document
The Submissions Report	April 2013	Part 1: http://www.rta.nsw.gov.au/roadprojects/projects/sydney_tern_sydney/windsor_bridge/documents/submissions_report_bridge_submissionspir_toch2.pdf
		Part 2: http://www.rta.nsw.gov.au/roadprojects/projects/sydney_tern_sydney/windsor_bridge/documents/submissions_report_bridge_submissionspir_ch3.pdf
		Part 3: http://www.rta.nsw.gov.au/roadprojects/projects/sydney_tern_sydney/windsor_bridge/documents/submissions_report_bridge_submissionspir_ch4.pdf
		Part 4: http://www.rta.nsw.gov.au/roadprojects/projects/sydney_tern_sydney/windsor_bridge/documents/submissions_report_bridge_submissionspir_ch5toappendixa.pdf
		Part 5: http://www.rta.nsw.gov.au/roadprojects/projects/sydney_tern_sydney/windsor_bridge/documents/submissions_report_bridge_submissionspir_appendixb.pdf
		Part 6: http://www.rta.nsw.gov.au/roadprojects/projects/sydney_tern_sydney/windsor_bridge/documents/submissions_report_bridge_submissionspir_appendixb_att1_1.pdf
		Part 7: http://www.rta.nsw.gov.au/roadprojects/projects/sydney_tern_sydney/windsor_bridge/documents/submissions_report_bridge_submissionspir_appendixb_att1_2.pdf
		Part 8: http://www.rta.nsw.gov.au/roadprojects/projects/sydney_tern_sydney/windsor_bridge/documents/submissions_report_bridge_submissionspir_appendixb_att1_3.pdf
		Part 9: http://www.rta.nsw.gov.au/roadprojects/projects/sydney_tern_sydney/windsor_bridge/documents/submissions_report_bridge_submissionspir_appendixb_att1_4.pdf
		Part 10: http://www.rta.nsw.gov.au/roadprojects/projects/sydney_tern_sydney/windsor_bridge/documents/submissions_report_bridge_submissionspir_appendixc.pdf
		Part 11: http://www.rta.nsw.gov.au/roadprojects/projects/sydney_tern_sydney/windsor_bridge/documents/submissions_report/windsor_bridge_submissionspir_appendixd.pdf
		Part 12: http://www.rta.nsw.gov.au/roadprojects/projects/sydney_tern_sydney/windsor_bridge/documents/submissions_report/windsor_bridge_submissionspir_appendixe.pdf
		Part 13: http://www.rta.nsw.gov.au/roadprojects/projects/sydney_tern_sydney/windsor_bridge/documents/submissions_report/windsor_bridge_submissionspir_appendixf_g.pdf

We have considered the contents and conclusions of the submissions listed above and our comments and suggestions are provided in the following sections.



2.1 Options Report (published August 2011)

Link to Document:

http://www.rta.nsw.gov.au/roadprojects/projects/sydney_region/western_sydney/windsor_bridge/bridge_options_report_aug2011.pdf

The Options Report, which was published in August 2011, includes the following

- ◁ Background information and site context;
- ◁ A description of the options that were considered;
- ◁ A high level comparison of the options against one another and the project objectives;
- ◁ The outcomes of an economic analysis of all the options;
- ◁ A summary of the outcomes of the Stakeholder Workshop on Options (18 September 2009) which options for further consideration were identified (Option 1, Option 3, and Option 6);
- ◁ Descriptions of refinements to Option 1, Option 3, and Option 6; and
- ◁ Identification of the preferred option (i.e. Option 1).

At the stakeholder workshop held on 18 September 2009, participants were asked to consider the nine options and identify the positive and negative aspects of each. The evaluation was carried out in two stages: an initial review to exclude options that did not meet the selection criteria, and a second more detailed consultation to rank the remaining options. A summary of the outcomes of this workshop is provided below. In this report, these outcomes are provided in the following sections.

Table 2.1: Summary of Outcomes of Stakeholder Workshop on Options (18 September 2009)

Option	Description	Outcome (Review 1)	Outcome (Review 2)
Option 1	High level 35 metre downstream of existing bridge	Assessed further by the group	Assessed further by the group
Option 2	Low level 35 metre downstream of existing bridge	Assessed further by the group	Assessed further by the group
Option 3	High level 10 metre upstream of existing bridge	Not favoured by group due to severance of town and loss of its unique character	Option 3 was not originally considered favourably due to constructability issues within Thompson Square. However a number of alterations to the design of the new bridge were suggested to address the issues that previously were of concern.
Option 4	From Windsor Road, along Macquarie Street and then along Baker Street	Not favoured by group due to severance of town and loss of its unique character	
Option 5	From Windsor Road, along Macquarie Street and then along Kable Street	Not favoured by group due to severance of town and loss of its unique character	
Option 6	From Windsor Road via new T intersection north of Town Road and via new alignment east of Palmer Street	Assessed further by the group	Assessed further by the group
Option 7	From Windsor Road along Cour and North Streets and then along Palmer Street	Assessed further by the group	The group considered that option would have major heritage impact and create potential traffic safety issues and recommended that it not be considered further.



Option	Description	Outcome(Review 1)	Outcome(Review 2)
Option 8	From Windsor Road along Pitt Town Road, Bathurst Street, F Road and then on a greenfield route to cross the Hawkesbur River to meet King Road and th to Wilberforce Road	Removed from further consideration due to capital c	
Option 9A	Refurbish existing bridge deck only	Assessed further by the group	The group considered that option 9A would not meet project objectives recommended that it not be considered further.
Option 9B	Refurbish existing bridge comprehensively	Assessed further by the group	The group considered that option would not meet project objectives recommended that it not be considered further.

In summary, it appears that it was determined relatively early on in the process that only Option 1, Option 2, Option 3 and Option 6 warranted further consideration. From the information provided to us, it appears that the group recommended that the remaining options not be considered primarily on heritage or cost grounds rather than traffic considerations. Notwithstanding this, traffic modelling of all of these options was undertaken under the U - assessment (discussed further in the following section).

Our opinions on the options which the group recommended not to be considered further are provided following.

2.1.1 Options 4 and 5

We agree that Option 4 and 5, which involve a major traffic route which runs through the centre of town (through or adjacent to George Street pedestrian mall), likely to be undesirable from a traffic perspective. We consider it appropriate from a traffic perspective that these options were not considered further.

2.1.2 Option 7

We note that the group determined that Option 7 (see Figure 2.1.2a below) would have major heritage impacts and would create potential traffic safety issues on the basis of these two issues.

This option, which involves replacement bridge designed with Palmer Street (and upgrades along the Court Street North Street route to access this bridge) and the signalisation of the Windsor Court Street intersection to cater for increased traffic movements into and out of Court Street under this scheme.

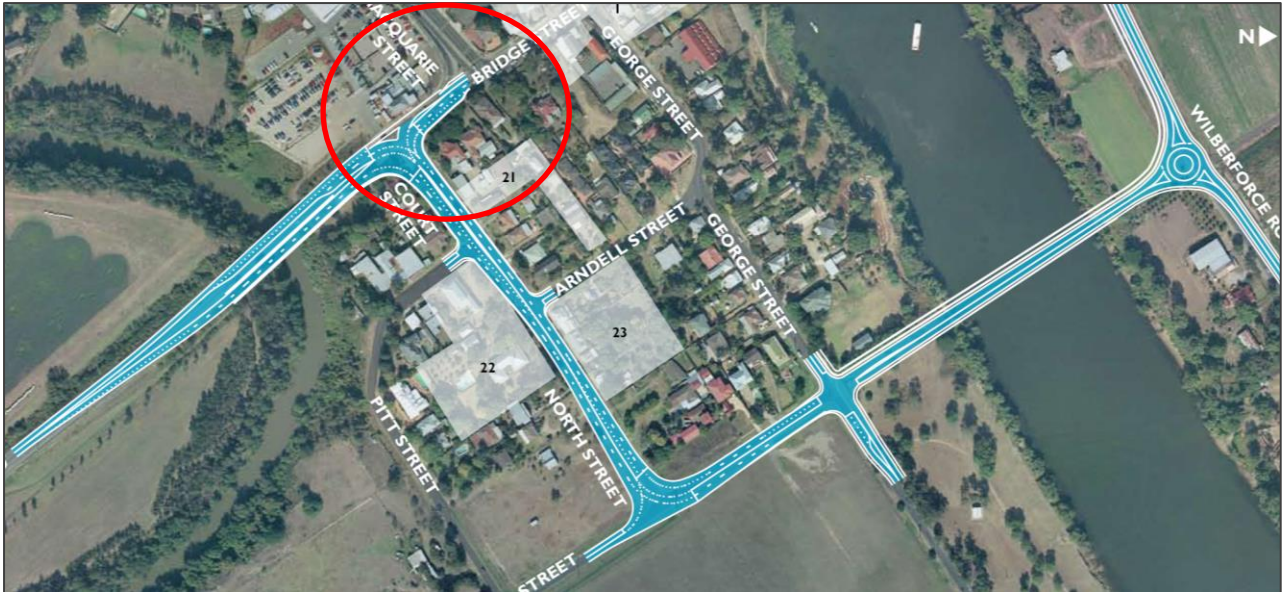


Figure 2.1.2a: Option 7 (from OptiBoster)

It appears (from the Traffic Modelling and Evaluation of Options Preliminary Report referred to by the applicant) that the proximity of the (proposed signalised) Windsor Road / Court Street intersection, to the existing Windsor Road / Macquarie Street signals.

However in our opinion:

- < the signalisation of the Windsor Road / Court Street intersection may be feasible, provided the signal and timing arrangements at both intersections are carefully considered. Coordination of the phasing at these closely spaced intersections may enable the queuing issues identified by the applicant to be at least minimised and
- < the current Windsor Road / Court Street intersection is less than desirable from a safety perspective due to existing sightline issues, the signalisation of this intersection may enable these existing issues to be addressed.

Based upon the traffic modelling provided by RMS (i.e. 2009 AM and PM VISSIM simulation modelling), it appears as though the heaviest movements at these intersections are (see Figure 2.1.2b below)

- < Movement 1: Windsor Road (northbound) to Macquarie Street
- < Movement 2: Windsor Road (northbound) to Court Street
- < Movement 3: Court Street to Windsor Road (southbound)
- < Movement 4: Court Street to Macquarie Street
- < Movement 5: Macquarie Street to Court Street

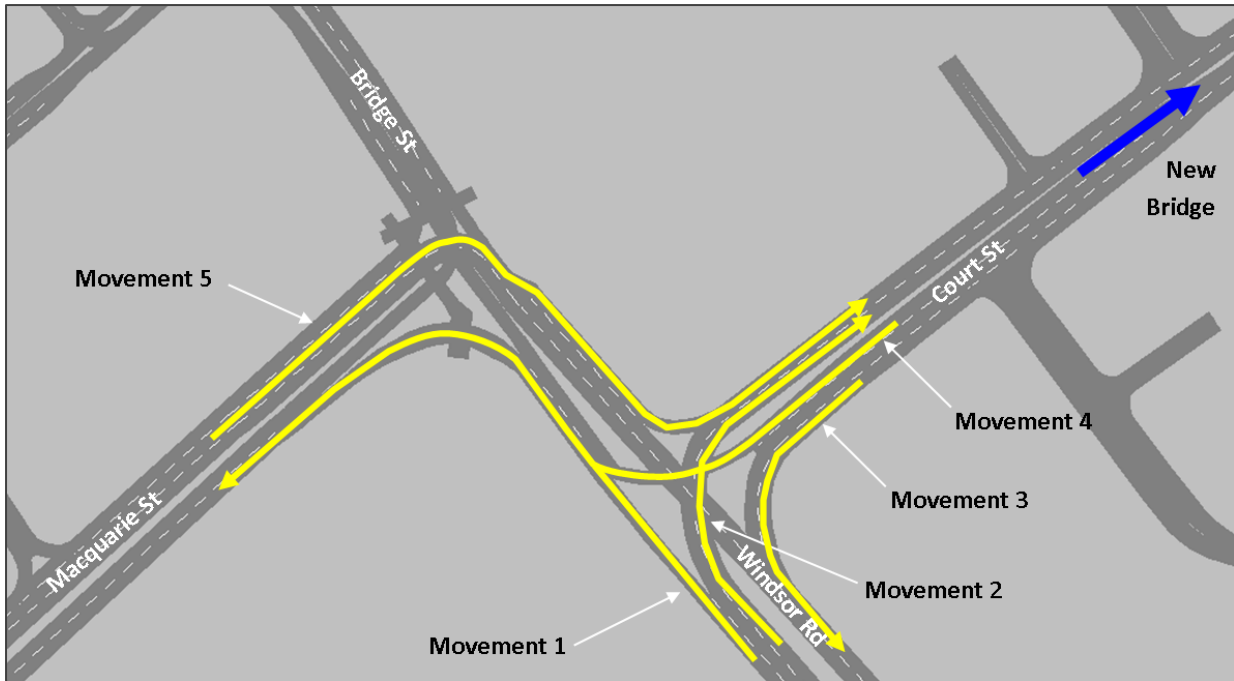


Figure 2.1.2: Option 7 Heavy Movements at Macquarie Street and Court Street Intersections

We have considered the likelihood of queuing as a result of these heavy movements and our comments are as follows:

Movement 1: The left turn into Macquarie Street is a continuous movement (opposed only by a zebra crossing) and therefore we expect that queuing back is unlikely to be an issue for this movement

Movement 2: Two right turn lanes into Court Street are proposed under this option, therefore there would be reasonable capacity for this movement. In addition, there is no upstream intersection in close proximity Windsor Road, therefore we expect that queuing back is unlikely to be an issue for this movement

Movement 3: Two left turn lanes from Court Street are proposed under this option, therefore there would be reasonable capacity for this movement. In addition, the major upstream intersection in close proximity Court Street is Windsor Road, therefore we expect that queuing back is unlikely to be an issue for this movement.

Movement 4: After the right turn from Court Street, the left turn into Macquarie Street is a continuous movement (opposed only by a zebra crossing), and therefore we expect that queuing back is unlikely to be an issue for this movement

Movement 5: We expect that the signal phasing at these two intersections could be coordinated for this movement, to minimise the likelihood that the left turn into Court Street queues back to the Macquarie Street intersection.

In summary, based upon the information we have been provided, we consider that Option 7 warrants further consideration, from a traffic perspective.

In addition, we believe there are alternative options which could be considered and/or modelled, including:

- < Reducing the proposed Court Street / North Street to a two-way cross section (as opposed to a four-lane, two-way cross section) to reduce costs and property impact
- < Realigning Macquarie Street to form a four-way intersection with Court Street, as shown diagrammatically in Figure 2.1.2 below.

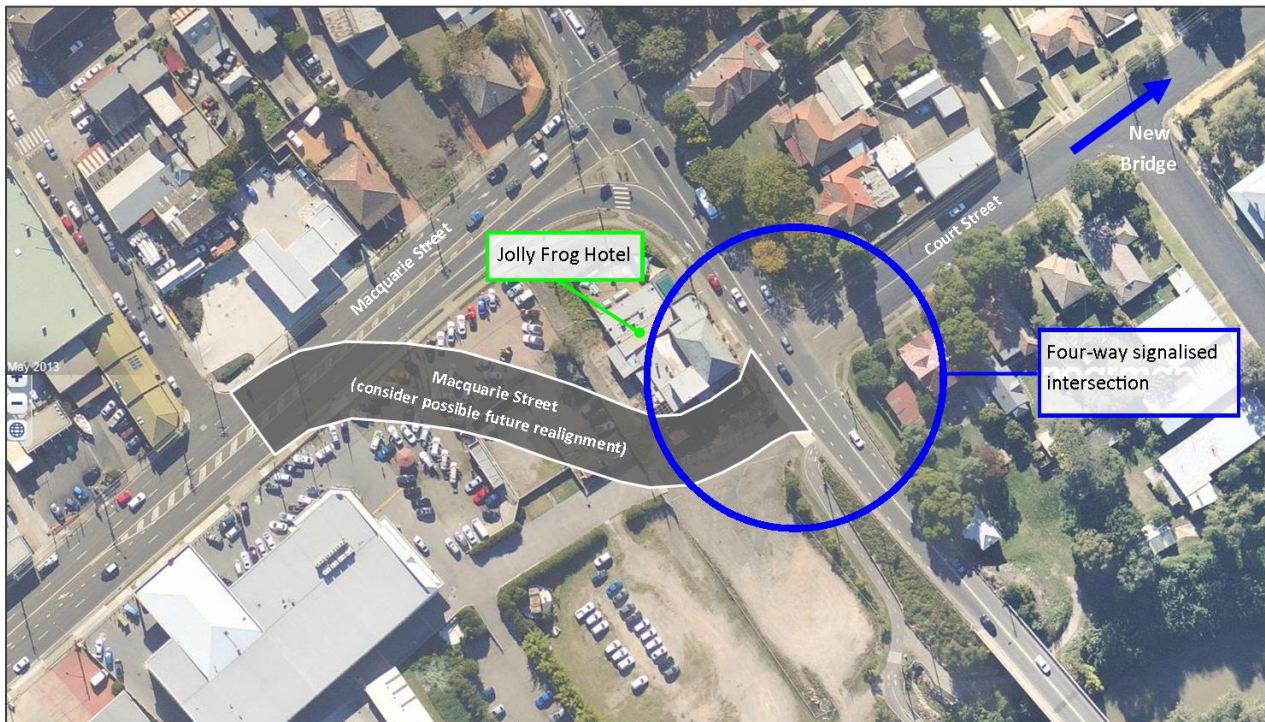


Figure 2.1.2 Option 7 Possible Future Alignment of Macquarie Street (Concept Only)

The realignment of Macquarie Street as shown in the figure above would clearly have property impacts understood that the Jolly Frog Hotel (formerly the Tavern) is of local heritage significance (see Figure 2.1.2d below) however we also understand that this hotel is currently not operational, and is considered by some to be in need of restoration.

There may be an opportunity to realign Macquarie Street to form a four-way intersection with Court Street, minimising impact upon the Jolly Frog Hotel. The Court Street and Macquarie Street intersections could potentially be offset whilst still operating as a single intersection. This may avoid or at least minimise physical impact upon the Jolly Frog Hotel.

We would suggest that this arrangement could be considered as a possible future road realignment, whereby government could seek to progressively acquire the land required for the realignment, which could be delivered if and when the operation of the closely spaced intersections of Court Street and Macquarie Street is no longer viable.

We acknowledge however that this option would increase traffic volumes past a number of residential properties along Court Street and North Street, as well as several heritage / cultural precincts and properties, and this would be a consideration of this option.

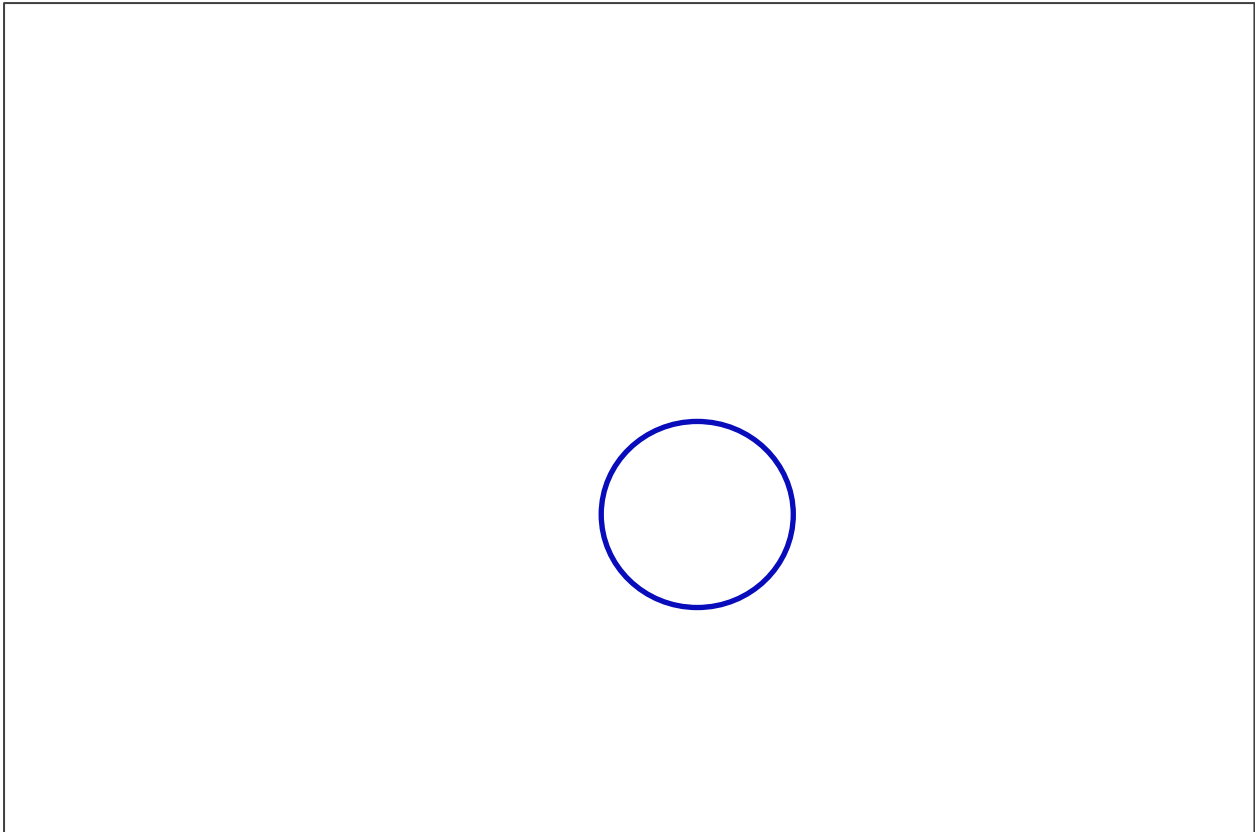


Figure 2.1.2d Heritage Map Sheet HER_008DBlawkesbury Local Environmental Plan 2012

2.1.3 Option 8

Whilst limited information has been provided on the performance of Option 8, our initial opinion is that this option would significantly increase travel distance to cross the river and would be likely to be cost prohibitive due to the extent of new/upgraded road required. We consider it appropriate from a traffic perspective that Option 8 was not considered further.

2.1.4 Option 9

Option 9A and Option 9B involve refurbishment of the existing bridge. We understand that the stakeholder group concluded that these options did not warrant further consideration as they would not meet project objectives.

The project objectives as stated in the Options Reports are as follows:

1. To improve safety for motorists, pedestrians, and cyclists
2. To improve traffic and transport efficiency
3. To improve the level of flood immunity
4. To meet long term community needs
5. To minimise the impact on the heritage and character of the local area
6. To be a cost effective and an affordable outcome

We acknowledge that retaining the existing river crossing (in isolation) may not be a more acceptable solution for a number of reasons. However, many of the options investigated (including the preferred Option 1) involve the major traffic route running through town, where there are significant costs associated with upgrades to the intersections. It is not clear if the current bridge is suitable for an alternative river crossing further out of town that would do away with it all together. This has been acknowledged by RMS in a number of the documents that have been prepared to support the application for the bridge replacement.

