

Roads and Maritime Services

Princes Highway Upgrade Berry Bypass

Community Review Group Option Review

6 December 2011

RMS 11.021

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1 EXECUTIVE SUMMARY

The proposed Foxground and Berry bypass will provide a four lane highway with median separation for approximately 11.6 kilometres on the Princes Highway between Toolijooa Road and Schofields Lane. It will include a bypass of Berry with access ramps at the north and south of the town.

The RMS *Preferred Options Report* (October 2008) had described the Berry bridge as “a relatively long low-level structure” with its height “largely dictated by the clearance required over Woodhill Mountain Road”. The report had described the future alignment near North Street as having “minor visual impact”.

Residents communicated with RMS their strong view that the design did not, in fact, meet these objectives.

The local member Gareth Ward agreed, noting not enough had been done to maintain noise and visual amenity close to Berry, requested RMS undertake an immediate review.

In August 2011 RMS commenced a process of consultation with the community to re-examine the Berry bypass route to the north of Berry. At the start of this process the RMS issued the following statements:

“potential alignments will be adjusted until we find something we feel best satisfies the issues. RMS will consider the benefits and impacts of moving the alignment of the proposed upgrade further north away from North Street. It is important to note that this is not a route selection process but a refinement of a short section of the preferred route to the north of Berry. The preferred route for the Foxground and Berry bypass was finalised and announced in 2009.”

“A community review group has been established to work in partnership with the project team to review these options. This group, comprised of approximately 20 local residents in and next to this area, will meet fortnightly to review the RMS studies and discuss the issues and constraints in this area as they relate to options. They are very concerned that information be provided to the whole community as soon as possible, so information will be posted on the project website following each meeting. Summary advertisements will be placed in both the South Coast Register and the Town Crier.”

The review was to focus on improving aesthetics and form of the Berry bridge, keeping the bridge alignment as low as possible to minimise environmental and community impacts, re-examining the north street alignment with a view to relocating it further north and identifying appropriate urban design solutions for the space between the bypass alignment and North Street.

Between August and November seven community review group meetings were held to examine the design and consider how to improve it. The process included inputs from technical studies, independent experts and community submissions. Updates documenting the meeting proceedings were published to inform the wider community. The review process also included two separate one-day workshops to carry out a detailed review of the Berry bridge and north interchange alignment and design.

The community review process was successful in revising the alignment for the Berry bypass. The key outcome was the identification of an alternative alignment that moved the Berry bridge to the north, lowered the vertical alignment over Woodhill Mountain Road

by 6.4 metres (from a height of 13.1m down to 6.7m) and lowered the highway in the vicinity of North Street. The review process allowed RMS to become better informed about community concerns and to contribute to ideas about the design in this area.

The Roads and Maritime Services (RMS) presented a revised Berry Bypass alignment to the community review group at a meeting on 30 November 2011, followed by an announcement to the wider community on 1 December 2011. A two week community discussion/submission period is envisaged prior to adopting the revised alignment and design as the preferred option. The alignment will be accompanied by a number of potential concept design treatments of the north Berry precinct and the Berry bridge. Design of the north Berry precinct and the Berry bridge will continue in 2012 to finalise a concept design for the assessment of the environmental impacts of the Berry bypass.

This report documents the community review group process between 24 August 2011 and 30 November 2011. This report has been prepared based on community meetings, documentation and presentation material provided at the community review group meetings, RMS website documents and other design information.

2 PROJECT OVERVIEW

2.1 Situation

The proposed Foxground and Berry bypass will provide a four lane highway with median separation for approximately 11.6 kilometres on the Princes Highway between Toolijooa Road and Schofields Lane. It will include a bypass of Berry with access ramps at the north and south of the town.

The preferred route for the Berry bypass to the north of town was announced in 2009. Since that time RMS developed a preferred early 2011 concept design (Appendix 3) through a number of design iterations.

The RMS *Preferred Options Report* (October 2008) had described the Berry bridge as “a relatively long low-level structure” with its height “largely dictated by the clearance required over Woodhill Mountain Road”. The report had described the future alignment near North Street as having “minor visual impact”. Local residents communicated with RMS their strong view that the design did not, in fact, meet these objectives.

The local member Gareth Ward agreed, noting that not enough had been done to maintain noise and visual amenity close to Berry, and requested RMS undertake an immediate review. In August 2011 local MP Gareth Ward announced a community review of the Berry bypass project in the area immediately north of the Berry township.

RMS commenced a process of consultation with the community to re-examine the Berry bypass route to the north of Berry. RMS invited interested members of the community to be part of a new Berry bypass community review group. This group consisted of residents who had appealed directly to RMS and engaged in conversations about their concerns. The 20 residents in the community review group have met fortnightly between August and November and include representative from organised community and stakeholder groups such as:

- Better Options for Berry
- Berry Chamber of Commerce
- North Street Corridor Amenity Group
- Representative of the local member Gareth Ward
- Landowners in the study area identified at the start of the review process
- Shoalhaven City Council
- South Coast Dairy

RMS agreed to work with the group to:

- re-examine the preferred concept design in this area, with a focus on improving aesthetics and form of the Berry bridge
- keep the bridge alignment as low as possible to minimise environmental and community impacts
- identify appropriate urban design solutions for the space between the bypass alignment and North Street.

This report documents the community review group process between 24 August 2011 and 30 November 2011 and the outcomes of that process. This report has been prepared based on community meetings, documentation and presentation material provided at the community review group meetings, RMS website documents, and other design information. The documents are listed in Appendix 1. Public documents referenced in this report are located on the RMS Foxground and Berry bypass project website – www.rms.nsw.gov.au/fbb.

2.2 Review process

The community review process was announced in August 2011 by local MP Gareth Ward. At that stage the NSW Government committed to RMS reviewing the bypass design and presenting options to the community in a public meeting in September 2011.

The community would have two weeks after the public meeting to comment on the options and the design would continue to be refined to determine the best alignment. The figure below documents this process.

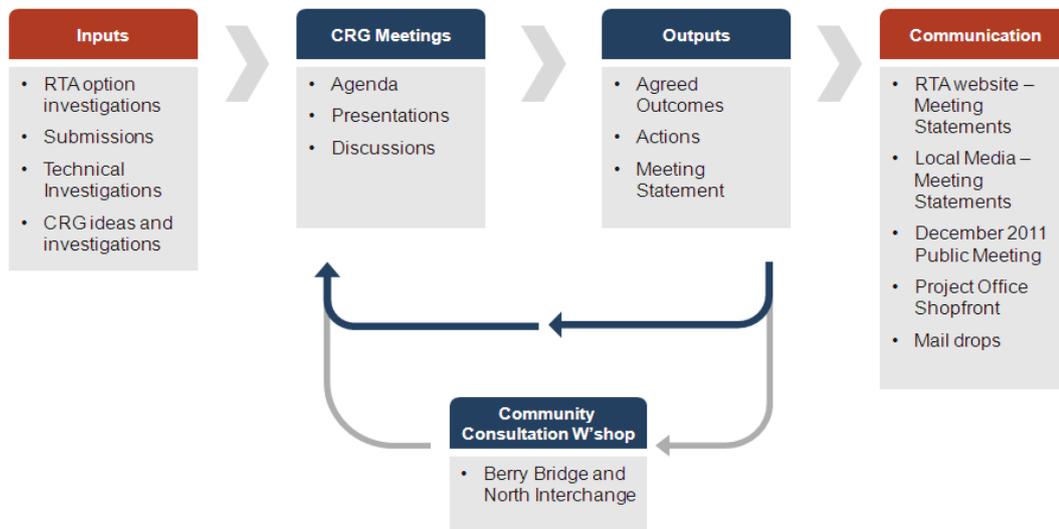


Since August, seven review group meetings have been held to inform the design development and included inputs from technical studies, independent experts and community submissions.

The meetings were structured and regular updates documenting the meeting proceedings were published to inform the broader community. Meeting statements were agreed to by the group and published within seven days in local media and on the RMS project website. The review process included two days of workshop discussions to review the Berry bridge alignment and design.

A value management workshop was initially considered to potentially be useful but later felt not to be required. The process adopted is shown in the figure below and outlined in Section 3.2.

CRG Review Process



The community review group has provided progress reports to the Berry community through meeting statements following each meeting or workshop. The design outcomes from the community review group process have been published for broader community feedback from 1 December to 14 December 2011.

Seven community review group meetings were held between August and November 2011. The first three review meetings focused on knowledge sharing, reviewing design work previously carried out by RMS and identifying community concerns. It was agreed by the group that the design issues and problems could be grouped under the following headings and used to guide further design development:

1. Amenity of North Street;
2. Flooding and flood management along the alignment north of North Street;
3. Visual impact and amenity of the highway at Woodhill Mountain Road;
4. Design and aesthetics of the Berry bridge;
5. Noise management;
6. Potential shadowing impacts from the noise walls; and
7. Noise impacts associated with bridge joints.

The fourth meeting (12 October 2011) focused on understanding how various alignment options responded to the design problems. At this meeting the group largely agreed to continue with two main areas of discussion relating to the proposed alignment in fieldwork and workshops separate to the community review group meetings. These discussions would focus on:

- the bridge aesthetics, alignment and design, with the aim of lowering the height of the bridge and reducing its impacts; and
- the north Berry precinct, aiming to reduce the impact of the highway on the north Berry precinct and examining appropriate landscape and urban design treatments for this newly created space.

At the fifth meeting (26 October 2011) the community review group endorsed a two-day workshop with external expert advice to address the Berry bridge, and agreed to commence discussions regarding the north Berry precinct with North Street resident meetings and urban design workshops at a later date.

The Berry bridge workshops were held on 27 October 2011 and 7 November 2011 and focused on refining design options to reach an agreement on the bridge and north interchange alignment, bridge structural form and aesthetic treatments. From this process a revised alignment called the "BR3 option" (Appendix 11) was generated which provided an agreed starting point for all design options investigated in the workshops. The workshop group defined a number of objectives to guide RMS in finalising the design for the Berry bridge and north interchange. The process and outcomes from these workshop are documented in 'Princes Highway Upgrade Berry Bypass Bridge Design Workshops Process Report' included in Appendix 2. The report and appendices are on the RMS project website.

The outputs of these workshops were presented to the sixth community review meeting on the 16 November 2011. At this meeting the community review group agreed that lowering the bridge alignment would have positive impacts on the north Berry precinct, and agreed to postpone the proposed urban design workshops until the revised bypass alignment was confirmed by RMS as the preferred option.

RMS presented a revised alignment to the community at the seventh review group meeting on 30 November 2011. The plan was accompanied by cross sections and photomontages depicting how the revised design will look at several points along the alignment. The alignment was supported by the community review group members and the broader community will now be invited to provide feedback on the proposed alignment during December 2011. All feedback received will be incorporated into the environmental impact assessment. The design of the north Berry precinct and the Berry bridge will continue in 2012.

2.3 Outcomes

The community review process was a key factor in informing the revised final alignment for the Berry bypass. This process developed a revised proposal which addressed many of the previously unacceptable noise and visual impacts of the RMS early 2011 concept design alignment.

The revised proposal:

- lowers the vertical alignment over Woodhill Mountain Road by 6.4 metres (from a height of 13.1m down to 6.7m) as shown in Figure 1 below;
- moves the highway north, further away from North Street (by 26m) as shown in Figure 2 below
- moves the Berry bridge 95m to the north at Woodhill Mountain Road;
- uses the width of the longstanding RMS bypass road reserve as a buffer between North Street and the revised alignment (approximately 40m wide); and
- lowers the road along North Street by up to two metres, with the road alignment 1.4 metres below natural ground level at George Street.
- Reduced the height of noise walls along North Street from five metres to four metres.

These changes combine to fulfil the key objective of minimising community impacts through reducing visual and noise impacts.

In relation to identifying appropriate aesthetics and urban design solutions for the north Berry precinct, the community review process sought various design solutions. Design of the North Street precinct has been deferred until the preferred alignment has been adopted. Workshops will continue in early 2012 to consider the detail design of public spaces, recreational areas, facilities, amenities, landscaping treatments, fencing, noise walls, pedestrian paths, materials, and views.

The community review group agreed that the review process was successful in collaboratively reviewing the revised design options, agreeing preferences for alignment outcomes and identifying areas of the design that required further work or revision.



Figure1 - Graphic representation of Berry bridge height reduction.



Figure 2: Graphic representation of old alignment and new alignment at North Street near Edward Street.

3 MEETING SUMMARIES

Seven community review group meetings were held fortnightly between August and November 2011. Two one-day workshops were also held in October and November 2011 focussing on the Berry bridge and north interchange.

Meeting #1 (24 August 2011)

The first community review group meeting established a structure and approach for the design review process and gained a high level understanding of community concerns. The group agreed to meet fortnightly between August and December as part of the intensive planning process, and to include stakeholders such as Shoalhaven City Council. The group and RMS committed to understanding the diverse range of issues and impacts of the potential alignments in the local area, and to achieving the best overall outcome for the community. The community review group was to identify issues of concern to the broader community and was committed to providing meeting statements after each meeting, to be shared via the RMS website and newspaper publications. The RMS General Manager of Infrastructure Communication was endorsed by the group to facilitate the meetings and the review group process.

Meeting #2 (7 September 2011)

The second community review group meeting focused on community members sharing their perspectives and concerns about the RMS early 2011 concept design for the bypass and also for the study area that was being examined. Presentations were provided by the Berry Chamber of Commerce, North Street Corridor Amenity Group, Dairy Co-op/farmers and Better Options for Berry (BOBs).

Concerns concentrated around visual and noise impacts of the bypass, potential economic and health impacts, flooding, and the project's impact on property values. These issues are summarised in the Meeting #2 update posted on the RMS website. The group felt that identifying a range of issues and impacts was an important first step, necessary to inform the design process before more technical discussions commenced on alignment options.

Meeting #3 (21 September 2011)

RMS presented alignment options at the third community review group meeting for discussion by the group. It was felt there was much more to do. RMS presented the start of work on a possible lowered highway alignment near North Street. RMS also provided detailed information regarding noise and flooding impacts relating to the proposed alignment.

The community review group discussed the assessment criteria (established in 2008 at project start up) to help evaluate the alignment options. RMS suggested a value management workshop may assist and provided early information on this type of process if it were needed. The group agreed that discussions at the subsequent meetings would give consideration to how the workshop would be conducted and to appropriate processes of community representation. It was agreed that discussions from the community review

group, wider community submissions, recommendations from technical workshops and technical studies would all contribute to defining an optimal bypass solution.

Community participants in the group presented alternative design solutions and it was agreed RMS would follow up on these and investigate further.

In an email to the group after the meeting outlining the problems to be solved, RMS General Manager for Infrastructure Communication Fiona Court reflected back to the group members RMS' understanding of the key community concerns as follows:

1. Amenity of North Street;
2. Flooding and flood management along the alignment north of North Street;
3. Visual impact and amenity of the highway at Woodhill Mountain Road;
4. Design and aesthetics of the Berry bridge;
5. Noise management;
6. Potential shadowing impacts from the noise walls; and
7. Noise impacts associated with bridge joints.

RMS adopted these items as a reference for further option development and to provide structure in responding to the community review group at the next meeting.

Meeting #4 (12 October 2011)

At the fourth community review group meeting RMS presented a update of each of the problems to be solved (items 1-7 above) and the status of actions requested from previous group discussions. The group focused on understanding how design problems had been taken into consideration by RMS in refining the proposed alignment and design options.

In seeking to reduce the height of Berry bridge, the community-led lowered bridge option "BR1" (Appendix 9) was discussed in detail, including the impact on surplus excavated spoil that would be generated from the cutting north of the bridge and the associated costs. Community representatives requested that RMS work harder to find lateral solutions to the problems.

It was agreed that further work should focus on the current alignment and the design options available generally along and in the vicinity of this alignment. It was agreed to continue discussions in workshops separate to the community review group meetings, focussing on:

- the bridge aesthetics and design, with the aim of lowering the height of the bridge and reducing its impacts; and
- the north Berry precinct, aiming to reduce the impact of the highway on the north Berry precinct and examining appropriate landscape and urban design treatments for this newly created space.

As separate and distinct processes for designing alignment improvements were agreed by the community review group it was felt by RMS that a value management workshop would not be an appropriate decision making process in this circumstance.

Meeting #5 (26 October 2011)

At the fifth community review group meeting RMS discussed the concept of engaging an independent panel of experts to work with community participants in two one-day workshops to consider design alternatives for Berry Bridge and north interchange. The review group endorsed the two-day workshop process and a small group would participate and report back to the community review group. Members of the community review group were working on design alternatives including Bruce Ramsey's BR2 option (Appendix 10) to lower the height of the bridge whilst trying to achieve best value for money. The group agreed that the workshops would focus on the RMS concept design and the alternative BR2 option as a baseline for commencing discussion.

The group also saw merit in further discussions regarding the north Berry precinct with individual resident meetings along North Street and George Street, to be followed by workshops with independent urban designers and landscape consultants. Workshops would discuss design ideas for streetscapes, public spaces, recreational areas, landscape treatments, fencing, noise walls, pedestrian paths, materials and views.

Berry bridge and northern interchange workshops (21 October 2011 and 7 November 2011)

A discussion paper issued on 21 October 2011 proposed a structured and collaborative approach to developing design options for the Berry bridge and northern interchange in a workshop environment. The proposal included the following key components:

- Hold workshops with members of the community and an independent road design and construction expert panel;
- The independent panel to be briefed ahead of the workshops to gain a better understanding of the issues and carry out a site visit (attendance by community participants optional);
- The workshops to be facilitated by Peter Stewart, an independent engineering professional and workshop facilitator;
- The workshops will review the current issues and design options, and identify and agree new options; and
- The process and outputs of the workshop to be documented by Evans & Peck (independent infrastructure advisory company) and published.

The workshops considered the two main design options as a baseline for commencing the discussion. These design options included RMS concept design and Bruce Ramsey's BR2 option.

The Berry bridge and northern interchange workshop held on 27 October 2011 reviewed the design options, worked together to generate new design ideas, and identified a list of 12 refinements/considerations for future design development. The priority considerations for review were (i) an optimised bridge format, (ii) improved bridge aesthetics, and (iii) optimised cut/fill balance.

Design review work was completed following the workshop taking into account the key considerations identified in workshop #1, to optimise the horizontal and vertical alignment of the BR2 option and develop an improved BR3 option (Appendix 11).

The second Berry bridge and northern interchange workshop held on 7 November 2011 presented the revised alignment option BR3 variants A, B and C, and focused on reaching agreement among the attendees on bridge and interchange alignment, bridge structural form and aesthetic treatments. The group agreed to adopt the revised BR3 option as the baseline road geometry for ongoing design development.

The key outcome from the workshops was agreement on horizontal alignment, lowering the height of the Berry bridge by approximately seven metres and correspondingly lowering the northern interchange layout to suit. The workshop group generated a number of preferences and agreed a set of objectives to guide RMS in finalising the design for the Berry bridge and northern interchange in consultation with residents. A report documenting the process and outcomes of the workshops is included in Appendix 2.

Meeting #6 (16 November 2011)

At the sixth community review group meeting the community review group examined the outcomes of the Berry bridge workshops and confirmed the outstanding process required to adopt a preferred concept design for the environmental assessment for the Berry bypass. The group largely agreed that the bridge and northern interchange workshop series was successful in reviewing the revised design options, agreeing preferences for alignment outcomes and identifying areas of the design that required further work or revision.

The group discussed the north Berry urban design workshops that were proposed at the previous community review group meeting. The group agreed that lowering the bridge alignment would reduce the visual impact in this area and confirmed the urban design workshops would take place when a preferred alignment was adopted.

The group agreed that the input into refining the alignment had been beneficial and that RMS would be responsible for the final preferred option recommendation. In documenting the alignment, RMS will need to address the issues of concern including visual, noise, amenity, road design and engineering, agricultural impacts and cost.

Meeting #7 (30 November 2011)

The final alignment was presented to the community review group on 30 November 2011. At the meeting the design improvements were presented by RMS and discussed by the group. The alignment was largely accepted by the community review group members. Wider community feedback will be sought from 1 December until 14 December 2011 and will be considered in reaching a decision in 2012. The revised alignment will be on display from 1 December 2011 and a community meeting will be held in Berry on Tuesday 6 December 2011. A concept design will then continue in early 2012 to detail a preferred concept design for the environmental assessment.

4 DESIGN ISSUES

Refinements to the design of the proposed Berry Bypass alignment evolved to address issues through continuing discussions in community review meetings. Design refinements specifically relating to the Berry bridge and north interchange were discussed in more detail at the bridge workshops and are documented in a separate report in Appendix 2.

4.1 Amenity of North Street

The community identified the amenity of North Street as a key concern in the 2011 early concept design of the Berry Bypass. It was understood a number of principle factors affected the amenity including:

- the footprint or amount of land taken up by the highway;
- the vertical and horizontal alignment of the highway in the vicinity of North Street;
- the visual impact of noise walls;
- requirements for drainage and detention of runoff;
- flood mitigation; and
- the design treatment of the precinct (what will it look like?).

The key objectives influencing the location of the alignment were reducing the visual and noise impacts on North Street residents by moving the alignment to the north, whilst also protecting the long term viability of the adjoining rural properties by limiting both the severance and acquisition of agricultural land.

In the second community review meeting, the group discussed the potential impact of shifting the alignment further to the north away from residences in North Street, and whether this would result in a lower noise wall design or a reduction in noise levels experienced at North Street. In response, RMS presented potential alternative alignments to the north of North Street at the third community review meeting (Appendix 4). The presentation included a plan view schematic of two potential alignments overlaid on the RMS early 2011 concept design. The alignments denoted as Alternative 1 and 2 (Appendix 7) were derived from a combination of sub-options A, B & C for the North Street (western) end (shown in Appendix 6) and sub-options 1, 2 & 3 for the Berry Bridge and north interchange (eastern) end (shown in Appendix 5).

RMS investigated potential alignments in the central and northern zones of the purple study area. These design investigations determined that any alignments which crossed the Bundewallah Creek and associated floodplain would require construction of extensive structures (either bridges and/or viaducts). Strategic cost estimates for this alignment were approximately \$300 million. This was compared with the strategic estimate of \$170 million for the early 2011 concept design alignment.

The community review group (meeting 4) generally accepted the proposition, supported by Gareth Ward, MP, that for any revised alignment to be acceptable to the NSW Government and NSW Treasury it would need to be economically approximate to the original alignment. Consequently any alignments which crossed into the floodplain were

discounted from further consideration. This reduced the study area to the zone between North Street in the south and Bundewallah Creek in the north and this was published.

At the fifth community review group meeting this narrowing of the study area was further discussed and a horizontal alignment was proposed by a member of the group, Mr Bruce Ramsey. This alignment was referred to as BR2 option (Appendix 10). The centreline of the alignment was midway between the typical house frontage along North Street and the house frontage of the Miller property, notionally providing an equitable exposure to noise for residents on either side of the alignment. Following this meeting RMS used BR2 as a reference point from which to further examine alignment options within the now reduced study area.

Between community review group meetings no.5 and no.6 RMS met with residents of North Street and the two major rural landholders affected by this study area. These discussions noted a new alignment would be required, since pursuing the original RMS concept design alignment was not considered acceptable due to the noise and visual impacts it would have on residents of North Street. RMS explored a number of other alignments within the refined study area. A range of options are compared on the plan in Appendix 12.

In the sixth community review group meeting the rural landholder Mr Miller stated that if the BR3 alignment was adopted, there would be insufficient flood-free land to support the re-introduction of dairy operations on the farm. In further consultation RMS was advised that the impact of the BR3 alignment on the Miller property could threaten the viability of the Berry Rural Co-operative Society Limited (trading as South Coast Dairy). South Coast Dairy plans to establish a milk processing plant in Berry, and this is closely linked to the increased local milk production associated with the re-introduction of dairy operations on the Miller Farm. RMS consulted closely with the two landholders in order to establish a threshold at which point the impact would not preclude current and future agricultural viability.

To reduce visual impact, options were explored to lower the highway between its intersection with North Street and the western end of the proposed Berry bridge.. The key constraint limiting the lowering of the road was both its longitudinal and cross drainage. RMS presented two possible lowered alignments near North Street at the fourth review meeting (Appendix 8). Cross-sections of the lowered alignments near North Street demonstrated a reduction in the overall height of noise walls on the southern side of the highway from 7 metres to approximately 4 metres. The use of retaining walls to reduce the width of the lowered highway cross section was also presented. The potential to introduce retaining walls in combination with a 'false cutting' or 'Ha Ha' wall concept adjacent to the lowered alignment was also examined and subsequently further discussed at community review group meeting no.6. The review group agreed these were viable options appropriate for further investigation by RMS.

The revised preferred alignment was presented in the seventh review group meeting and is included in Appendix 13. The alignment was largely accepted by the community review group members.

In the fourth community review meeting, the group agreed there should be a focus on examining appropriate landscape and urban design options for the newly created buffer zone at North Street. The process of considering urban design was subsequently deferred as it was felt the alignment should be confirmed before detail design commenced. The process will recommence in early 2012 and provide an important input into continuing the design.

4.2 Flooding and flood management along the alignment north of North Street

In response to the requirement for flood mitigation and management along the alignment north of North Street it was identified that lowering the highway must also consider the impact from flooding and the flow of Town Creek. Concerns were raised by members of the community in relation to excessive flooding at Woodhill Mountain Road (and the bridge crossing) from a full diversion of Town Creek along a swale. It was suggested that partial diversion of the Town Creek could overcome this problem. RMS visited the site with Shoalhaven City Council and group members to view the flood issues at Town Creek, Connelly's Creek, Bundewallah Creek, Broughton Mill Creek and Woodhill Mountain Road, and to consider diversion or re-routing of Town creek. Lowering of the alignment was evidently contingent on diverting Town Creek in to Bundewallah Creek.

Concerns were also raised by members of the community review group in relation to excessive flooding at the Bowling Club caused by the Woodhill Mountain Road embankment. It was suggested that additional drainage across Woodhill Mountain Road could overcome this problem.

RMS presented plans to re-route Town Creek at review meeting no.4. The community review group accepted re-routing of the creek as a viable option, subject to RMS conducting further investigations in consultation with the Office of Environment and Heritage (OEH) to address environmental impacts on the riparian landscape. The limited extent of flood immune high ground on the two farm properties north of North Street was a key consideration in determining the route of the creek diversion. The finalised route diverts Town Creek from its intersection with North Street and approximately follows Rawlings Lane to join Bundewallah Creek. Although OEH has given in-principle support to re-routing Town Creek, considerable design work and negotiation remains to be completed with two affected landholders and other stakeholders.

The community review group also considered the option of using permanent pumps in the sag point of the lowered alignment as a means of draining the road pavement and dealing with flood water along the alignment north of North Street. However this concept was not recommended by RMS on the basis of the volumes of water a pumping facility would need to deal with; the size of the pumping infrastructure required; and the risk of road closures as a result of pump equipment failures, based on experience elsewhere.

4.3 Visual impact and amenity at Woodhill Mountain Road

The community review group has worked with RMS to explore a number of design alternatives to reduce the visual impact and amenity of the highway at Woodhill Mountain Road. The visual impact of the Berry bridge over Woodhill Mountain Road was primarily driven by the height of the bridge, as well as aesthetic design treatments discussed further in Section 4.4.

In relation to bridge height, the community review group presented a number of design alternatives to RMS prepared by engineer Bruce Ramsey. The initial proposal (BR1 shown in Appendix 9) from Bruce Ramsay considered in the third review meeting, lowered the height of the bridge over Woodhill Mountain Road by providing a deeper cutting into the ridge at the eastern end of the study area. Although the BR1 option offered improved visual amenity at Woodhill Mountain Road there was a significant environmental impact associated with the deeper cutting. RMS' analysis of the BR1 option indicated it would produce in excess of 540,000m³ of surplus excavated material and cost approximately \$250 million, rendering it not economically viable. Based on a favourable comparison of the visual impacts of the BR1 option compared with the RMS early 2011 concept design, the group agreed to continue further design development towards an optimal design solution through the bridge workshop process. In preparation for the workshop process, Bruce Ramsay prepared a second BR2 option (Appendix 10) which sought to address the issues described above and was then used as a baseline for discussion in the workshops.

Alternative design solutions explored by the community review group included diverting Woodhill Mountain Road over the new highway using an overbridge. RMS advised that this option did not meet the criteria for the highway itself to be on a structure above the 1 in 100 year flood event, and the group agreed the visual impact of the two structures was not ideal. Another option considered was a 600 metre long cut and cover tunnel at the northern interchange which was deemed unviable based on excessive cost estimate of over \$300 million. The additional width of on/off ramp lanes would necessitate an excessively wide tunnel, and the aesthetics of a tunnel were also not considered to be in keeping with the Berry rural environment.

In the bridge workshops RMS modelling of the BR2 option maintained the lower vertical alignment of the bridge and reduced the excess cut material, although not sufficient to offer a significant cost reduction. In response, Bruce Ramsay worked with the RMS design team to prepare a refined BR3 option in three variants, BR3-A, BR3-B, and BR3-C (Appendix 11). The options shared a common horizontal alignment and 3% vertical grade for the mainline carriageway, however differed in terms of cut/fill balance, off load ramp grades and safety considerations, primarily around the interchanges. The BR3 design reduced excess cut material significantly, but increased the height of the bridge over Woodhill Mountain Road by 1.3 metre due to the vertical curve east of the bridge through the cutting, and a minimum 4.6 metre vehicle clearance required under the bridge at Woodhill Mountain Road. RMS agreed to investigate options to lower or realign Woodhill Mountain Road to improve clearance under the Berry Bridge, and achieve a further lowering of the bridge alignment across the floodplain.

The process and outcomes of the bridge workshops are described in detail in Appendix 2. The group agreed a series of alignment preferences for RMS to address in finalising the bridge alignment (Appendix 13), with a key objective being to lower Woodhill Mountain Road as far as possible to allow Berry bridge to be lowered.

4.4 Design and aesthetics of the Berry bridge

The visual impact of the Berry bridge over Woodhill Mountain Road is primarily driven by the height of the bridge (as discussed in Section 4.3), as well as aesthetic design treatments. Through the review process the group sought to understand how the bridge proportions and urban design approach could improve the design of the proposed structures. RMS engaged independent experts as part of the bridge workshops to assist in identifying alternative design options for the bridge once alignment had been confirmed. The process and outcome of the bridge workshops are described in detail in Appendix 2.

Two alternative bridge structures (bridge plank and super-T) were considered by the community review group and the workshop group. At the workshop, 3D models of bridge structural types were presented which allowed the group to visualise and compare different bridge options, and to gain an understanding of the aesthetics of each, and the impact on amenity and views of each bridge structure from the public domain. The options presented included:

- 2 pier bridge options, for 15m span plank bridge and 30m span super-T bridge;
- 4 pier bridge option, for twin 15m span plank bridges; and
- 3 and 4 pier bridge options, for a single bridge.

The workshop group agreed that bridge span length could have a significant impact on the bridge aesthetics. A solution with larger span super-T girders would offer a different appearance to a shorter span plank bridge. It was noted that a plank bridge would have additional thinner profile spans and more piers, whilst a super-T bridge would have fewer deeper profile spans and less piers. The plank bridge was judged less costly than the super-T bridge, and would be verified once a cost estimate had been completed.

The aesthetics of noise walls on the bridge was also an issue considered at the workshops. It was agreed that noise walls have the ability to change the bulk of the bridge significantly and if required for noise mitigation, should be lightweight and relate to the treatment of the headstock and parapet. RMS confirmed that modelling of the bridge on its original alignment shows noise walls are not required on the bridge, with a noise wall to be introduced along the southern side of the highway embankment on its western approach. It was agreed that the requirement for investigation of noise mitigation and noise wall types be deferred until noise modelling is complete for the new bridge alignment.

The final revised preferred alignment was presented in the seventh review group meeting and RMS agreed to continue working with residents on urban design aspects, including considering how a nod to the local heritage could be incorporated into the design and to explore the functional treatment of surrounding land next to the alignment.

4.5 Noise management

Noise issues have been continually discussed throughout the community review process. In the fourth community meeting, the RMS committed to fully assess the noise impacts of the proposed bypass during the environmental assessment and to develop the design with the aim of reducing noise. Issues relating to noise mitigation were broken down into two key categories (problems 5 and 7):

- noise mitigation from the alignment of the highway in the vicinity of North Street, and;
- noise mitigation from the bridge design.

In relation to North Street, residents were concerned about the impact of noise on residents of North Street and other North Berry streets in close proximity to the proposed bypass. There was also considerable concern about the potential visual impact of noise walls. These concerns resulted in numerous written, interview-based and informal requests for the highway alignment to be located further north from North Street. Following the third community review group meeting, RMS noted in a message to the group that noise level targets for North Street would remain the same, regardless of the final alignment of the highway, which may provide scope to reduce noisewall height with a highway alignment further to the north.

In a presentation by acoustic expert and community member Bob Fitzell at the third meeting, potential noise mitigation mechanisms were outlined including:

- modifying the horizontal alignment (i.e. moving the road north);
- lowering the vertical alignment (i.e. lowering the road from embankment down to ground level or lower where possible); and
- providing physical barriers such as noise walls and noise mounds.

Noise mitigation options relating to bridge design were discussed in further detail at the bridge workshops as reported in Appendix 2.

4.6 Shadowing impacts

Shadowing impacts on properties on North Street was a major concern. To visualise potential shadowing affecting the residents of North Street, RMS developed a 3D model of the road and surrounding landforms. At the fourth review meeting the group viewed an RMS animation of shadowing effects from noisewalls on a lowered alignment adjacent to North Street. The design was a re-grading of the vertical alignment of the RMS concept design between the western end of the bridge and Kangaroo Valley Road Interchange with the alignment approximately one metre below ground level in the area between Edward and Albany Streets, progressively increasing to approximately two metres towards George Street. Noise walls were five metres above road level as shown on the cross-section included in Appendix 8. This animation indicated shadows from the noise walls would only impact some properties on North Street about 15 minutes before sunset during the winter solstice.

The group agreed to further examine noise wall options and heights in conjunction with lowering the highway in the vicinity of North Street. There would also be a separate urban design workshop focusing on improving the design in the north Berry precinct.

As discussed in Section 1.1, the highway alignment has been modified considerably both horizontally and vertically. These changes were presented to the group by RMS at the community review group meeting no.6. Further preliminary investigations by RMS since that meeting indicate that the revised alignment eliminated the issue of shadowing along most of North Street, with the exception of the area in the immediate vicinity of North Street and George Street intersection, where the highway alignment curves closer to North Street. Whilst 3D modelling of the revised alignment is still to be completed, RMS has committed to provide the model during the display of the revised option in December 2011.

4.7 Ongoing design

The community review process has resulted in the design improvements outlined above, however the process of refining and improving the design of the proposed bypass will continue.

In relation to identifying appropriate aesthetics and urban design solutions for the north Berry precinct, the community review process sought various design solutions. Design of the North Street precinct has been deferred until the revised alignment has been confirmed and adopted. Workshops will continue in early 2012 to consider the detail design of public spaces, recreational areas, facilities, amenities, landscaping treatments, fencing, noise walls, pedestrian paths, materials, and views.

During the finalisation of the environmental assessment and during further concept design refinements, as well as during the subsequent detailed design process, stakeholder involvement will continue on issues including, but not limited to:

- North Berry precinct urban design.
- Design of the Kangaroo Valley Road interchange.
- Design of new Huntingdale Park Road junction.
- Pedestrian and cyclist access across and around bypass.
- Schofields Lane junction design.
- Town Creek diversion.

5 NEXT STEPS

RMS presented a preferred Berry bypass option to the community review group at a meeting on 30 November 2011, and will present to the wider community on 6 December 2011. The revised alignment takes into account feedback and discussion gathered through the community review process to consider issues such as visual amenity, noise impact, road design and engineering, agricultural impacts and cost. The plan was accompanied by cross sections and photomontages depicting how the revised design will look at several points along the alignment.

During a two week period from 1 December 2011 to 14 December 2011, the community will be invited to provide feedback on the preferred Berry bypass option. During this two week period the Berry project office will be open to the wider community to maximise contributions from the community and to assist with the provision of project information. All community submissions will be considered as part of the 2011 decision making process.

RMS will continue the design of the north Berry precinct and the Berry bridge in 2012 to enable a preferred concept design for the environmental assessment for the Berry bypass. In January 2012 the community review group will discuss its future role with RMS. Workshop discussions relating to the urban design treatment of the north Berry precinct which were postponed pending agreement of the bypass alignment by the wider community are to be rescheduled by RMS early in 2012.