Wells Crossing to Iluka Road

Upgrading the Pacific Highway

Value Management Workshop Report

March 2006

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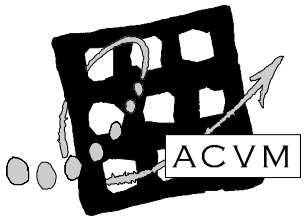

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WELLS CROSSING TO ILUKA ROAD
UPGRADING THE PACIFIC HIGHWAY

VALUE MANAGEMENT WORKSHOP
FOR THE WELLS CROSSING TO HARWOOD BRIDGE SECTION

March 2006

Workshop Report

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Overview of the Project and Workshop

Overview of the Project

The Pacific Highway is the main road transport corridor serving the north coast region of NSW and is a major highway link between Sydney and Brisbane. The Pacific Highway Upgrade Program is a commitment by the NSW and Commonwealth Governments to improve the condition of the highway, reduce road accidents and improve transport efficiency.

This Value Management Workshop (VMW) addressed the section of Pacific Highway between Wells Crossing and Harwood Bridge. The Harwood Bridge to Iluka Road section will be addressed separately.

This section of highway is approximately 69 km long and serves as part of the local and regional road network with different destinations and demands. The traffic on this section of road is a mix of heavy and light vehicles. The highway is currently a two lane single carriageway with occasional overtaking opportunities and some short sections of divided road. In some locations it does not meet design standards.

The existing highway passes through numerous towns, villages and other settlements and as vehicle volumes and the number of heavy vehicles have increased, the potential for conflicts between highway and local traffic has increased . The current accident rate within this section of highway is considered high at around 32 crashes/MVKT. The project objective is 15 crashes/MVKT.

Progressive development of the highway and recent changes to allow the Pacific Highway to operate as a B-double route have led to changes to traffic profile and increased traffic volumes. More traffic is being attracted to use the highway for commercial use between Sydney and Brisbane.

Without upgrading the highway in this section, and as other sections of the highway are improved, it is likely that the number of crashes and traffic delays would increase in proportion to the ongoing growth in traffic volumes. The highway would not meet the aims of the NSW and Commonwealth Governments as well as not meeting community needs of improving local access, safety, traffic efficiency and capacity of this section of road.

Investigations to upgrade this section of the highway commenced in October 2004 with the Roads and Traffic Authority (RTA) commissioning consultants SKM to undertake route option investigation, preferred route selection processes and concept development within the study area (see **Figure 1**).

The aim in selecting a preferred route is to meet the future transport needs for the highway whilst balancing social, environmental, functional, economic and cost factors.

A number of route options have been investigated within the study area. As a result, four short listed route options for the upgrade of the highway (together with two potential connections between options) were placed on public display in October 2005 with public submissions being sought.

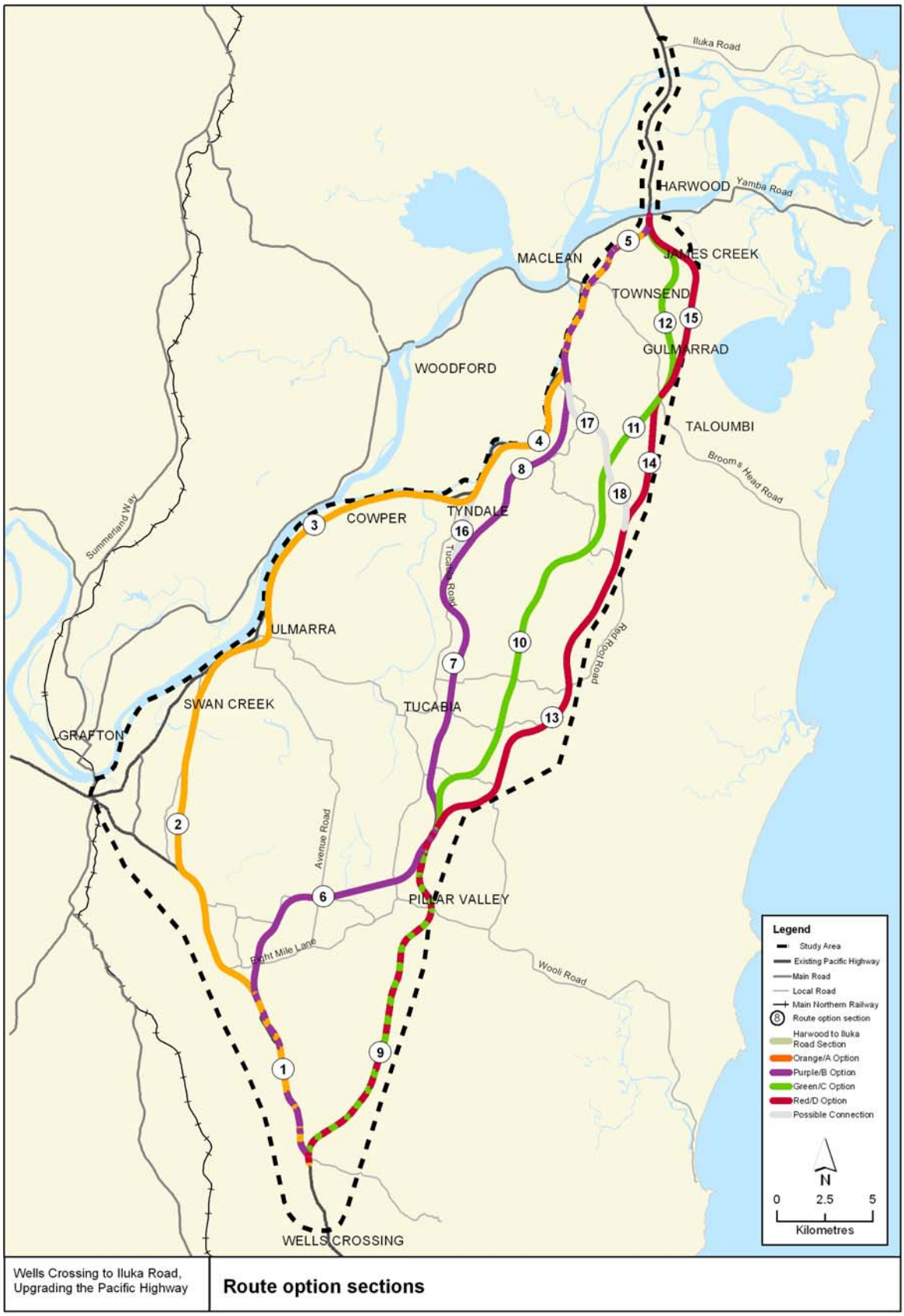
The development of the four short listed route options along with the findings from a range of studies (including social, environmental and engineering investigations) undertaken within the study area have been documented in the RTA's *Pacific Highway Upgrade – Wells Crossing to Iluka Road: Route Options Development Report* (RTA/Pub 05.216, October 2005). The four route options placed on public display are identified as:

- Orange/A Option
- Purple/B Option
- Green/C Option
- Red/D Option

In addition, two potential connections between these options were part of the displayed options.

Each option is defined as a 250 metre wide corridor. The locations of the four options and potential connections as well as key features of each route option are shown in **Figure 1**. For the purposes of evaluation the options and connections were delineated as sections, also shown in **Figure 1**.

Figure 1 – Short listed Options and Connections, shown as sections (source: SKM)



The VMW was undertaken after the route options display period. It provided an appropriate tool to bring together a wide range of stakeholder interests and expertise to review the outcomes of investigations undertaken to date and, on the balance of issues and consideration of the options against agreed assessment criteria, to recommend a direction for further investigation to progress the project's development.

The Value Management Workshop is one input into the process for determining the preferred route for the project.

The Australian Centre for Value Management (ACVM) was commissioned to facilitate and report on the workshop which was attended by a range of stakeholders on 8th, 9th and 10th March 2006. A list of participants who attended the workshop can be found in **Appendix 1**.

The workshop report was distributed as a draft to all participants for comment. Modifications made to the report as a result of comments received are noted in footnotes.

The project team acknowledges the contribution of all participants to the Value Management study.

Workshop Objectives

The purpose of the workshop, as presented to the participants, was to "***Obtain a common understanding of the project and its objectives, review the work undertaken to date and to recommend a preferred direction, if appropriate, so as to progress the project to the next stage of development."***

The workshop objectives to achieve this were stated as:

- *Clarify the objectives of the project*
- *Examine the short listed options developed to meet the project objectives*
- *Recommend a preferred option(s) to the RTA to progress the project*
- *Develop an action plan to progress the project*

This report has been compiled by ACVM and seeks to provide an objective overview of the project aspects discussed and the conclusions formulated by the end of the workshop.

Workshop Activities

The workshop process builds on the perspectives as well as the detailed and specialist knowledge which resides with the workshop participants.

There were three main activities or processes associated with this VMW. These are detailed later in this report, and were:

A) Review of Information
B) Development of Assessment Criteria
C) Evaluation of Options

The Review of Information included the following:

- Background papers were issued to VMW participants prior to the workshop.
- A bus tour of the study area was held on the morning of 8th March 2006 for VMW participants to gain a better understanding of issues.
- A number of short presentations relating to the project were made to commence the workshop. Additional data and information was provided as required throughout the workshop.
- What was important about the project from various stakeholder perspectives was identified and shared.
- The problem situation and the program objectives were reviewed.
- Assumptions being made about the project were identified and challenged from various points of view.

The Development of Assessment Criteria included the following:

- Assessment criteria were developed and weighted under three key themes/perspectives being:
  - Functional
  - Social and local economic
  - Natural environment

- These were based on the list of what participants considered important that was generated during the review of information as well as to meet the program objectives for the highway upgrade.

The Evaluation of Options process reviewed the various possible line combinations of route options and potential connections against each of the criteria developed as part of the workshop.

The workshop group undertook the evaluation process in three phases being:

- **Phase 1** – Three focus groups were formed each using a separate theme of either functional; social and local economic; and natural environment criteria. Each focus group assessed whether various alternative line combinations of route options could improve the primary Purple/B, Green/C or Red/D options for their theme. The Orange/A option cannot be modified and was not discussed in this phase of the assessment. (The possible route combinations shown in **Figure 1** are further discussed in the Workshop Outcomes section).
- **Phase 2** – The whole workshop group then assessed whether, overall, a combination of line options could improve the primary Purple/B, Green/C or Red/D options. Strategic costs were also taken into consideration. Where the group agreed, a "modified" option was developed.
- **Phase 3** – The workshop group reformed its three focus groups again and assessed each of the modified options together with the Orange/A option (shown in **Figure 2**) against the assessment criteria for the full length of the section (i.e. Wells Crossing to Harwood Bridge). The workshop group as a whole were then in a position to draw conclusions from the overall assessment which included strategic cost estimates.

Project Information and Analysis

The information presented in this section of the report is a consolidation of the general outputs and perceptions by the workshop group as they shared information about the Pacific Highway Upgrade: Wells Crossing to Iluka Road Project (Wells Crossing to Harwood Bridge Section) which allowed them to later make comparisons of options based on the analysis of what the project was required to achieve.

The Strategic Context of the Project

In order to allow the participants to obtain an understanding of the project's context, Mr Mark Eastwood, Senior Project Development Manager, Pacific Highway Office, RTA outlined the strategic context of the project (the "Big Picture") within the context of the Pacific Highway Upgrade Program.

Key points raised in his presentation included:

- The purpose of the Pacific Highway is:
  - As a major transport asset of National significance.
  - To provide safe and efficient transportation of people and goods to destinations between Sydney and Brisbane.
  - To service coastal townships and populations along the route.
  - To support National, Regional and Local economic development.
- The Pacific Highway Upgrade Program is currently in its 10th year and the RTA is working on various projects (at various stages of planning, development or construction) from Hexham to the Queensland border.
- The State Government contributes $160 million/year and the Federal Government $60 million/year ($220 million/year total) to the ten year upgrading program.
- What is the future (beyond the 10 year program)?
  - The State Government is committed to continue the upgrade of the Pacific Highway.
  - The Federal Government released the AusLink White Paper which maintains expenditure at $60 million/year to the end of current 10 year program (2006) and increases contributions to $160 million/year over the following 3 years to match State Government contributions.
- The Pacific Highway Upgrade Program Objectives are to:
  - Significantly reduce road accidents and injuries.
  - Reduce travel times.
  - Reduce freight transport costs.
  - Develop a route that involves the community and considers their interests.
  - Have a route that supports economic development.
  - Manage the upgrading of the route in accordance with ecologically sustainable development (ESD) principles.
  - Maximises the effectiveness of expenditure.
- Why are we fast tracking the Upgrade Program?
  - There is increasing pressure to accelerate the completion of dual carriageway due to the road crashes involving fatalities still being high.
  - Increased travel demand from rapid growth on the North Coast and increased interstate/regional traffic (including freight).
  - Loss of amenity to local communities such as:
    - Highway noise.
    - Local and through traffic interactions.
- The Project has to strike a balance between transport needs, social and economic needs and environmental needs while providing value for money.

Clarence Valley Council Perspective

A Clarence Valley Council perspective of the Wells Crossing to Iluka Road Project was outlined by Mr Kerry Lloyd, Councillor, Clarence Valley Council. Key points made in his presentation included:

- The Clarence Valley Council area covers a very diverse area from the sea to the tablelands and has 50,000 constituents varying in occupation and age.

- The Pacific Highway passes through the council area from the Dirty Creek Range in the south to Iluka Road in the north.
- The residents of the Clarence Valley will be affected by any upgrade of the highway and the Council held an extraordinary meeting in November 2005 which included Community Liaison Group (CLG) representatives, RTA and SKM project team members to discuss the upgrade and share an understanding of expectations.
- As a result, Council made recommendations in a Mayoral Minute (which had since been amended as shown below) being "That the RTA be requested to ensure that, in its Highway Upgrade Route Selection process, it commits to:
  - Full consideration of the environmental factors of the various options.
  - Full consideration of the impacts on future development potential in the areas affected.
  - Adoption by the RTA of timeframes which minimise disruption to the lives of the affected property owners.
  - Appropriately compensating affected property owners in a timely manner.
  - Extending the time for consideration of options until at least 31st January 2006.
  - Providing all necessary information including reports in a timely manner to assist people in lodging informed submissions.
  - The SKM report being urgently reviewed and that the RTA embraces the readily available more current and relevant statistical data, and further, that if necessary the present report be withdrawn and the current consultation process be discontinued in the interim.
  - Undertaking a thorough study into the feasibility of the Summerland Way route option.
  - Giving a firm commitment that in the event of Clarence Valley Council becoming responsible for the future maintenance of the former highway, that the RTA will fully reimburse council's future expenditure outlays thereon.
  - Undertaking to ensure more appropriate representation on the Value Management Committees of the people from the community in the study areas.
  - Undertaking to properly assess likely impacts along the route options of vehicle noise and pollution levels.
  - Undertaking to provide appropriate data in relation to the intended Clarence River crossing at Harwood and location and numbers of accesses to and egresses from the new highway on the clear understanding that more than one interchange at either end of the new carriageway is essential".

Project Overview Presentation

An overview of where the project was up to in its planning was undertaken by Ms Diana Loges, Project Development Manager, Pacific Highway Office, RTA. Key points made in her presentation are summarised below.

- In October 2005, the RTA released the route options for the Pacific Highway Wells Crossing to Iluka Road Upgrade project. This was the first time that people were able to view and comment on specific "on the ground" routes.
- As part of the route option display, the RTA undertook a very substantial program of community consultation, including staffed displays, visits to properties, focus group meetings and one-to-one discussions of issues. The project team followed up the extraordinary Council meeting of November 2005 with meetings with a range of council staff including planning, heritage, floodplain management, economic development and ecology; and also with the Mayor and General Manager. A number of other briefings and meetings have been held with government agencies, environmental groups and other stakeholders.
- The project team has added to and further refined its studies and design. This includes traffic and safety, environment, flooding, social impacts, noise and so on. Some of the information is included in the background papers to the Value Management Workshop (VMW). Some will be presented during the course of the workshop.
- The important point to note in terms of where we are at is the purpose of this workshop is not to select a preferred route, but to find a way forward. The RTA will consider the results of this workshop as an input into deciding on a preferred route.

Overview of Strategic Transportation and Traffic Issues

An overview of the strategic transportation and traffic issues was presented by Mr Peter Prince, Traffic and Economics Team Leader of the SKM project team. Key points made in his presentation are outlined below.

- Key transport issues along this section of the highway are:
  - Road safety.
  - Heavy vehicles.
  - Rail freight.
  - Public transport use.
  - Efficiency of long distance transport.
  - Traffic growth.
- With regards to road safety within the study area, historical records (2000-2003) indicate 25 serious and 2 fatal crashes with a crash rate of 32 crashes/100 million vehicle kilometres travelled (MVKT). The project target is 15 crashes/100 MVKT (i.e. around half of the existing rate).
- The long distance rail freight task:
  - Accounts for 9% of the corridor task (i.e. 1 million of the 12 million tonnes of freight moved in 2001).
  - 2-3% per annum growth expected compared with 4% per annum growth of road freight.
  - Rail share unlikely to increase.
- Existing highway traffic volumes are:
  - 7,500 vehicles per day (AADT).
  - 20% heavy vehicles.
  - 10% are 6, 8 and 9 axle articulated vehicles (50% of which travel at night).
  - 50% of heavy vehicles are serving the local economy.
- The traffic mix in 2004 was:
  - Through traffic (30% – 35%).

    Through-traffic is defined, for the purpose of this Project, as traffic which travels through the study area, i.e. vehicles with both their origin and destination of their trip outside the study area. This includes all vehicles that stop for a short break (of up to 2 hours).
  - Regional traffic (25% – 30%).

    Regional traffic is defined as vehicles with either their origin or destination trip end outside the study area. Examples would be trips from Coffs Harbour to Grafton or Maclean to the New England Highway via Grafton, etc.
  - Local traffic (40% – 45%).

    Local traffic is defined with both trip-ends in the study area. This definition would include visitors as well as residents of the study area.
- The predicted traffic mix comparison in 2021 is likely to be:
  - Total traffic 12,290 vehicles/day.
  - Light vehicles – 9,550 vehicles/day (78%):
    - Local/Regional traffic – 7,050 vehicles/day (74%).
    - Through traffic – 2,500 vehicles/day (26%) of which 450 vehicles/day will stop for 1-2 hours.
  - Heavy vehicles – 2,740 vehicles/day (22%):
    - Local/Regional traffic – 1,350 vehicles/day (49%).
    - Through traffic – 1,390 vehicles/day (51%) of which 100 vehicles/day will stop for 1-2 hours.
- The traffic forecasts for year 2021 indicate that the majority of the traffic between Maclean and Grafton would use the new route rather than the existing highway for the Orange/A option. However for the eastern options (Purple/B, Green/C and Red/D), the majority of traffic would use the existing highway rather than the new route.
- Also the results show that for the eastern options, there would be a lower volume of traffic on the new alignment (although the proportion of total traffic using these routes that is heavy vehicles would higher than in the Base Case or the Orange/A options). The eastern options would also result in local traffic continuing to use the existing highway, particularly between Grafton and Maclean
- A broad strategic assessment of the Orange/A option compared with the eastern options against the traffic and transport objectives for the project indicate that the Orange/A option would satisfy the transport and traffic objectives better than the eastern options in terms of safety (Objective 1), reduced travel times (Objective 2) and freight transport cost savings (Objective 3). All options would support regional economic development (Objective 4).

What's Important about the Pacific Highway Upgrade: Wells Crossing to Iluka Road

The group identified from their various view points (individually, then within focus groups and finally collectively) what was important about the highway upgrade project. These are recorded below.

Upon reflection, the workshop group concurred that there was overlap in the list. However, the list did reflect the items considered important that the project needs to address as planning proceeds. This "What's Important" list (as well as other information such as the program objectives) would later be used in the workshop to develop assessment criteria (within the themes of functional; social and local economic; and natural environment) to assess the various options in the study area.

No.	What's Important to participants about the Pacific Highway Upgrade
1.	Maintaining the living environment for people
2.	Having creative solutions to perceived and real problems
3.	Having a safe road for new and existing routes including safe intersections
4.	Reducing travel times
5.	Mitigating all impacts effectively and cost effectively
6.	Maintaining the environment for flora and fauna (especially for the coastal Emu)
7.	Funding is assured before the project commences
8.	Having access to the highway (especially local access)
9.	Having safe and efficient transportation for freight
10.	Minimising sensitive vegetation impacts
11.	Considering the feasibility and effectiveness of mitigation at the route selection stage
12.	Location of interchanges to service Grafton, the airport and Wooli as well as Harwood and providing access for emergency vehicles
13.	Better driving conditions on dual carriageway
14.	Minimising the spread of pollution by the new highway
15.	Minimising impacts on SEPP 14 wetlands and other wetlands
16.	Ensuring a fair assessment of impacts of the whole corridor including the existing highway
17.	Linking up with the adjoining upgrade sections of the highway (i.e. not just half the job)
18.	Providing a highway acceptable to the community and other travellers
19.	Protection of the existing environment
20.	Minimising the impacts on the livelihood of all businesses (including farms, highway related businesses, forestry and others)
21.	Maintaining landscape and ecological functions
22.	Minimising the impact of the highway on flooding in the valley
23.	Protecting the creeks and waterways (particularly the Clarence River system)
24.	Respecting cultural heritage (indigenous and non-indigenous)
25.	Reducing impacts on people's homes
26.	Recognising the social and historical choices of residents
27.	Minimising the fragmentation of properties and communities
28.	Providing value for money
29.	Having a highway system which is functional in the medium and long term
30.	Having adequate and timely compensation
31.	The decision making is done with adequate information
32.	Supplying the best available data to provide the best possible outcomes
33.	Meeting overall highway and project objectives

No.	What's Important (cont.)
34.	Reducing the number of heavy vehicles in urban areas
35.	Separating local and through traffic
36.	Reducing multiple accesses to highway (generally)
37.	Considering the cost of environmental mitigation at route selection stage for each option
38.	Continuing community liaison through and beyond project delivery
39.	Protecting quarry resources from sterilisation (especially Shark Creek Quarry)
40.	Achieving a balance between social, cost, function and environmental perspectives
41.	Improving the flooding immunity along the highway
42.	Ensuring Aboriginal groups and traditional owners are heard and given feedback
43.	Protecting petroleum prospects from sterilisation (especially Shark Creek Ridge)
44.	Protecting future land use opportunities
45.	Preserving the local road system and access
46.	Having the ability to differentiate all options on the basis of environmental values and impacts
47.	Providing a solution that is constructible
48.	Facilitating communities to adapt to economic impacts
49.	Maximising energy savings by the most direct route
50.	Reducing impacts on water and air quality
51.	Having sustainability of quarry supplies (post construction)
52.	Reflecting community desires
53.	Minimising noise impacts (existing and new receivers)
54.	Protecting Aboriginal sites, heritage and places
55.	Ameliorating fish passage and road run-off of pollutants
56.	Maximising the use of existing infrastructure
57.	Minimising habitat loss
58.	Minimising loss of native vegetation
59.	Ensuring detailed Aboriginal site surveys, inspections and documentation
60.	Having consistent driving conditions
61.	Having a review of signage (e.g. bigger signs)
62.	Having good wildlife crossings
63.	Preserving wildlife corridors
64.	Protecting threatened species
65.	Having a route that has least impact on environment and communities
66.	Considering the cost of threatened species management
67.	Having roads which are passed onto council being in good condition and funded
68.	Consulting with Aboriginal groups regarding stockpiles
69.	Minimising impacts on indigenous sites in Pillar Valley
70.	Shortening the timelines for new construction and staging
71.	Having certainty so we can get back to normal
72.	Preventing crime in previously isolated areas being accessible because of the new highway
73.	Minimising impact on property values
74.	Considering visual impact/urban design
75.	Considering investments already made (existing asset)
76.	Preserving the character of the area

The Problem Situation

The group reflected on the "problem situation" in terms of the background material for the workshop as well as from their own viewpoints. They then reviewed and added to the list of problems causing the need for a project. These were recorded as the following:

- The highway is currently two lane single carriageway with occasional overtaking opportunities and some short sections of dividing road.
- In some locations it does not meet design standards.
- The existing highway passes through numerous towns, villages and other settlements.
- As vehicle volumes and the number of heavy vehicles have increased, the potential for conflicts between highway and local traffic have increased and the amenity of settlements has been affected.
- The current accident rate within this section of highway is considered high (around 32 crashes/MVKT). The project objective is 15 crashes/MVKT.
- Progressive development of the highway has led to changes to traffic profile and increased traffic volumes. More traffic is being attracted to use the highway for commercial use between Sydney and Brisbane.
- Through traffic volumes are expected to increase as the Pacific Highway Upgrade Program proceeds, leading to more conflict of local and through traffic, congestion and accidents.
- Regional growth will continue to exacerbate problems with traffic and transport.
- There will continue to be a dependency on the car in the region.

Program Objectives

The group reviewed the program objectives (i.e. what must the program achieve to be successful) as stated in the Route Options Development Report and the Workshop Background Papers to ensure there was a common understanding as to what they were.

The Pacific Highway Upgrade Program Objectives are:

- Significantly reduce road accidents and injuries.
- Reduce travel times.
- Reduce freight transport costs.
- Develop a route that involves the community and considers their interests.
- Have a route that supports economic development.
- Manage the upgrading of the route in accordance with ecologically sustainable development (ESD) principles.
- Maximise the effectiveness of expenditure (i.e. provide value for money).

Assumptions

The group (in focus groups) identified assumptions being made about the project from various perspectives. The assumptions recorded from each focus group were assessed using the assessment table below. This allowed participants to further share information about the project and find out about the various views that are being held within the group.

Assessment Table

Key	Assessment Explanation
✓	It is safe to proceed with planning on the basis of this assumption
❋	There is some doubt or uncertainty about this assumption and it needs to be resolved as the project planning proceeds

Topics for each group gave focus to the assumptions identified. The topic for each focus group is listed below:

- **Focus group 1: Key Planning/Design Parameters**
- **Focus group 2: Local and Through Traffic, Commercial and Future Planning Assumptions**
- **Focus group 3: Community, Safety, Access, Heritage and Environmental Assumptions**
- **Focus group 4: Big Picture/Strategic Assumptions**

Each focus group's assumptions and the overall group's assessment (comments in italics where required) are listed below.

Focus group 1: Key Planning/Design Parameters

No.	Assumptions in relation to - Key Planning/Design Parameters	Category
Planning		
1.	Preferred route will be subject to assessment under Part 3A of the EPA Act.	✓
2.	Relevant legislative requirements will be met.	✓
3.	Relevant government policies/guidelines will be considered.	✓
4.	Conditions of approvals/licences will be complied with and enforced by the appropriate regulatory authority.	✓
Design		
5.	Designed for 110km/h horizontal alignment.	✓
6.	Designed for 100km/h vertical alignment.	❋
7.	One carriageway will be above the 20 year ARI (i.e. 1:20 year flood level).	❋
8.	Road will be designed for a Class "M" standard but it may still be built to a Class "A" standard.	❋
9.	All routes will meet the program and project safety objectives.	✓
10.	There will be at least two interchanges (one at either end of the project).	✓
11.	Planning for a service road along the length of the highway.	✓
12.	Road corridor will be of sufficient size to allow for a Class "M" standard road, service roads and environmental controls/mitigation.	✓
13.	The local road network will be maintained.	✓
14.	The design will reflect the environmental constraints.	✓
15.	Not everyone will agree with the chosen route.	✓
16.	Severance is be minimised for the chosen route.	✓
17.	Land acquisition will be minimised for the chosen route.	❋
18.	Access to all properties will be maintained *(but may not be the access used currently).*	✓

Focus group 2: Local and Through Traffic, Commercial and Future Planning Assumptions

No.	Assumptions in relation to - Local and Through Traffic, Commercial and Future Planning	Category
1.	There will be continued growth in the local and regional population, tourism, freight requirements and economic development.	✓
2.	There will be no significant behavioural change in transport preferences (i.e. private vehicles will continue to be used in the region).	✓
3.	There will be no significant modal shift in freight transport.	✓
4.	There will be no relative shift in transport costs.	✓
5.	The base traffic data (volume and distribution) is accepted as sufficient to move the project forward.	✓
6.	Traffic will continue to grow.	✓
7.	Separation of local and through traffic will create a safer traffic environment.	✓
8.	There will be closer linkages and accessibility to other regions along the Pacific Highway as a result of the highway upgrade.	✓
9.	Residential growth will continue generally in accordance with the current settlement strategy.	✓
10.	Location of the route and access arrangements will have an economic impact on Grafton and others areas in the study area.	✓

Focus group 3: Community, Safety, Access, Heritage and Environmental Assumptions

No.	Assumptions in relation to - Community, Safety, Access, Heritage and Environmental	Category
1.	The community will have to adapt to the new upgraded highway.	✓
2.	Adequate compensation will be paid to directly impacted owners (i.e. for acquisition).	❋
3.	The new upgraded highway will result in a reduced number of accidents and will be safer.	✓
4.	Access (to properties and services) will be maintained.	✓
5.	The design of the upgraded highway will minimise severance to communities (once the route is chosen).	❋
6.	Once the route is chosen, we will aim to minimise the impact of the route on the environment *(aim).*	✓
7.	The upgraded highway will have a negative impact on the environment.	✓
8.	The upgraded highway will bypass villages.	✓
9.	The route chosen will adequately consider heritage (indigenous/non indigenous) impacts.	✓
10.	No one criteria will determine the route *(a compromise – on balance decision of all issues will need to be made).*	✓
11.	An environmental assessment will be required.	✓
12.	Community issues will be considered as part of the selection of a preferred route.	✓
13.	Due to high conservation values of the area, a Species Impact Study will be required.	❋
14.	The short listed corridors are designed to minimise impact on high conservation areas (e.g. SEPP 14, EECs, etc).	❋

Focus group 4: Big Picture/Strategic Assumptions

No.	Assumptions in relation to - Big Picture/Strategic	Category
1.	The highway upgrade is needed.	✓
2.	Population growth will continue to focus on the coast.	✓
3.	Rail will continue to serve bulk freight, but road is still required for the majority of freight (in the foreseeable future).	✓
4.	The project will be affordable.	❋
5.	There is broad local community support for an upgrade.	✓
6.	Independent of the highway, land use patterns in the study area won't change dramatically	✓
7.	There is a need to define a route corridor now as it will only get more difficult into the future.	✓
8.	Natural resources should be retained for the future (i.e. minerals, gas, quarries, fish, agriculture, forestry, eco-tourism – bio diversity).	✓
9.	With a highway upgrade will come greater regional accessibility.	✓
10.	The highway upgrade will generate changes in land use in the region.	✓
11.	The route corridors have the capacity for the highway upgrade to cater for future growth.	✓
12.	The project will be considered in the broader ecological context (e.g. greenhouse impacts, etc).	✓

Developing the Assessment Criteria

As a result of the information shared in the workshop (in particular, the "What's Important" statements and the program objectives), a focus group consisting of a representative cross section of the workshop participants (i.e. RTA, Council, community liaison group representative, Aboriginal representative, business representative, government agencies, a representative of the environmental perspective, study team representative) clustered the "What's Important" statements and developed criteria to present to the whole group for comment, amendment and if acceptable, endorsement to assess the various options in the study area.

The approach adopted was to:

(1) Separate from the list of "What's Important" statements, those that would not assist in differentiating between the options. Some of the statements were expressed as objectives, some referred to process, givens and/or questions. Others statements were viewed as generalisations or duplications.

(2) Cluster the remaining "What's Important" statements and considered program objectives under three key themes or perspectives being: ***Functional; Social and Local Economic; and Natural Environment.***

(3) Develop summary statements from the consolidated list within each theme which could be used as assessment criteria to meaningfully compare and differentiate the options and various combinations within the study area. The focus group highlighted points for resolution by the whole group which were either adopted as an assessment criteria or listed as an issue that needs to be resolved as planning proceeds

(4) Present the approach and the outputs to the workshop group for consideration, discussion, adjustment and endorsement.

Agreeing to the "Non-Differentiators"

The focus group agreed the following "What's Important" statements would not help to differentiate between the options or were generalisations or duplications of those assessment criteria put forward.

No.	What's Important – *but will not assist in differentiating between options*
2.	Having creative solutions to perceived and real problems.
7.	Funding is assured before the project commences.
13.	Better driving conditions on dual carriageway.
14.	Minimising the spread of pollution by the new highway.
17.	Linking up with the adjoining upgrade sections of the highway (i.e. not just half the job).
18.	Providing a highway acceptable to the community and other travellers.
19.	Protection of the existing environment.
21.	Maintaining landscape and ecological functions.
28.	Providing value for money.
29.	Having a highway system which is functional in the medium and long term.
30.	Having adequate and timely compensation.
31.	The decision making is done with adequate information.
32.	Supplying the best available data to provide the best possible outcomes.
33.	Meeting overall highway and project objectives.
34.	Reducing the number of heavy vehicles in urban areas.
36.	Reducing multiple accesses to highway (generally).
38.	Continuing community liaison through and beyond project delivery.
40.	Achieving a balance between social, cost, function and environmental perspectives.
42.	Ensuring Aboriginal groups and traditional owners are heard and given feedback.
45.	Preserving the local road system and access.
46.	Having the ability to differentiate all options on the basis of environmental values and impacts.
48.	Facilitating communities to adapt to economic impacts.
51.	Having sustainability of quarry supplies (post construction).
52.	Reflecting community desires.
59.	Ensuring detailed Aboriginal site surveys, inspections and documentation.
60.	Having consistent driving conditions.
61.	Having a review of signage (e.g. bigger signs).
62.	Having good wildlife crossings.
65.	Having a route that has least impact on environment and communities.
66.	Considering the cost of threatened species management.
67.	Having roads which are passed onto council being in good condition and funded.
68.	Consulting with Aboriginal groups regarding stockpiles.
70.	Shortening the timelines for new construction and staging.
71.	Having certainty so we can get back to normal.
72.	Preventing crime in previously isolated areas being accessible because of the new highway.
73.	Minimising impact on property values.

The focus group also noted that some statements although not used as assessment criteria are important qualifiers. That is, any recommendations from the workshop should be considered to be made "subject to" the following:

- Appropriate adequacy and quality of data.
- Accommodating costs for mitigable impacts and the unknown ability to mitigate impacts.
- Costs of managing threatened species for any solution.
- Ensure the sustainability of quarry resources (post construction).

The remaining statements were considered as having the capacity to differentiate between options. They were clustered under the three themes/perspectives below and rephrased as assessment criteria for consideration by the whole workshop group. Also the group reflected on other material presented in the workshop to ensure no other assessment criteria were required.

After review, comment and amendment by the whole workshop group, the assessment criteria within each of the three perspectives to evaluate the options later in the workshop were agreed as:

1. Functional Perspective

A) Travel times within the study area (all categories of travel/vehicle).

B) Engineering risks (i.e. soft and acid sulphate soils, work under or near traffic, resource access, safety for workers and road users).

C) Effective access to highway and local road network.

D) Ability to stage.

E) Safer "traffic corridor" (from a study area perspective for management of traffic volumes).

F) Energy savings (i.e. volume, weight, route length, number of routes, efficiency, etc).

G) Visual/Urban design impacts experienced by the road user.

2. Social and Local Economic Perspective

A) Impact on Aboriginal heritage and culture.

B) Impact on non-Aboriginal heritage and culture.

C) Visual/urban design impacts for the community.

D) Impact of noise on existing and new receivers.

E) Extent of community severance.

F) Extent of homes/residences lost.

G) Impact on future land uses.

H) Impact on local businesses.

I) Impact on farms and productive lands (including forests and fragmentation).

J) Social and economic risks of changes in flood impacts.

K) Impacts on lifestyle environment choices (including degree of change, bush/rural and town settings).

L) Impact on DEC estates and State Forest Conservation Zones (i.e. land use/use of public estate).

3. Natural Environment Perspective

A) Area of native vegetation lost (including high value habitat).

B) Impact on Endangered Ecological Communities (EECs).

C) Threatened and regionally significant flora impacts.

D) Threatened and regionally significant fauna impacts.

E) Impacts on wildlife corridors.

F) Environmental impacts of changes to hydrological regimes.

G) Impacts on SEPP 14 and other wetlands.

H) Impacts on water quality and the aquatic environment (including proximity, number of bridges, length across the floodplain, fish passage, etc) – not assessed by other criteria above.

Weighting of Assessment Criteria

Relative weightings for the assessment criteria within each perspective were then undertaken by the whole group using a paired comparison technique.

The paired comparison technique compares the preference “on balance” by the whole group of one criteria against each other criteria, but only within a specific perspective (functional; social and local economic; natural environment). The group also determines whether the preference of one criteria as against another is a major, medium or minor one (and in some cases equal). This assists in relatively weighting the criteria within each perspective/theme.

It should be noted that in some cases, the paired comparison process resulted in some criteria receiving a weighting of zero. This should be interpreted as, the group believed the evaluation and recommendation of the preferred direction would not rely on the performance of the option against this criteria even though the criteria is important and requires careful consideration during the next stage of the project development.

The discussion in undertaking the paired comparison process was extensive and allowed the group to understand and appreciate the various perspectives represented within the group. The final weightings were reached on a consensus basis. The group’s workings and their weightings of the assessment criteria for each perspective are shown in the Tables that follow.

The extent one criteria was preferred by the group over another was indicated by using the scoring system below:

3. *Major Preference*
2. *Medium Preference*
1. *Minor Preference*

Functional Perspective – Weighting of Assessment Criteria

No	Assessment	Raw Score	Relative Weightings
A.	Travel times within the study area	7.5	16.5%
B.	Engineering risks	6	13%
C.	Effective access to highway and local road network	6.5	14%
D.	Ability to stage	2	4.5%
E.	Safer "traffic corridor"	18	39%
F.	Energy savings	6	13%
G.	Visual/urban design impacts experienced by the road users	0	0%
	Total	**46**	**100%**

Scoring Matrix

The workings for the paired comparison are shown below.

	B	**C**	**D**	**E**	**F**	**G**
A	A/B	2A	2A	3E	1F	3A
	B	C	2B	3E	B/F	3B
		C	2C	3E	C/F	3C
			D	3E	2F	2D
				E	3E	3E
					F	2F

Summary

The weighting of the assessment criteria for Functional Performance using the paired comparison methodology ranked the criteria as follows:

"Safer traffic corridor" was the most important criteria followed by ***"Travel times within the study area",*** the ***"Effective access to highway and local road network"*** and ***"Engineering risks".*** Then followed by ***"Energy savings"*** and then ***"Ability to stage"*** on the next level of importance. ***"Visual/urban design impacts experienced by the road users"*** although important was not considered as important as the other criteria when compared in pairs and scored zero.

Social and Local Economic Perspective – Weighting of Assessment Criteria

No	Assessment	Raw Score	Relative Weightings
A.	Impact on Aboriginal heritage and culture	14	17%
B.	Impact on non-Aboriginal heritage and culture	4.5	5.5%
C.	Visual/urban design impacts for community	0.5	1%
D.	Impact of noise on existing and new receivers	8.5	10%
E.	Extent of community severance	9	11%
F.	Extent of homes/residences lost	11.5	14%
G.	Impact on future land uses	2	2.5%
H.	Impacts on local businesses	8	9%
I.	Impact on farms and productive lands (including forests and fragmentation)	10	12%
J.	Social and economic risks of changes in flood impacts	4	5%
K.	Impacts on lifestyle environment choices	8.5	10%
L.	Impact on DEC estates and State Forest Conservation Zones	2.5	3%
	Total	**83**	**100%**

[1] Please see footnote below

Scoring Matrix

The workings for the paired comparison are shown below.

	B	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**
A	2A	2A	1A	1A	1A	2A	1A	1A	1A	1A	1A
B		1B	B/D	B/E	1F	1B	B/H	1I	1.5J	B/K	B/L
C			2D	2E	3F	1G	2H	2I	IJ	2K	C/L
D				D/E	D/F	2D	D/H	1I	D/J	D/K	1.5D
E					E/F	1E	E/H	E/I	1E	E/K	2E
F						2F	F/H	F/I	1F	F/K	2F
G							1H	2I	G/J	2K	G/L
H								H/I	1H	H/K	1H
I									1I	I/K	1I
J										1K	J/L
K											K/L
L											

Summary

The weighting of the assessment criteria for Social and Local Economic Performance using the paired comparison methodology ranked the criteria as follows:

"Impact on Aboriginal heritage and culture" was the most important criteria followed by the ***"Extent of homes/residences lost"*** and then ***"Impact on farms and productive lands (including forests and fragmentation)".*** The next most important criteria were ***"Extent of community severance", "Impact of noise on existing and new receivers"***, ***"Impacts on lifestyle environment choices"*** and ***"Impacts on local businesses"*** on the next level of importance followed by ***"Impact on non-Aboriginal heritage and culture"***, ***"Social and economic risks of changes in flood impacts", "Impact on DEC estates and State***

[1] There was a minor inconsistency is calculating the relative weightings of the Social and Local Economic criteria during the workshop which has been rectified in this report. The inconsistency was an error in calculating percentages from the raw score. The impact was to change four criteria by a percentage point from what was presented in the workshop. It should be noted that the weighting discrepancy made no overall difference to the outcomes of the workshop

Forest Conservation Zones" and ***"Impact on future land uses"*** and finally ***"Visual/urban design impacts for community"***.

Natural Environment – Weighting of Assessment Criteria

No	Assessment	Raw Score	Relative Weightings
A.	Area of native vegetation lost including high value habitat	4.5	16%
B.	Impact on EECs	5	18%
C.	Threatened and regionally significant flora impacts	4	14%
D.	Threatened and regionally significant fauna impacts	4	14%
E.	Impacts on wildlife corridors	1	4%
F.	Environmental impacts of changes to hydrological regimes	1	4%
G.	Impacts on SEPP 14 and other wetlands	4.5	16%
H.	Impacts on water quality and the aquatic environment not assessed in other criteria	4	14%
	Total	**28**	**100%**

Scoring Matrix

The workings for the paired comparison are shown below.

	B	C	D	E	F	G	H
A	A/B	A/C	A/D	1A	1A	A/G	A/H
	B	B/C	B/D	1B	1B	B/G	1B
		C	C/D	C/E	1C	C/G	C/H
			D	D/E	1D	D/G	D/H
				E	1F	1G	1H
					F	1G	1H
						G	G/H
							H

Summary

The weighting of the assessment criteria for the Natural Environmental Performance using the paired comparison methodology ranked the criteria as follows:

"Impact on EECs" was the most important criteria followed by ***"Area of native vegetation lost including high value habitat"*** and ***"Impacts on SEPP 14 and other wetlands"*** on the next level of importance followed by the ***"Threatened and regionally significant flora impacts", "Threatened and regionally significant fauna impacts"*** and ***"Impacts on water quality and the aquatic environment not assessed in other criteria"*** on the next level of importance, and then ***"Impacts on wildlife corridors"*** and ***"Environmental impacts of changes to hydrological regimes"*** on the next level of importance.

Summary of Weightings of Assessment Criteria

A summary of the weightings of the assessment criteria within the various themes as determined by the group appears below. These weighted assessment criteria were used to evaluate the options for the project.

Assessment Criteria					
Functional		**Social and Local Economic**		**Natural Environment**	
Criteria	**Wt**	**Criteria**	**Wt**	**Criteria**	**Wt**
Travel times within the study area	16.5%	Impact on Aboriginal heritage and culture	17%	Area of native vegetation lost including high value habitat	16%
Engineering risks	13%	Impact on non-Aboriginal heritage and culture	5.5%	Impact on EECs	18%
Effective access to highway and local road network	14%	Visual/urban design impacts for community	1%	Threatened and regionally significant flora impacts	14%
Ability to stage	4.5%	Impact of noise on existing and new receivers	10%	Threatened and regionally significant fauna impacts	14%
Safer “traffic corridor”	39%	Extent of community severance	11%	Impacts on wildlife corridors	4%
Energy savings	13%	Extent of homes/residences lost	14%	Environmental impacts of changes to hydrological regimes	4%
Visual/urban design impacts experienced by the road users	0%	Impact on future land uses	2.5%	Impacts on SEPP 14 and other wetlands	16%
		Impacts on local businesses	9%	Impacts on water quality and aquatic environment (not assessed in other criteria)	14%
		Impact on farms and productive lands	12%		
		Social and economic risks of changes in flood impacts	5%		
		Impacts on lifestyle environment choices	10%		
		Impact on DEC estates and State Forest Conservation Zones	3%		

Options Evaluation

Options, Connections and Possible Modifications

As previously mentioned, this workshop concentrated on the section of the project between Wells Crossing and Harwood Bridge. A number of options were investigated by the project team within the study area and as a result, a short list of four options for the upgrade of the highway (together with some alternative cross over combinations) were placed on public display in October 2005 with public submissions being sought.

The development of the four short listed options (and connections) along with the findings of the investigations undertaken within the study area were documented in the RTA's *Pacific Highway Upgrade – Wells Crossing to Iluka Road: Route Options Development Report* (RTA/Pub 05.216, October 2005). This information was supplemented by Workshop Background Papers (dated 8-10 March 2006) distributed prior to the workshop to participants who would be attending.

The study area tour enabled participants to further obtain an understanding of the options and their associated issues. Clarification was sought by the group on key issues including flooding issues in the study area, road upgrade standards and known locations of coastal Emu habitat. Also the group had the opportunity (in focus groups) to seek further information on topics relevant to their particular assessment topic during the evaluation of options.

The four main options placed on public display together with alternative cross over line combinations (which may improve the options) are shown in **Figure 1**. The four main options and possible connections are identified as:

Orange/A Option

- The Orange Option is the most western of the short listed options. It is predominantly a new motorway adjacent to the existing highway alignment with an easterly deviation adjacent to Four Mile Lane between Bom Bom State Forest and Swan Creek. This option involves consideration of bypasses of Grafton, Ulmarra and Tyndale. It would provide at least one carriageway above the 1 in 20 year flood level. It is approximately 69km long of which 38km crosses the Clarence River floodplain. Bridges would be provided at Swan Creek, Coldstream River, Shark Creek and other minor creeks.
- Possible interchange locations for this option would be to the north of Bom Bom State Forest and north of Swan Creek to provide access to Grafton. Another possible interchange would be located south of the Harwood Bridge to provide access to Maclean and Yamba. Access via the local road network would be over or under the motorway. Preliminary costs in $2005 would be $1,300-$1500 million. It would be the most expensive of the options due to the additional length and floodplain bridges and earthworks required. The option offers opportunities for staged construction.

Purple/B Option

- The Purple Option follows the existing highway from Wells Crossing to about Eight Mile Lane. It then deviates north-east passing through the north-west of Pillar Valley and to the west of the Pine Brush State Forest, before rejoining the existing highway south of Maclean. This option involves the duplication of 19km of the existing highway and it would provide at least one carriageway above the 1 in 20 year flood level. It is approximately 66km long of which 13km crosses the Clarence River floodplain. Bridges would be provided at Coldstream River, Chaffin Creek, Shark Creek and other minor creeks.
- A possible interchange for this option would be located to the north of Glenugie State Forest to provide access to Grafton. Another possible interchange would be located south of the Harwood Bridge to provide access to Maclean and Yamba. Access via the local road network would be over or under the motorway. Preliminary costs in $2005 would be $950-$1050 million. The option offers opportunities for staged construction.

Green/C Option

- The Green Option deviates from the existing highway just north-west of Wells Crossing. It then follows a northerly alignment along the eastern side of the study area to the Clarence River at Harwood Bridge. This option passes through the Pine Brush State Forest and an ecologically significant coastal wetland. It would provide at least one carriageway above the 1 in 20 year flood level. It is approximately 60km long of which 5km crosses the Clarence River floodplain. Bridges would be provided at Coldstream River, Chaffin Creek and other minor creeks.

- A possible interchange for this option would be located north of Wells Crossing to provide access to Grafton from the south. Another possible interchange would be located south of the Harwood Bridge to provide access to Maclean, Yamba and Grafton from the north. Access via the local road network would be over or under the motorway. Preliminary costs in $2005 would be $700-$800 million. The option does not offer any opportunities for staged construction.

Red/D Option

- The Red Option is the most eastern of the short listed options. It deviates from the existing highway just north-west of Wells Crossing. It then follows a northerly alignment along the eastern side of the study area to the Clarence River at Harwood Bridge. This option passes to the east of Pillar Valley and the Pine Brush State Forest. It would provide at least one carriageway above the 1 in 20 year flood level. It is approximately 60km long of which 9km crosses the Clarence River floodplain. Bridges would be provided at Coldstream River, Chaffin Creek and other minor creeks.
- A possible interchange would be located north of Wells Crossing to provide access to Grafton from the south. Another possible interchange would be located south of the Harwood Bridge to provide access to Maclean, Yamba and Grafton from the north. Access via the local road network would be over or under the motorway. Preliminary costs in $2005 would be $700-$800 million. The option does not offer any opportunities for staged construction.

Tyndale Connection

- A possible connection between the Orange/A and Purple/B options is located just south of Tyndale.

Northern Connection

- A second possible connection between Orange/A or Purple/B options with Green/C or Red/D is located in the Shark Creek area.

Development and Evaluation of Modified Options

The group was now in a position to evaluate the options against the assessment criteria under the three themes/perspectives developed earlier in the workshop.

The evaluation process used for the workshop was to work through the alternative line combinations in a logical manner so as to determine if the original Purple/B, Green/C and Red/D options could be improved. Orange/A cannot be modified by combinations with sections of other options and was not discussed in this phase of assessment.

This would allow the group to make recommendations at the end of the process (on balance of all criteria discussed) as to a way forward from the options and combinations displayed. Various lines have been numbered as in **Figure 1** to assist the group in working through the alternative line combinations and build "modified" (improved) options for assessment.

The group (in three focus groups) evaluated the various options using the assessment criteria for each perspective being Functional; Social and Local Economic; and Natural Environment.

That is, one focus group assessed options against the functional perspective, whilst a second focus group assessed options against the social and local economic perspective, and a third focus group assessed options against the natural environment perspective. It should be noted that each focus group consisted of a representative cross section of the workshop participants (i.e. a mix of community, council, government agencies, RTA and study team representatives).

The various options were assessed relatively and on a qualitative basis of how each line option met each criteria on a scale of 1 through to 5. The best performing option was generally given a rating of 5 and other options given a rating based on their performance against that criteria relative to the best performing option.

Where information on a particular issue was incomplete, the group was requested to use the "collective wisdom" of the stakeholders undertaking the evaluation to determine the relativity of the options against the criteria in question.

Once the qualitative evaluation was completed, the evaluation was scored using the weightings of the criteria. Following this, a comparative ranking for each option within each perspective was established. It should be noted that where the difference in score between options was not greater than the value of the highest weighted criteria used within that perspective, the options were considered equally ranked as the

difference in score was not considered significant enough (using a coarse sensitivity analysis) to differentiate between them. For example, the highest weighted criteria for the functional perspective is ***"Safer traffic corridor"*** (which has a weighting of 39). In the case of the functional perspective then, the score of an option would need to be more than 39 for there to be a difference in rankings between options.

Each focus group discussed their findings and recorded their observations and conclusions as a result of their deliberations.

The findings of each focus group were presented to the whole group for discussion, amendment (if necessary) and finally endorsement of the assessment to assist the group move forward. Their findings as presented (together with amendments, where required) are listed below.

The evaluation information below is structured in three phases being:

- **Phase 1** – Assessment of the line combinations (against their various alternatives) which may improve the three primary options (Purple/B, Green/C and Red/D. The Orange/A option is not able to be improved.)
- **Phase 2** – Assessment by the whole group as to whether any of the various line combinations would improve the three primary options so as to determine *"modified"* options
- **Phase 3** – Assessment of the (modified) options against the assessment criteria for the full length of the section (i.e. Wells Crossing to Harwood Bridge) and then draw some conclusions from the overall assessment

Below is the evaluation process in the phases outlined above.

Phase 1: Evaluation of Various Line Combinations

As discussed above, the group (in three focus groups) evaluated the various line combination options (as shown on **Figure 1**) using the assessment criteria for each perspective being Functional; Social and Local Economic; and Natural Environment.

The comparative ranking (from each perspective) of the following alternative lines were required to build "modified" options for the overall length of the project. The comparative ranking of alternative line combinations were identified as:

- Comparatively ranking of Line **1+6** and Line **9 (potential modifications common to Purple/B, Green/C and Red/D options).**
- Comparatively ranking of Line **16+4** and Line **8 (potential modifications to the Purple/B option)**
- Comparatively ranking of Line **17+5**, Line **11+12** and Line **11+15 (potential modifications to the Green/C option)**
- Comparatively ranking of Line **18+17+5**, Line **14+12**, Line **14+15**, Line **18+11+12**, and Line **18+11+15 (potential modifications to the Red/D option).**

Since the assessment criteria developed by the group were to be used over the whole length of the study area, it could be that some criteria may not be relevant or assist in differentiating between some of the line combinations. These were noted where this was the case. Also recorded are the focus groups' key observations and summary of their findings.

Assessment of Line Combination Options

Comparing Line 1+6 and Line 9

Evaluation of Line 1 + 6 and Line 9 – Functional Perspective

Functional												
Criteria	Travel times	Engineering risks	Access to hwy & local road network	Ability to stage	Safer "traffic corridor"	Energy savings						
	ASSIGNED WEIGHT											
OPTIONS	16.5	13	14	4.5	39	13						
Line 1+6	5	5	(5)	(5)	5	5	5	5	5	5	5	RANK
	4	(4)	4	4	4	4	4	4	4	4	4	
	(3)	3	3	3	3	3	3	3	3	3	3	**1**
	2	2	2	2	2	2	2	2	2	2	2	
	1	1	1	1	1	1	1	1	1	1	1	
Sub Total	49.5	52	70	22.5								194
Line 9	(5)	(5)	5	5	5	5	5	5	5	5	5	RANK
	4	4	4	4	4	4	4	4	4	4	4	
	3	3	(3)	(3)	3	3	3	3	3	3	3	**1**
	2	2	2	2	2	2	2	2	2	2	2	
	1	1	1	1	1	1	1	1	1	1	1	
Sub Total	82.5	65	42	13.5								203

Key Observations

- In relation to the criteria "Travel times", Line 9 performs better than Line 1+6.
- In relation to criteria "Engineering risks", Line 9 performs better than Line 1+6 (working under traffic on Line 1).
- In relation to the criteria "Effective access to highway and local road network", Line 1+6 performs better since interchange closer to Grafton.
- In relation to the criteria "Ability to stage", Line 1+6 is better since Line 1 can be staged.
- In relation to the criteria "Safer traffic corridor", Line 1 provides benefit to local traffic whereas Line 9 provides benefits to through traffic. Lines equal.
- In relation to the criteria "Energy savings", same comment as per as "Safer traffic corridor". Lines equal.

Evaluation of Line 1+6 and Line 9 – Social and Local Economic Perspective

Social and Local Economic													
Criteria	Impact on Aboriginal heritage & culture	Impact on non-Aboriginal heritage & culture	Visual/urban design impacts for community	Impact of noise on existing & new receivers	Extent of community severance	Extent of homes/ residences lost	Impact on future land uses	Impact on local businesses	Impact on farms & productive lands	Social & economic risk of changes in flood impacts	Impact on lifestyle environment choices	Impact on DEC estate & State Forest conservation zones	
	ASSIGNED WEIGHT												
OPTIONS	17	5.5	1	10	11	14	2.5	9	12	5	10	3	
Line 1+6	(5)	5	(5)	(5)	5	5	(5)	(5)	5	5	(5)	5	RANK
	4	4	4	4	4	4	4	4	4	4	4	(4)	
	3	3	3	3	3	3	3	3	(3)	3	3	3	**1**
	2	2	2	2	2	2	2	2	2	2	2	2	
	1	1	1	1	1	1	1	1	1	1	1	1	
Sub Total	85		5	50			12.5	45	36		50	12	295.5
Line 9	5	5	5	5	5	5	5	5	(5)	5	5	(5)	RANK
	4	4	4	(4)	4	4	4	4	4	4	(4)	4	
	3	3	(3)	3	3	3	(3)	3	3	3	3	3	**2**
	2	2	2	2	2	2	2	(2)	2	2	2	2	
	(1)	1	1	1	1	1	1	1	1	1	1	1	
Sub Total	17		3	40			7.5	18	60		40	15	200.5

Key Observations

- In relation to the criteria “Impact on Aboriginal heritage and culture”, Line 1+6 is better than Line 9 due to Aboriginal significance around Pillar Rock and near waterhole. This area needs further investigation. Impacts to sites near Line 1+6 can be mitigated.
- In relation to criteria “Impacts on non-Aboriginal heritage and culture”, not differentiable.
- In relation to the criteria “Visual/urban design impacts for community”, Line 1+6 avoids Pillar Valley and uses the existing highway more.
- In relation to the criteria “Impact of noise on existing and new receivers”, the existing highway will continue to have traffic noise from existing route even if Line 9 is chosen as new highway route. Net impact on Line 9 is considered higher impact because existing residences on Line 9 have currently experience very low traffic noise. Increased noise on Line 9 will be mainly from heavy vehicles.
- In relation to the criteria “Extent of community severance”, both line options divide the rural community. Not differentiable.
- In relation to the criteria “Extent of homes/residences lost”, not differentiable between line options.
- In relation to the criteria “Impact on future land uses”, Line 9 potentially impacts on future development of the town and rural residential areas around Pillar Valley – therefore minor negative impacts. Line 1+6 has a positive impact for Grafton and the airport as it directs traffic closer to these locations.
- In relation to criteria “Impacts on local businesses”, Line 1+6 has greater benefits for business because it is closer to Grafton. Business opportunities could be increased near the airport. Line 9 has no business benefit to community.
- In relation to the criteria “Impact on farms and productive lands”, Line 1+6 affects most forest and prime agricultural lands. Line 9 has less effect – some larger properties impacted but changes to alignment may be adjusted.
- In relation to the criteria “Social and economic risks of changes in flooding impacts”, Line 1+6 go through the 1:20 year flood level, however, not a differentiator.
- In relation to the criteria “Impacts on lifestyle environment choices”, there is marginal difference – Pillar Valley slightly more impacted. Line 1+6 is ranked better.
- In relation to the criteria “Impact on DEC estates and State Forest Conservation Zones”, Line 1+6 has bigger impact, so Line 9 performs better on this criteria.

Evaluation of Line 1 + 6 and Line 9 – Natural Environment Perspective

Natural Environment												
Criteria	Area of native vegetation lost incl high value habitat	Impact on EECs	Threatened & regionally significant flora impacts	Threatened & regionally significant fauna impacts	Impacts on wildlife corridors	Environmental impacts of changes to hydrological regimes	Impacts on SEPP 14 & other wetlands	Impacts on water quality & aquatic environment				
	ASSIGNED WEIGHT											
OPTIONS	16	18	14	14	4	4	16	14				
Line 1+6	(5)	5	5	5	5	5	5	5	5	5	5	RANK
	4	4	4	4	4	4	4	4	4	4	4	
	3	3	3	3	3	(3)	3	(3)	3	3	3	**2**
	2	(2)	2	2	2	2	(2)	2	2	2	2	
	1	1	1	1	1	1	1	1	1	1	1	
Sub Total	80	36				12	32	42				202
Line 9	5	(5)	5	5	5	(5)	(5)	(5)	5	5	5	RANK
	(4)	4	4	4	4	4	4	4	4	4	4	
	3	3	3	3	3	3	3	3	3	3	3	**1**
	2	2	2	2	2	2	2	2	2	2	2	
	1	1	1	1	1	1	1	1	1	1	1	
Sub Total	64	90				20	80	70				324

Key Observations

- In relation to the criteria “Area of native vegetation lost including high value habitat”, Line 1+6 has least impact – existing disturbance along highway and in agricultural land.
- In relation to criteria “Impacts on EECs”, Line 9 has least impact – area of impact on system quality of EECs around Coldstream River.
- In relation to the criteria “Threatened and regionally significant flora impacts”, not differentiable between the line options. Still a relevant issue, but threatened species would be spread across area.
- In relation to the criteria “Threatened and regionally significant fauna impacts”, not differentiable between the line options. Still a relevant issue, but threatened species would be spread across area.
- In relation to the criteria “Impacts on wildlife corridors”, not differentiable between the line options. Wildlife corridors go across both lines.
- In relation to criteria “Environmental impacts of changes to hydrological regimes”, Line 9 has least impact. Line 6 crosses significant flood area.
- In relation to the criteria “Impacts on SEPP 14 and other wetlands”, Line 9 has least impact. Line 6 crosses very significant wetland.
- In relation to criteria “Impacts on water quality and the aquatic environment not assessed in other criteria”, Line 9 has least impact. Line 9 has greater potential for buffering. Coldstream River wetland has higher aquatic habitat values.

Comparing Line 16+4 and Line 8

Evaluation of Line 16+4 and Line 8 – Functional Perspective

Functional												
Criteria	Travel times	Engineering risks	Access to hwy & local road network	Ability to stage	Safer "traffic corridor"	Energy savings						
	ASSIGNED WEIGHT											
OPTIONS	16.5	13	14	4.5	39	13						
Line 16+4	5	5	(5)	(5)	5	5	5	5	5	5	5	RANK
	4	4	4	4	4	4	4	4	4	4	4	
	3	3	3	3	3	3	3	3	3	3	3	**1**
	2	2	2	2	2	2	2	2	2	2	2	
	1	1	1	1	1	1	1	1	1	1	1	
Sub Total			70	22.5								92.5
Line 8	5	5	5	5	5	5	5	5	5	5	5	RANK
	4	4	(4)	4	4	4	4	4	4	4	4	
	3	3	3	(3)	3	3	3	3	3	3	3	**2**
	2	2	2	2	2	2	2	2	2	2	2	
	1	1	1	1	1	1	1	1	1	1	1	
Sub Total			56	13.5								69.5

Key Observations

- In relation to the criteria "Travel times". Lines equal.
- In relation to criteria "Engineering risks", assessed as equal. Soft soil on Line 8 against working under traffic for Line 4.
- In relation to the criteria "Effective access to highway and local road network", Line 16+4 has potential for better access under Class "A" or an interchange for Class "M".
- In relation to the criteria "Ability to stage", Line 16+4 is better since Line 4 can be staged.
- In relation to the criteria "Safer traffic corridor". Lines equal.
- In relation to the criteria "Energy savings". Lines equal.

Evaluation of Line 16+4 and Line 8 – Social and Local Economic Perspective

Social and Local Economic													
Criteria	Impact on Aboriginal heritage & culture	Impact on non-Aboriginal heritage & culture	Visual/urban design impacts for community	Impact of noise on existing & new receivers	Extent of community severance	Extent of homes/ residences lost	Impact on future land uses	Impact on local businesses	Impact on farms & productive lands	Social & economic risk of changes in flood impacts	Impact on lifestyle environment choices	Impact on DEC estate & State Forest conservation zones	
	ASSIGNED WEIGHT												
OPTIONS	17	5.5	1	10	11	14	2.5	9	12	5	10	3	
Line 16+4	5	5	5	5	5	5	5	(5)	5	5	5	5	RANK
	4	4	(4)	4	(4)	4	(4)	4	4	(4)	(4)	4	**2**
	3	3	3	(3)	3	(3)	3	3	3	3	3	3	
	2	2	2	2	2	2	2	2	2	2	2	2	
	1	1	1	1	1	1	1	1	1	1	1	1	
Sub Total			4	30	44	42	10	45		20	40		235
Line 8	5	5	(5)	(5)	(5)	(5)	(5)	5	5	(5)	(5)	5	RANK
	4	4	4	4	4	4	4	(4)	4	4	4	4	**1**
	3	3	3	3	3	3	3	3	3	3	3	3	
	2	2	2	2	2	2	2	2	2	2	2	2	
	1	1	1	1	1	1	1	1	1	1	1	1	
Sub Total			5	50	55	70	12.5	36		25	50		303.5

Key Observations

- In relation to the criteria “Impact on Aboriginal heritage and culture”, not differentiable between line options.
- In relation to criteria “Impacts on non-Aboriginal heritage and culture”, not differentiable.
- In relation to the criteria “Visual/urban design impacts for community”, Line 8 travels behind Tyndale Village but closer to people who currently don’t experience visual impacts of road. Minor difference in favour of Line 8.
- In relation to the criteria “Impact of noise on existing and new receivers”, Line 8 performs better because fewer houses on the route.
- In relation to the criteria “Extent of community severance”, very slight difference in favour of Line 8.
- In relation to the criteria “Extent of homes/residences lost”, substantially less homes lost on Line 8.
- In relation to the criteria “Impact on future land uses”, Line 8 is limited with future land use opportunities.
- In relation to criteria “Impacts on local businesses”, Line 16+4 rated higher because of the opportunity for an interchange to allow access to the village.
- In relation to the criteria “Impact on farms and productive lands”, Line 8 has a larger impact as it traverses through flood free land. Line 16+4 removes flood free land compared to land not currently affected. On balance not a differentiator.
- In relation to the criteria “Social and economic risks of changes in flooding impacts”, Line 8 slightly better since impacts easier to mitigate.
- In relation to the criteria “Impacts on lifestyle environment choices”, positive impact by Line 16+4 and a negative impact by Line 8, but many fewer houses on Line 8.
- In relation to the criteria “Impact on DEC estates and State Forest Conservation Zones”, it was not differentiable between line options.

Evaluation of Line 16+4 and Line 8 – Natural Environment Perspective

Natural Environment												
Criteria	Area of native vegetation lost incl high value habitat	Impact on EECs	Threatened & regionally significant flora impacts	Threatened & regionally significant fauna impacts	Impacts on wildlife corridors	Environmental impacts of changes to hydrological regimes	Impacts on SEPP 14 & other wetlands	Impacts on water quality & aquatic environment				
	ASSIGNED WEIGHT											
OPTIONS	16	18	14	14	4	4	16	14				
Line 16+4	(5)	(5)	5	5	(5)	(5)	(5)	(5)	5	5	5	RANK
	4	4	4	4	4	4	4	4	4	4	4	
	3	3	3	3	3	3	3	3	3	3	3	**1**
	2	2	2	2	2	2	2	2	2	2	2	
	1	1	1	1	1	1	1	1	1	1	1	
Sub Total	80	90			20	20	80	70				360
Line 8	5	5	5	5	5	5	5	5	5	5	5	RANK
	4	4	4	4	4	4	4	(4)	4	4	4	
	3	3	3	3	(3)	3	3	3	3	3	3	**2**
	(2)	(2)	2	2	2	(2)	2	2	2	2	2	
	1	1	1	1	1	1	(1)	1	1	1	1	
Sub Total	32	36			12	8	16	56				160

Key Observations

- In relation to the criteria “Area of native vegetation lost including high value habitat”, Line 16+4 has least impact – area of vegetation.
- In relation to criteria “Impacts on EECs”, Line 16+4 has least impact – avoids EECs.
- In relation to the criteria “Threatened and regionally significant flora impacts”, not differentiable between the line options. Lack of information.
- In relation to the criteria “Threatened and regionally significant fauna impacts”, not differentiable between the line options. Lack of information.
- In relation to the criteria “Impacts on wildlife corridors”, Line 16+4 has least impact – existing corridor. Line 8 will reduce habitat availability.
- In relation to criteria “Environmental impacts of changes to hydrological regimes”, Line 16+4 has least impact. Line 8 goes through lower lying areas and through wetlands.
- In relation to the criteria “Impacts on SEPP 14 and other wetlands”, Line 16+4 has least impact. Line 8 goes through lower lying areas and through wetlands.
- In relation to criteria “Impacts on water quality and the aquatic environment not assessed in other criteria”, Line 16+4 has least impact. Line 8 wetland impacts more significant but has opportunity to improve Line 8 by connecting to existing highway further south.

Comparing Line 17+5 and Line 11+12 and Line 11+15

Evaluation of Line 17+5 and Line 11+12 and Line 11+15– Functional Perspective

Functional												
Criteria	Travel times	Engineering risks	Access to hwy & local road network	Ability to stage	Safer "traffic corridor"	Energy savings						
	ASSIGNED WEIGHT											
OPTIONS	16.5	13	14	4.5	39	13						
Line 17+5	5	5	5	(5)	5	5	5	5	5	5	5	RANK
	(4)	4	4	4	4	4	4	4	4	4	4	
	3	3	3	3	3	3	3	3	3	3	3	**2**
	2	(2)	2	2	2	2	2	2	2	2	2	
	1	1	1	1	1	1	1	1	1	1	1	
Sub Total	66	26		22.5								114.5
Line 11+12	(5)	(5)	5	5	5	5	5	5	5	5	5	RANK
	4	4	4	4	4	4	4	4	4	4	4	
	3	3	3	(3)	3	3	3	3	3	3	3	**1**
	2	2	2	2	2	2	2	2	2	2	2	
	1	1	1	1	1	1	1	1	1	1	1	
Sub Total	82.5	65		13.5								161
Line 11+15	5	5	5	5	5	5	5	5	5	5	5	RANK
	(4)	4	4	4	4	4	4	4	4	4	4	
	3	(3)	3	(3)	3	3	3	3	3	3	3	**2**
	2	2	2	2	2	2	2	2	2	2	2	
	1	1	1	1	1	1	1	1	1	1	1	
Sub Total	66	39		13.5								118.5

Key Observations

- In relation to the criteria "Travel times", Line 11+12 is slightly quicker.
- In relation to criteria "Engineering risks", Line 11+12 is considered best, Line 11+15 has more soft soils and acid sulphate soils, Line 17+5 also has working near traffic.
- In relation to the criteria "Effective access to highway and local road network", Line 17+5 as Class "A" road could provide better access. Considered non differentiable as a Class "M" road.
- In relation to the criteria "Ability to stage", Line 17+5 is better since Line 5 can be staged.
- In relation to the criteria "Safer traffic corridor", Lines equal (unless interchange provided at Shark Creek, as this would attract more traffic to the new route from the existing highway due to greater accessibility to the new highway for the local community).
- In relation to the criteria "Energy savings", Lines equal.

Evaluation of Line 17+5 and Line 11+12 and Line 11+15 – Social and Local Economic Perspective

Social and Local Economic													
Criteria	Impact on Aboriginal heritage & culture	Impact on non-Aboriginal heritage & culture	Visual/urban design impacts for community	Impact of noise on existing & new receivers	Extent of community severance	Extent of homes/ residences lost	Impact on future land uses	Impact on local businesses	Impact on farms & productive lands	Social & economic risk of changes in flood impacts	Impact on lifestyle environment choices	Impact on DEC estate & State Forest conservation zones	
ASSIGNED WEIGHT													
OPTIONS	17	5.5	1	10	11	14	2.5	9	12	5	10	3	
Line 17+5	5	5	(5)	(5)	5	5	5	(5)	5	5	(5)	5	RANK
	4	(4)*	4	4	(4)	4	(4)	4	4	4	4	(4)	
	3	3	3	3	3	(3)	3	3	3	(3)	3	3	**2**
	2	2	2	2	2	2	2	2	(2)	2	2	2	
	1	1	1	1	1	1	1	1	1	1	1	1	
Sub Total		22*	5	50	44	42	10	45	24	15	50	12	319*
Line 11+12	5	(5)*	5	5	5	(5)	5	5	(5)	(5)	5	(5)	RANK
	4	4	4	4	4	4	4	(4)	4	4	4	4	
	3	3	(3)	(3)	3	3	(3)	3	3	3	(3)	3	**2**
	2	2	2	2	(2)	2	2	2	2	2	2	2	
	1	1	1	1	1	1	1	1	1	1	1	1	
Sub Total		27.5*	3	30	22	70	7.5	36	60	25	30	15	326*
Line 11+15	5	(5)*	(5)	(5)	(5)	(5)	(5)	5	5	5	5	(5)	RANK
	4	4	4	4	4	4	4	(4)	(4)	(4)	4	4	
	3	3	3	3	3	3	3	3	3	3	(3)	3	**1**
	2	2	2	2	2	2	2	2	2	2	2	2	
	1	1	1	1	1	1	1	1	1	1	1	1	
Sub Total		27.5*	5	50	55	70	12.5	36	48	20	30	15	369*

Key Observations

- In relation to the criteria “Impact on Aboriginal heritage and culture”, scattered artefacts, not differentiable between line options.
- In relation to criteria “Impacts on non-Aboriginal heritage and culture”, the two eastern routes are marginally better than the Orange/A route.
- In relation to the criteria “Visual/urban design impacts for community”, Line 11+12 has the most impact on visual amenity compared to Line 17+5 and Line 11+15.
- In relation to the criteria “Impact of noise on existing and new receivers”, Line 17+5 has noise currently but the change in noise will be higher due to heavy vehicles moving. Line 11+12 has the greatest change with heavy vehicles and number of houses being affected. Line 11+15 has a similar number of residences as Line 11+12 but more scattered, not clumping and the line is further away from main group of residences.
- In relation to the criteria “Extent of community severance”, Line 11+12 has the most impact to Gulmarrad and James Creek. For Line 17+5, there will be some additional severance, but this relates to widening of the existing highway corridor. Line 11+15 less severance than Line 11+12 to communities (edge only – little further growth). Line 11+15 better than Line 17+5 and then Line 11+12.
- In relation to the criteria “Extent of homes/residences lost”, Line 17+5 most impact.
- In relation to the criteria “Impact on future land uses”, Line 11+15 has limited opportunity for growth. Line 11+12 has potential for growth and therefore impact. Line 5 has some potential for growth and Line 11 has some resource issues but unlikely to limit use of option.
- In relation to criteria “Impacts on local businesses”, there are future plans around Townsend and the industrial estate. Access will be important. Line 11+12 may impact some access. Having the highway away from Line 5 may cause impact on businesses – may need interchanges.
- In relation to the criteria “Impact on farms and productive lands”, Line 17+5 has the highest impact. Line 15+11 the second largest impact. Line 11+12, the least impact.
- In relation to the criteria “Social and economic risks of changes in flooding impacts”, Line 17+5 has the highest impact. Line 15+11 the second largest impact. Line 11+12, the least impact.

- In relation to the criteria “Impacts on lifestyle environment choices”, Lines 11+12 and 11+15 have more impact to lifestyle.
- In relation to the criteria “Impact on DEC estates and State Forest Conservation Zones”, Line 17+5 has impacts and route may need refinement.

***** *It should be noted for the criteria “Impact on non-Aboriginal heritage and culture”, the focus group made an error in transcribing their evaluation of the Line options onto the above matrix. This was discovered after the completion of the workshop.*

The focus group’s findings, as recorded in their key observations, was that Lines 11+12 and 11+15 were marginally better than Line 17+5. The ratings should have been recorded as Lines 11+12 and 11+15 rating as “5” and Line 17+5 rating as “4”. However in the workshop, it was incorrectly transcribed by the focus group as Lines 11+12 and 11+15 rated as “4” and Line 17+5 rated as “5”.

The correction, as shown above, has changed the overall scoring of the three line options to that which was presented in the workshop. However it did not change the overall ranking of the options from the Social and Local Economic perspective. There is no change in the ranking of the options.

It is believed that the error would not have had a significant bearing on the conclusions drawn by the workshop group

Evaluation of Line 17+5 and Line 11+12 and Line 11+15 – Natural Environment Perspective

Natural Environment												
Criteria	Area of native vegetation lost incl high value habitat	Impact on EECs	Threatened & regionally significant flora impacts	Threatened & regionally significant fauna impacts	Impacts on wildlife corridors	Environmental impacts of changes to hydrological regimes	Impacts on SEPP 14 & other wetlands	Impacts on water quality & aquatic environment				
	ASSIGNED WEIGHT											
OPTIONS	16	18	14	14	4	4	16	14				
Line 17+5	(5)	(5)	5	(5)	(5)	5	5	5	5	5	5	RANK
	4	4	4	4	4	(4)	(4)	4	4	4	4	**1**
	3	3	3	3	3	3	3	3	3	3	3	
	2	2	2	2	2	2	2	2	2	2	2	
	1	1	1	1	1	1	1	1	1	1	1	
Sub Total	80	90		70	20	16	64					340
Line 11+12	5	5	5	5	5	(5)	(5)	5	5	5	5	RANK
	4	(4)	4	(4)	(4)	4	4	4	4	4	4	**2**
	3	3	3	3	3	3	3	3	3	3	3	
	(2)	2	2	2	2	2	2	2	2	2	2	
	1	1	1	1	1	1	1	1	1	1	1	
Sub Total	32	72		56	16	20	80					276
Line 11+15	5	5	5	5	5	5	5	5	5	5	5	RANK
	(4)	(4)	4	(4)	(4)	(4)	(4)	4	4	4	4	**2**
	3	3	3	3	3	3	3	3	3	3	3	
	2	2	2	2	2	2	2	2	2	2	2	
	1	1	1	1	1	1	1	1	1	1	1	
Sub Total	64	72		56	16	16	64					288

Key Observations

- In relation to the criteria “Area of native vegetation lost including high value habitat”, Line 17+5 better than Line 11+15 and then Line 11+12 – based on area.
- In relation to criteria “Impacts on EECs”, Line 17+5 better than Line 11+15 and Line 11+12 since Line 17+5 impacts through an existing corridor except around Shark Creek.
- In relation to the criteria “Threatened and regionally significant flora impacts”, not differentiable between the line options.
- In relation to the criteria “Threatened and regionally significant fauna impacts”, Line 17+5 better than Line 11+15 and Line 11+12 since existing corridor would have less potential for impacts.
- In relation to the criteria “Impacts on wildlife corridors”, Line 17+5 better than Line 11+15 and Line 11+12 since southern section influences results regarding emus (Line 17).
- In relation to criteria “Environmental impacts of changes to hydrological regimes”, Line 11+12 better than Line 17+5 and Line 11+15 since Line 11+12 is on higher ground. Line 11+15 impacts around Wooloweyah and Line 17 through Shark Creek.
- In relation to the criteria “Impacts on SEPP 14 and other wetlands”, Line 11+12 better than Line 17+5 and Line 11+15 – same comment as criteria above.
- In relation to criteria “Impacts on water quality and the aquatic environment not assessed in other criteria”, not differentiable between the line options. Potential risk of impacts is high for all.

Comparing Line 18+17+5 and Line 14+12 and Line 14+15 and Line 18+11+12 and Line 18+11+15

Evaluation of Line 18+17+5, Line 14+12, Line 14+15, Line 18+11+12, Line 18+11+15 – Functional Perspective

Functional												
Criteria	Travel times	Engineering risks	Access to hwy & local road network	Ability to stage	Safer "traffic corridor"	Energy savings						
	ASSIGNED WEIGHT											
OPTIONS	16.5	13	14	4.5	39	13						
Line 18+17+5	5	5	5	(5)	5	5	5	5	5	5	5	RANK
	4	4	4	4	(4)	4	4	4	4	4	4	**4**
	3	3	3	3	3	3	3	3	3	3	3	
	(2)	2	2	2	2	(2)	2	2	2	2	2	
	1	(1)	1	1	1	1	1	1	1	1	1	
Sub Total	33	13		22.5	156	26						250.5
Line 14+12	(5)	(5)	5	5	(5)	(5)	5	5	5	5	5	RANK
	4	4	4	4	4	4	4	4	4	4	4	**1**
	3	3	3	(3)	3	3	3	3	3	3	3	
	2	2	2	2	2	2	2	2	2	2	2	
	1	1	1	1	1	1	1	1	1	1	1	
Sub Total	82.5	65		13.5	195	65						421
Line 14+15	5	5	5	5	(5)	5	5	5	5	5	5	RANK
	(4)	4	4	4	4	(4)	4	4	4	4	4	**2**
	3	(3)	3	(3)	3	3	3	3	3	3	3	
	2	2	2	2	2	2	2	2	2	2	2	
	1	1	1	1	1	1	1	1	1	1	1	
Sub Total	66	39		13.5	195	52						365.5
Line 18+11+12	5	5	5	5	5	5	5	5	5	5	5	RANK
	4	(4)	4	4	(4)	4	4	4	4	4	4	**3**
	(3)	3	3	(3)	3	(3)	3	3	3	3	3	
	2	2	2	2	2	2	2	2	2	2	2	
	1	1	1	1	1	1	1	1	1	1	1	
Sub Total	49.5	52		13.5	156	39						310
Line 18+11+15	5	5	5	5	5	5	5	5	5	5	5	RANK
	4	4	4	4	(4)	4	4	4	4	4	4	**4**
	3	3	3	(3)	3	3	3	3	3	3	3	
	(2)	(2)	2	2	2	(2)	2	2	2	2	2	
	1	1	1	1	1	1	1	1	1	1	1	
Sub Total	33	26		13.5	156	26						254.5

Key Observations

- In relation to the criteria "Travel times", Line 14+12 is better than Line 14+15, then Line 18+11+12 followed by Line 18+17+5 and Line 18+11+15.
- In relation to criteria "Engineering risks", Line 14+12 is better based on soft soils, acid sulphate soils and working under traffic. Line 18+17+5 and Line 18+11+15 seen as worse.
- In relation to the criteria "Effective access to highway and local road network", considered non differentiable as a Class "M" road.
- In relation to the criteria "Ability to stage", Line 18+17+5 is better since Line 5 can be staged.
- In relation to the criteria "Safer traffic corridor", Lines including 18 introduces steeper grades (i.e. poorer route).
- In relation to the criteria "Energy savings", Line 14+12 better and others assessed based on length and grade.

Evaluation of Line 18+17+5, Line 14+12, Line 14+15, Line 18+11+12, Line 18+11+15 – Social and Local Economic Perspective

Social and Local Economic													
Criteria	Impact on Aboriginal heritage & culture	Impact on non-Aboriginal heritage & culture	Visual/urban design impacts for community	Impact of noise on existing & new receivers	Extent of community severance	Extent of homes/ residences lost	Impact on future land uses	Impact on local businesses	Impact on farms & productive lands	Social & economic risk of changes in flood impacts	Impact on lifestyle environment choices	Impact on DEC estate & State Forest conservation zones	
	ASSIGNED WEIGHT												
OPTIONS	17	5.5	1	10	11	14	2.5	9	12	5	10	3	
Line 18+17+5	5	(5)	(5)	(5)	5	5	5	(5)	5	5	(5)	5	RANK **3**
	4	4	4	4	(4)	4	(4)	4	4	4	4	(4)	
	3	3	3	3	3	(3)	3	3	3	(3)	3	3	
	2	2	2	2	2	2	2	2	(2)	2	2	2	
	1	1	1	1	1	1	1	1	1	1	1	1	
Sub Total		27.5	5	50	44	42	10	45	24	15	50	12	324.5
Line 14+12	5	5	5	5	5	(5)	5	5	(5)	(5)	5	(5)	RANK **5**
	4	(4)	4	4	4	4	4	(4)	4	4	4	4	
	3	3	(3)	3	3	3	(3)	3	3	3	3	3	
	2	2	2	(2)	(2)	2	2	2	2	2	(2)	2	
	1	1	1	1	1	1	1	1	1	1	1	1	
Sub Total		22	3	20	22	70	7.5	36	60	25	20	15	300.5
Line 14+15	5	5	(5)	5	(5)	(5)	(5)	5	5	5	5	(5)	RANK **2**
	4	(4)	4	(4)	4	4	4	(4)	(4)	(4)	4	4	
	3	3	3	3	3	3	3	3	3	3	3	3	
	2	2	2	2	2	2	2	2	2	2	(2)	2	
	1	1	1	1	1	1	1	1	1	1	1	1	
Sub Total		22	5	40	55	70	12.5	36	48	20	20	15	343.5
Line 18+11+12	5	5	5	5	5	(5)	5	5	(5)	(5)	5	(5)	RANK **3**
	4	(4)	4	4	4	4	4	(4)	4	4	4	4	
	3	3	(3)	(3)	3	3	(3)	3	3	3	(3)	3	
	2	2	2	2	(2)	2	2	2	2	2	2	2	
	1	1	1	1	1	1	1	1	1	1	1	1	
Sub Total		22	3	30	22	70	7.5	36	60	25	30	15	320.5
Line 18+11+15	5	5	(5)	(5)	(5)	(5)	(5)	5	5	5	5	(5)	RANK **1**
	4	(4)	4	4	4	4	4	(4)	(4)	(4)	4	4	
	3	3	3	3	3	3	3	3	3	3	(3)	3	
	2	2	2	2	2	2	2	2	2	2	2	2	
	1	1	1	1	1	1	1	1	1	1	1	1	
Sub Total		22	5	50	55	70	12.5	36	48	20	30	15	363.5

Key Observations

- In relation to the criteria “Impact on Aboriginal heritage and culture”, not differentiable between line options.
- In relation to criteria “Impacts on non-Aboriginal heritage and culture”, Line 18+17+5 slightly better and the rest are not differentiable.
- In relation to the criteria “Visual/urban design impacts for community”, no change from the comment made for the previous comparison for Line 17+5 as against Line 11+12 and Line 11+15 (i.e. Line 11+12 has the most impact on visual amenity compared to Line 17+5 and Line 11+15). Line 14+12 has similar impacts to Line 18+11+12 as most potentially affected houses are near Line 12, rather than Lines 11 or 14. Line 14+15 is similar to Line 18+11+15 because most potentially affected are near Line 15. Generally lines including Line 15 perform better than lines containing Line 12 because of greater separation from rural residential areas.
- In relation to the criteria “Impact of noise on existing and new receivers”, no change from the comment made for the previous comparison for Line 17+5 as against Line 11+12 and Line 11+15

(i.e. Line 17+5 has noise currently but the change in noise will be higher due to heavy vehicles moving. Line 11+12 has the greatest change with heavy vehicles and number of houses being affected. Line 14+12 is similar because most houses are near Line 12 rather than Lines 18+11 or 14. Line 11+15 has a similar number of residences as Line 11+12 but more scattered, not clumping and the line is further away from main group of residences). Line 14+15 is similar to Line 18+11+15 because most houses are near Line 15 rather than Lines 18+11 or 14. Generally lines including Line 15 perform better than lines containing Line 12 because of greater separation from rural residential areas.

- In relation to the criteria "Extent of community severance", no change from the comment made for the previous comparison for Line 17+5 as against Line 11+12 and Line 11+15 (Line 11+12 has the most impact to Gulmarrad and James Creek. For Line 17+5, there will be some additional severance, but this relates to widening of the existing highway corridor. Line 11+15 less severance than Line 11+12 to communities (edge only – little further growth). Line 11+15 better than Line 17+5 and then Line 11+12). Main community severance impacts are around Gulmarrad and James Creek (Lines 12 and 15) rather than further south (Lines 18+11 or Line 14).
- In relation to the criteria "Extent of homes/residences lost", no change from the comment made for the previous comparison for Line 17+5 as against Line 11+12 and Line 11+15 (i.e. Line 17+5 most impact).
- In relation to the criteria "Impact on future land uses", impacts on potential petroleum resources around Line 18 – would only be an issue if mining is affected. Unlikely that drilling would be denied. No change from the comment made for the previous comparison for Line 17+5 as against Line 11+12 and Line 11+15 (i.e. Line 11+15 has limited opportunity for growth. Line 11+12 has potential for growth and therefore impact. Line 5 has some potential for growth and Line 11 has some resource issues but unlikely to limit use of option).
- In relation to criteria "Impacts on local businesses", no change from the comment made for the previous comparison for Line 17+5 as against Line 11+12 and Line 11+15 (i.e. there are future plans around Townsend and the industrial estate. Access will be important. Line 11+12 may impact some access. Having the highway away from Line 5 may cause impact on businesses – may need interchanges).
- In relation to the criteria "Impact on farms and productive lands", marginal changes to land area not likely to affect productivity.
- In relation to the criteria "Social and economic risks of changes in flooding impacts", no change from the comment made for the previous comparison for Line 17+5 as against Line 11+12 and Line 11+15 (i.e. Line 17+5 has the highest impact. Line 11+15 the second largest impact. Line 11+12, the least impact).
- In relation to the criteria "Impacts on lifestyle environment choices", Lines with 14 are worse than the Lines with 18+11.
- In relation to the criteria "Impact on DEC estates and State Forest Conservation Zones", no change from the comment made for the previous comparison for Line 17+5 as against Line 11+12 and Line 11+15 (i.e. Line 17+5 has impacts and route may need refinement).

Evaluation of Line 18+17+5, Line 14+12, Line 14+15, Line 18+11+12, Line 18+11+15 – Natural Environment Perspective

Natural Environment												
Criteria	Area of native vegetation lost incl high value habitat	Impact on EECs	Threatened & regionally significant flora impacts	Threatened & regionally significant fauna impacts	Impacts on wildlife corridors	Environmental impacts of changes to hydrological regimes	Impacts on SEPP 14 & other wetlands	Impacts on water quality & aquatic environment				
	ASSIGNED WEIGHT											
OPTIONS	16	18	14	14	4	4	16	14				
Line 18+17+5	(5)	(5)	5	5	5	5	5	5	5	5	5	RANK
	4	4	4	4	4	4	4	4	4	4	4	
	3	3	3	3	3	(3)	(3)	3	3	3	3	**2**
	2	2	2	2	2	2	2	(2)	2	2	2	
	1	1	1	1	1	1	1	1	1	1	1	
Sub Total	80	90				12	48	28				258
Line 14+12	5	5	5	5	5	5	(5)	5	5	5	5	RANK
	(4)	4	4	4	4	(4)	4	(4)	4	4	4	
	3	(3)	3	3	3	3	3	3	3	3	3	**2**
	2	2	2	2	2	2	2	2	2	2	2	
	1	1	1	1	1	1	1	1	1	1	1	
Sub Total	64	54				16	80	56				270
Line 14+15	(5)	5	5	5	5	5	5	5	5	5	5	RANK
	4	4	4	4	4	4	(4)	4	4	4	4	
	3	(3)	3	3	3	(3)	3	(3)	3	3	3	**2**
	2	2	2	2	2	2	2	2	2	2	2	
	1	1	1	1	1	1	1	1	1	1	1	
Sub Total	80	54				12	64	42				252
Line 18+11+12	5	5	5	5	5	(5)	(5)	(5)	5	5	5	RANK
	(4)	(4)	4	4	4	4	4	4	4	4	4	
	3	3	3	3	3	3	3	3	3	3	3	**1**
	2	2	2	2	2	2	2	2	2	2	2	
	1	1	1	1	1	1	1	1	1	1	1	
Sub Total	64	72				20	80	70				306
Line 18+11+15	(5)	5	5	5	5	5	5	5	5	5	5	RANK
	4	(4)	4	4	4	4	(4)	4	4	4	4	
	3	3	3	3	3	(3)	3	(3)	3	3	3	**2**
	2	2	2	2	2	2	2	2	2	2	2	
	1	1	1	1	1	1	1	1	1	1	1	
Sub Total	80	72				12	64	42				270

Key Observations

- In relation to the criteria “Area of native vegetation lost including high value habitat”, combination of habitat and vegetation makes it difficult to differentiate. Some cleared areas still have high habitat values.
- In relation to criteria “Impacts on EECs”, Line 18+17+ 5 has least impact because of use of existing corridor, others have greater fragmentation.
- In relation to the criteria “Threatened and regionally significant flora impacts”, not differentiable between the line options, but all have a high potential for impact.
- In relation to the criteria “Threatened and regionally significant fauna impacts”, not differentiable between the line options, but all have a high potential for impact.
- In relation to the criteria “Impacts on wildlife corridors”, not differentiable between the line options, but all have a high potential for impact.
- In relation to criteria “Environmental impacts of changes to hydrological regimes”, Line18+11+12 is on highest ground, therefore has least risk of impact. Line 14+12 has same logic.
- In relation to the criteria “Impacts on SEPP 14 and other wetlands”, Line 18+11+12 has least impact as it is on highest ground. Again, Line 14 + 12 has the same reasoning.

- In relation to criteria “Impacts on water quality and the aquatic environment not assessed in other criteria”, Line 18+11+12 has least impact based on highest ground comment above, Line 14+12 has some flood impacts. Wooloweyah is very significant, but routes are some distance away.

Summary of Line Combination Rankings

	Social and Local Economic		Natural Environment		Functional	
Line combination	**Rank (Score)**	**Reasons Why**	**Rank (Score)**	**Reasons Why**	**Rank (Score)**	**Reasons Why**
Sub-option common to Purple, Green and Red Options						
Line 1+6	1 (295.5)	Line 1+6 is substantially better in most social + local economic criteria	2 (202)	Line 9 – better in terms of EEC, water quality SEPP 14 and others.	1 (194)	Line 9 – better travel times and lower risk Line 1+6 – better access and staging
Line 9	2 (200.5)		1 (324)		1 (203)	
Purple Sub-options						
Line 16+4	2 (235)	Line 8 - substantially better in most cases categories except business	1 (360)	Line 16+4 – better in terms of native vegetation, EECs, SEPP 14 and others.	1 (92.5)	Line 16+4 – better potential for access potential for staging
Line 8	1 (303.5)		2 (160)		2 (69.5)	
Green Sub-options						
Line 17+5	2 (319)	Line 11+15 - better as it is further away from settlements	1 (340)	Line 17+5 is better as there are less impacts on native vegetation, significant fauna. Section 17 has high impact. 11+12 better on hydrology, SEPP 14.	2 (114.5)	Line 11+12 – better as there are lower risks and better travel times
Line 11+12	2 (326)		2 (276)		1 (161)	
Line 11+15	1 (369)		2 (288)		2 (118.5)	
Red Sub-options						
Line 18+17+5	3 (324.5)	Similar rating to the Green Sub-options Lines 14 and 18 have minimal influence on the ranking of options.	4 (258)	Line 18+11+12 – better in terms of hydrology, water quality, SEPP14. .Section 17 made ranking difficult due to high impacts, but combines with Section 5 – existing corridor	4 (250.5)	Line 14+12 – performed best on most categories
Line 14+12	5 (300.5)		2 (270)		1 (421)	
Line 14+15	2 (343.5)		4 (252)		2 (365.5)	
Line 18+11+12	3 (320.5)		1 (306)		3 (310)	
Line 18+11+15	1 (363.5)		2 (270)		4 (254.5)	

Summary of Line Combination Option Assessment Rankings

Below is a summary of findings of the three focus groups in ranking the various line combination options. This information was combined with strategic cost estimates supplied by the project team for the construction of the highway along the various line combination options.

It was noted that the costs were strategic in nature with a high level of contingency (50%). The costs included construction, land acquisition and some mitigation measures (i.e. flora and fauna fencing, noise, flooding, etc).

	Theme/Perspective Rankings and Strategic Estimates			
Lines	**Function**	**Social & Local Economic**	**Natural Environment**	**$ (million)**
Sub-options common to Purple, Green and Red Options				
Line 1+6	1 (194)	1 (295)	2 (202)	273.7
Line 9	1 (203)	2 (200.5)	1 (324)	239.2
Purple Sub-options				
Line 16+4	1 (92.5)	2 (235)	1 (360)	312.4
Line 8	2 (69.5)	1 (303.5)	2 (160)	310.6
Green Sub-options				
Line 17+5	2 (114.5)	2 (319)	1 (340)	462.6
Line 11+12	1 (161)	2 (326)	2 (276)	248.7
Line 11+15	2 (118.5)	1 (369)	2 (288)	272.2
Red Sub-options				
Line 18+17+5	4 (250.5)	3 (324.5)	2 (258)	503.5
Line 14+12	1 (421)	5 (300.5)	2 (270)	280.9
Line 14+15	2 (365.5)	2 (343.5)	2 (252)	304.5
Line 18+11+12	3 (310)	3 (320.5)	1 (306)	289.6
Line 18+11+15	4 (254.5)	1 (363.5)	2 (270)	313.1

[2] See footnote below

[2] As mentioned earlier, some minor arithmetic errors in the social and local economic perspective scores as presented at the workshop were discovered after the workshop. These were caused by an error in calculating the weightings (see page 18) and the transcription error discussed earlier (see page 21) and have been rectified in this report. None of the errors were significant or had a bearing on the conclusions drawn by the workshop group.

Phase 2: Conclusions Drawn from the Assessment of Alternative Line Combinations and Determining the Modified Options

From the information above, the group drew the following conclusions to allow the building of a number of "modified" (improved) options which could be comparatively assessed along the whole length of the study area in question (i.e. Wells Crossing to Harwood Bridge)

Line 1+6 as against Line 9 (Improvements common to Purple, Green and Red Options)

- There are a number of issues associated with both Line 1+6 and Line 9. Line 1+6 has environmental issues (i.e. impacts on EECs, impacts on SEPP14 and other wetlands, insufficient information on threatened and regionally significant flora and fauna, etc) whereas Line 9 has a number of social and local economic issues (i.e. impacts on aboriginal heritage and cultural sites, visual impacts, impacts on future land uses and impacts for convenient access to local businesses and Grafton).
- There was no consensus reached in the workshop as to which offered the better line combination and further work would be required to resolve the issues raised before a recommendation as to the preferred line in this area could be reached.
- ***However for the purposes of moving forward in the workshop and subject to further work in order to make a recommendation, the group agreed to move forward with Line 9 since it ranked first from a Natural Environment perspective and Strategic Cost Estimate and equal first from a Functional perspective.***

Line 16+4 as against Line 8 (Modified Purple Option Improvements)

- ***The group agreed to move Line 16+4 forward to improve the Purple Option because it ranked first from a Functional and Natural Environment perspective and as the Strategic Cost Estimates were reasonably similar, cost was not a major consideration***.
- This recommendation was subject to examining ways to improve the Social and Local Economic performance of Line 16+4.

Line 17+5 as against Line 11+12 as against Line 11+15 (Modified Green Option Improvements)

- The group agreed that Line 17+5 should not move forward due to environmental issues (particularly with the Line 17 leg) and the very high Strategic Cost Estimate.
- The group agreed that Line 11+12 should not move forward due to major social impacts (visual, noise, life choice and community severance impacts).
- ***The group agreed that Line 11+15 should move forward to improve the Green Option although it was noted that the Line 15 leg has some significant environmental impacts.***
- This recommendation was subject to examining ways to improve the Functional and Natural Environment performance of Line 11+15.

Line 18+17+5 as against Line 14+12 as against Line 14+15 as against Line 18+11+12 as against Line 18+11+15 (Modified Red Option Improvements)

- The group agreed that all options have high conservation value.
- Line 18+17+5 should not move forward since it ranks poorly from a Functional and Social and Local Economic perspective. It ranked equal second with three other options from a Natural Environment perspective and has a very high Strategic Cost Estimate.
- Line 14 leg created social problems for the community east of the ridge.
- Other than Line 18+17+5, the other four options have essentially the same Strategic Cost Estimate.
- From the earlier discussion on improvements to the Green Option, options including the Line 15 leg perform better than options including the Line 12 leg.
- ***The group agreed that Line 18+11+15 should move forward to improve the Red Option although it was noted that the Line 15 leg still has some significant environmental impacts.***
- This recommendation was subject to examining ways to improve the Functional and Natural Environment performance of Line 18+11+15.

Phase 3: Evaluation of the Modified Options

As a result of the evaluation of alternative line options and drawing conclusions from the assessment, the following modified options were put forward for evaluation over the length of the study area in question (i.e. Wells Crossing to Harwood Bridge (as shown in **Figure 2**). It should be noted that these recommended options are subject to a number of issues being resolved (including the resolution of the Line 1+6 as against Line 9 mentioned earlier).

The Modified Options are:

- ***Orange Option***
- ***Modified Purple Option (being Line 9+7+16+4+5)***
- ***Modified Green Option (being Line 9+10+11+15)***
- ***Modified Red Option (being Line 9+13+18+11+15)***

Having modified (improved) the various options, the group was now in a position to assess the modified options against the assessment criteria over their whole length using the three key themes/perspectives developed earlier in the workshop and the same process as outlined previously.

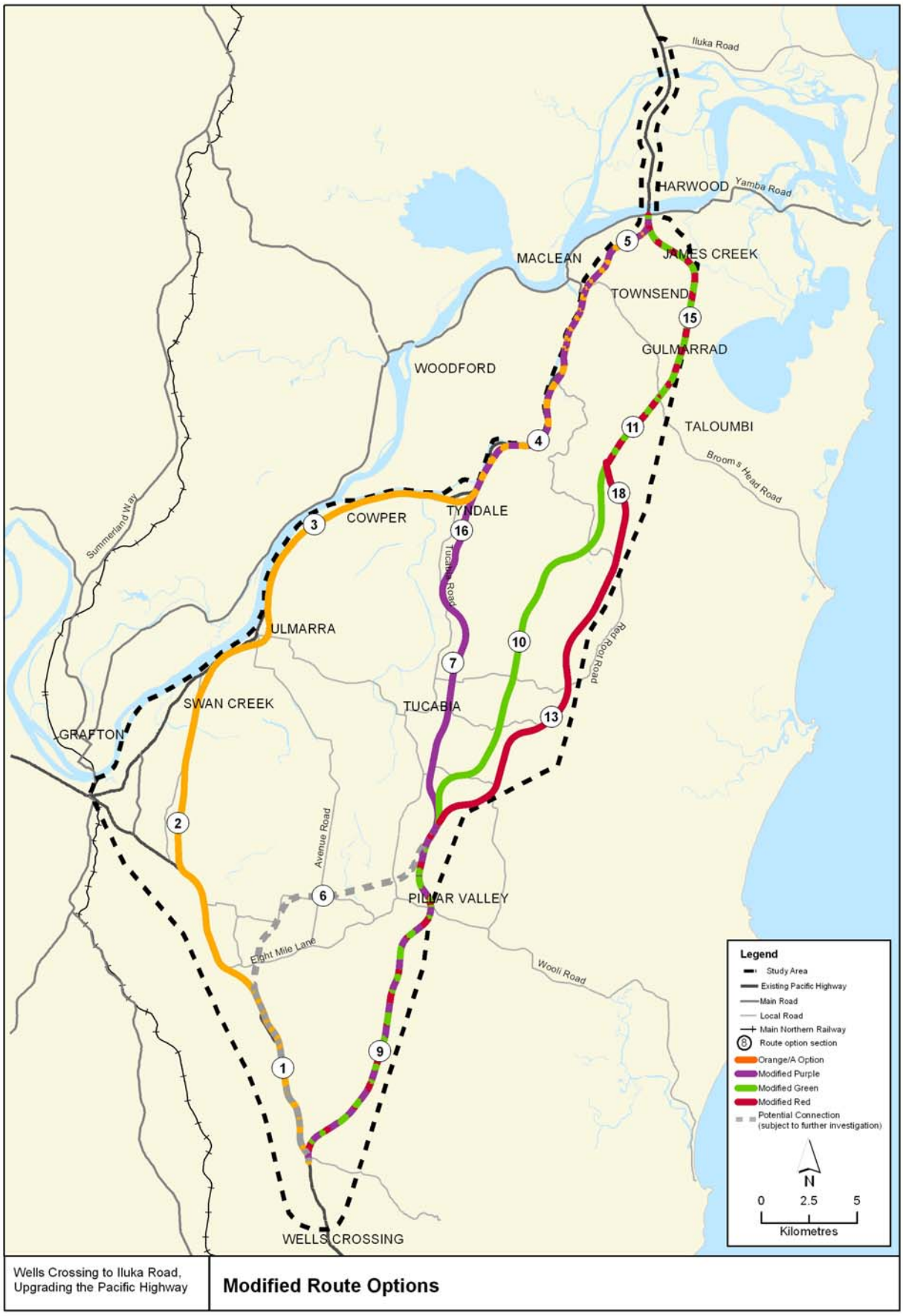
Where information on a particular issue was incomplete, the group again was requested to use the "collective wisdom" of the stakeholders undertaking the evaluation to determine the relativity of the options against the criteria in question. Also, the assessment of the option against each criteria was to be made "on balance" over the whole corridor.

Again, once the qualitative evaluation was completed, the evaluation was scored using the weightings of the criteria and a comparative ranking for each option within each perspective was established.
It should be noted that where the difference in score between options was not greater than the value of the highest weighted criteria within that perspective, the options were considered equally ranked as the difference in score was not considered significant enough (using a coarse sensitivity analysis) to differentiate between them.

Each focus group discussed their findings and recorded their observations and conclusions as a result of their deliberations.

The findings of each focus group was presented to the whole group for discussion, amendment (if necessary) and finally endorsement of the assessment to assist the group move forward. Their findings as presented (together with amendments, where required) are listed below.

Figure 2 – Modified Route Options (source: SKM)



Assessment of Modified Options within the Functional Perspective

Functional												
Criteria	Travel times	Engineering risks	Access to hwy & local road network	Ability to stage	Safer "traffic corridor"	Energy savings						
	ASSIGNED WEIGHT											
OPTIONS	16.5	13	14	4.5	39	13						
Orange	5	5	(5)	(5)	(5)	5	5	5	5	5	5	RANK
	4	4	4	4	4	4	4	4	4	4	4	
	3	3	3	3	3	(3)	3	3	3	3	3	**1**
	(2)	2	2	2	2	2	2	2	2	2	2	
	1	(1)	1	1	1	1	1	1	1	1	1	
Sub Total	33	13	70	22.5	195	39						372.5
Modified Purple	5	5	5	5	5	(5)	5	5	5	5	5	RANK
	(4)	4	4	4	(4)	4	4	4	4	4	4	
	3	(3)	(3)	(3)	3	3	3	3	3	3	3	**1**
	2	2	2	2	2	2	2	2	2	2	2	
	1	1	1	1	1	1	1	1	1	1	1	
Sub Total	66	39	42	13.5	156	65						381.5
Modified Green	(5)	(5)	5	5	5	(5)	5	5	5	5	5	RANK
	4	4	4	4	4	4	4	4	4	4	4	
	3	3	3	3	(3)	3	3	3	3	3	3	**1**
	2	2	(2)	2	2	2	2	2	2	2	2	
	1	1	1	(1)	1	1	1	1	1	1	1	
Sub Total	82.5	65	28	4.5	117	65						362
Modified Red	5	(5)	5	5	5	(5)	5	5	5	5	5	RANK
	(4)	4	4	4	4	4	4	4	4	4	4	
	3	3	3	3	(3)	3	3	3	3	3	3	**1**
	2	2	(2)	2	2	2	2	2	2	2	2	
	1	1	1	(1)	1	1	1	1	1	1	1	
Sub Total	66	65	28	4.5	117	65						345.5

Table 27: Assessment of overall Modified Options from a Functional Perspective

Key Observations

- In relation to the criteria "Travel times"[3], on the basis of through traffic, Modified Green has the best travel time. Local and regional travel had no significant travel time decreases.
- In relation to criteria "Engineering risks", Modified Red and Modified Green Options have balancing geotechnical conditions. Modified Purple has greater lengths of soft and acid sulphate soils and has working under traffic conditions. The Orange Option has all the risks.
- In relation to the criteria "Effective access to highway and local road network", there is the possibility of having an interchange in the Tyndale area in the Modified Purple Option. There is potential for an interchange at Eight Mile Lane for the Wooli area on the Orange Option. There is potential to add an interchange on the eastern options to service Wooli, Minnie Water, Tucabia and Pillar Valley.
- In relation to the criteria "Ability to stage", no further comment.
- In relation to the criteria "Safer traffic corridor", impacts of flooding on the Orange Option could increase risks of accidents on occasion, due to pavement issues of one carriageway being lower than the other. The Orange Option will have higher percentage of traffic use (i.e. regional and local traffic as compared to other routes). There is a high level of sensitivity on the "Safer traffic corridor" criteria due to its 39% weighting.

[3] It is noted that a participant to the workshop has queried the ranking in relation to travel time and energy savings, although this outcome was the consensus of the participants as a whole. This report notes that orange/A is superior to the eastern options in terms of reduced travel times and freight transport costs.

- In relation to the criteria "Energy savings", regional and local traffic will have minor energy savings based on uniform speed over a similar distance. Energy savings based on route distance and time travelled.

Assessment of Modified Options within the Social and Local Economic Perspective

Social and Local Economic													
Criteria	Impact on Aboriginal heritage & culture	Impact on non-Aboriginal heritage & culture	Visual/urban design impacts for community	Impact of noise on existing & new receivers	Extent of community severance	Extent of homes/ residences lost	Impact on future land uses	Impact on local businesses	Impact on farms & productive lands	Social & economic risk of changes in flood impacts	Impact on lifestyle environment choices	Impact on DEC estate & State Forest conservation zones	
ASSIGNED WEIGHT													
OPTIONS	17	5.5	1	10	11	14	2.5	9	12	5	10	3	
Orange	(5)	5	5	(5)	5	5	(5)	(5)	5	5	(5)	5	RANK
	4	4	4	4	4	4	4	4	4	4	4	4	
	3	(3)	3	3	3	3	3	3	3	3	3	(3)	**3**
	2	2	2	2	2	2	2	2	2	2	2	2	
	1	1	1	1	1	(1)	1	1	(1)	(1)	1	1	
Sub Total	85	16.5		50		14	12.5	45	12	5	50	9	299
Modified Purple	5	(5)	5	5	5	5	5	5	5	5	(5)	5	RANK
	4	4	4	(4)	4	4	(4)	(4)	4	4	4	4	
	(3)	3	3	3	3	(3)	3	3	(3)	(3)	3	(3)	**3**
	2	2	2	2	2	2	2	2	2	2	2	2	
	1	1	1	1	1	1	1	1	1	1	1	1	
Sub Total	51	27.5		40		42	10	36	36	15	45.5	9	311.5
Modified Green	5	5	5	(5)	5	(5)	5	5	5	(5)	5	5	RANK
	(4)	(4)	4	4	4	4	4	4	(4)	4	(4)	(4)	
	3	3	3	3	3	3	3	3	3	3	3	3	**1**
	2	2	2	2	2	2	(2)	(2)	2	2	2	2	
	1	1	1	1	1	1	1	1	1	1	1	1	
Sub Total	68	22		50		70	5	18	48	25	40	12	358
Modified Red	5	5	5	(5)	5	(5)	5	5	5	(5)	5	(5)	RANK
	(4)	(4)	4	4	4	4	4	4	(4)	4	(4)	4	
	3	3	3	3	3	3	(3)	3	3	3	3	3	**1**
	2	2	2	2	2	2	2	(2)	2	2	2	2	
	1	1	1	1	1	1	1	1	1	1	1	1	
Sub Total	68	22		50		70	7.5	18	48	25	40	15	363.5

Table 28: Assessment of overall Modified Options from a Social and Local Economic Perspective

Key Observations

- In relation to the criteria "Impact on Aboriginal heritage and culture", all Aboriginal issues are manageable except for issues in Pillar Valley *(needs to be tested)*. The Orange Option has the highest number of Aboriginal items but these potential impacts are thought to be manageable. Modified Purple has the highest potential to impact on the Pillar Valley area[4]. The Orange Option rates the best, subject to further investigation. Within the study area, of the 27 items identified, 13 items impacted – 3 considered very important – all along the Orange Option.
- In relation to criteria "Impacts on non-Aboriginal heritage and culture", the most important areas are along the Orange Option (greatest impact). The best option is the Modified Purple due to issues with Tyndale and Maclean brickworks. The whole of Ulmarra would be bypassed but potentially there could be some impact on significant structures.
- In relation to the criteria "Visual/urban design impacts for community", not a differentiator.
- In relation to the criteria "Impact of noise on existing and new receivers"[5], Orange, Modified Red and Modified Green were rated ahead of Modified Purple as they impact most on noise receivers. The

[4] It is noted though that Modified Purple/Red/Green are along a similar alignment in the Pillar Valley area including in the vicinity of key Pillar Valley Aboriginal sites./.

[5] It is noted that there was considerable debate about this issue and number of potentially affected households versus the impact on houses that currently have very low noise levels and change in noise levels for existing highway dwellers.

Orange option will have most people affected and the existing highway will continue to have traffic (local access). A number of homes will require treatment (Orange Option will have the highest, then Modified Purple). There will be more highway noise – mostly from heavy vehicles. Significant debate took place within the group. Final ratings are Orange Option rated same as Modified Green and Modified Red followed by Modified Purple. (Is it still the case that purple option is "the worst" because it would have the most impact on new receivers- can this be rephrased?

- In relation to the criteria "Extent of community severance", the Pillar Valley community will be impacted. James Creek and Gulmarrad communities will be impacted. Far enough away from Tucabia so as to not cause severance issues[6]. Bypass of Ulmarra generally skirts village. Not a discriminator – issues cancel each other out (on balance).
- In relation to the criteria "Extent of homes/residences lost", using the numbers supplied, Orange Option is the highest; followed by Modified Purple next with Modified Red and Modified Green the same (i.e. low).
- In relation to the criteria "Impact on future land uses", same amount of resource use with the quarry on each option. Possible future development at Gulmarrad and Pillar Valley. Clarenza is increasing in development. The Orange Option is the most appropriate for growth. Modified Purple next most appropriate for growth. Modified Red and Modified Green Options provide similar land use opportunities (including potential resource with the quarry).
- In relation to criteria "Impacts on local businesses", access issues to Grafton with all options. Orange Option is the best, then Modified Purple next best junction point. Modified Red and Modified Green Options the same.
- In relation to the criteria "Impact on farms and productive lands":
  - The most productive land is on the Orange Option. Complying aggregate in quarry on the Modified Green Option. A participant asked if there was an opportunity to change the alignment (500m – 1km away from the quarry resource). Higher quality material than in production between Ballina and Woolgoolga and has a high value. It could be strategically important (needs to be confirmed and resolved). This would have the potential to open up the quarry. Potential resource value of quarry could be $10M-$100M (Ken Graham contact for quarry). Modified Green and Modified Red Options are the better options subject to possible realignment and investigation.
  - Modified Red and Modified Purple Options have lower impacts on productive land. Productive land being assessed by quality of the agricultural land. Even if land area is larger, the value of land may be higher with a smaller area; therefore Orange Option has highest value land, then Modified Purple and then Modified Green and Modified Red with the lowest value land. However the difficulty is that because productive land includes agriculture, quarry and forests, these were reviewed to reflect the overall situation (on balance).
- In relation to the criteria "Social and economic risks of changes in flooding impacts", there is potential risk that the engineering and flooding mitigation measures may be wrong. Substantially higher risk with Orange Option. Modified Red and Modified Green Options present the lowest risk with Modified Purple in between.
- In relation to the criteria "Impacts on lifestyle environment choices", there will be a higher impact to lifestyle on the eastern options (Modified Red and Modified Green). Some areas along the Orange Option will have similar lifestyle issues. Potential for lifestyle changes along all routes. Strong discussion and no consensus on rating for Modified Purple, Modified Red and Green Options within the focus group.
- In relation to the criteria "Impact on DEC estates and State Forest Conservation Zones", the southern end of the study area has the road going through the State Forest. Modified Green goes straight through State Forest. Yaegl Nature Reserve affected by the Orange and Modified Purple Options. Modified Red and Modified Green Options pass through Pine Brush State Forest. Modified Red has the least implications, then Modified Green, then Modified Purple and then the Orange Option.

Note:

- The inclusion of Line 1+6 would improve some of the social and local economic aspects of the route. It would utilise more of the existing highway, thereby minimising the length of new road corridor. It would better support local business by providing an interchange closer to Grafton. If Line 1+6 is included, the change would shift some of the social and local economic aspects of the preferred

[6] It is noted that the group discussed severance being an issue for some but not all people resident in that area.

route by utilising part of the existing highway, locating an interchange closer to Grafton and avoiding the need to create a new road corridor to the south-east and to the east of Glenugie.

- Line 9 was deemed inappropriate by the Aboriginal community because of its potential for impact on cultural sites at Pillar Valley. The group noted that if Line 9 was re-routed to the west, to avoid these sites, it would increase the social impacts on Pillar Valley.
- If the Orange Option is not selected, the social and local economic group feels that Line 1+ 6 should be considered to improve economic issues particularly to Grafton and Grafton Airport. Impacts to lifestyle and homes affected would also decrease.

Assessment of the Modified Options within the Natural Environment Perspective

Natural Environment												
Criteria	Area of native vegetation lost incl high value habitat	Impact on EECs	Threatened & regionally significant flora impacts	Threatened & regionally significant fauna impacts	Impacts on wildlife corridors	Environmental impacts of changes to hydrological regimes	Impacts on SEPP 14 & other wetlands	Impacts on water quality & aquatic environment				
OPTIONS	ASSIGNED WEIGHT 16	18	14	14	4	4	16	14				
Orange	(5)	(5)	(5)	(5)	(5)	5	(5)	5	5	5	5	RANK
	4	4	4	4	4	4	4	4	4	4	4	
	3	3	3	3	3	(3)	3	(3)	3	3	3	**1**
	2	2	2	2	2	2	2	2	2	2	2	
	1	1	1	1	1	1	1	1	1	1	1	
Sub Total	80	90	70	70	20	12	80	42				464
Modified Purple	5	5	5	5	5	5	5	5	5	5	5	RANK
	4	4	4	4	4	(4)	4	(4)	4	4	4	
	(3)	3	(3)	3	3	3	(3)	3	3	3	3	**2**
	2	(2)	2	(2)	(2)	2	2	2	2	2	2	
	1	1	1	1	1	1	1	1	1	1	1	
Sub Total	48	36	42	28	8	16	48	56				282
Modified Green	5	5	5	5	5	(5)	5	(5)	5	5	5	RANK
	4	4	4	4	4	4	4	4	4	4	4	
	3	(3)	(3)	3	3	3	3	3	3	3	3	**3***
	2	2	2	2	2	2	(2)	2	2	2	2	
	(1)*	1	1	(1)	(1)	1	1	1	1	1	1	
Sub Total	16*	54	42	14	4	20	32	70				252
Modified Red	5	5	5	5	5	5	5	5	5	5	5	RANK
	4	4	4	4	4	(4)	4	(4)	4	4	4	
	3	3	(3)	3	3	3	3	3	3	3	3	**4**
	(2)*	2	2	2	2	2	(2)	2	2	2	2	
	1	(1)	1	(1)	(1)	1	1	1	1	1	1	
Sub Total	32*	18	42	14	4	16	32	56				214

Table 29: Assessment of overall Modified Options from a Natural Environment Perspective

** It should be noted for the criteria "Area of native vegetation lost including high value habitat", the focus group made an error in transcribing their evaluation of the Modified Red and Modified Green options onto the above matrix. This was discovered after the completion of the workshop.*

The focus group's findings, as recorded in their key observations and supported by high value habitat areas calculated in the workshop, was that Modified Red should be rated as "2" and Modified Green should be rated as "1". However in the workshop, it was incorrectly transcribed by the focus group as Modified Red rated as "1" and Modified Green rated as "2". The Orange option (rated as "5") and the Modified Purple option (rated as "3") were correctly recorded.

The correction, as shown above, has affected Modified Green and Modified Red's overall score. The correction has also affected the ranking of Modified Green (as presented in the workshop). Modified Green changes from a rank of 2 to a rank of 3, from a Natural Environment perspective. There is no change in the ranking of the Modified Red option.

It is believed that the error would not have had a significant bearing on the conclusions drawn by the workshop group

Key Observations

- In relation to the criteria "Area of native vegetation lost including high value habitat", the Orange Option has the lowest impacts on native vegetation and habitat by area. All other options have double the amount of native vegetation cleared (about the same). With regards to high value habitat, Orange Option is the best, then Modified Purple, then Modified Red and then Modified Green Options.

- In relation to criteria “Impacts on EECs”, The Orange Option has lowest impacts on EECs by area however it still has impacts near the Yaegl Nature Reserve. So by area comparatively, Orange Option is the best, then Modified Green, then Modified Purple and then Modified Red.
- In relation to the criteria “Threatened and regionally significant flora impacts”, there is not enough information to differentiate between the eastern options particularly in the northern sections. The Orange Option may have the lowest risk for threatened plants. The Orange Option has remnant trees and significant plants. Orange Option rated as 5 and all other options rated as 3.
- In relation to the criteria “Threatened and regionally significant fauna impacts”, threatened species recordings are throughout study area. Lack of vegetation along Orange Option generally supports decreased fauna on that alignment. Orange Option rated as 5 predicting least impacts to threatened fauna species. Modified Red and Modified Green rated as 1 due to most threatened fauna records/habitat. Modified Purple rated as 2 because of common section with Orange Option in the northern section. There is a barrier to the coastal Emu in the middle. There are more threatened species records pending (both flora and fauna). The above recommendations are tentative only.
- In relation to the criteria “Impacts on wildlife corridors”, the Orange Option is vastly better for retaining wildlife corridors. The Clarence River is a corridor in itself. The Orange Option crosses wildlife corridors at the southern end. There are still road kills on the existing alignment. Also there is a wildlife corridor south east of Maclean Lookout. Modified Purple is slightly better than Modified Red and Modified Green Options. However it still creates a new corridor of impact. Significant impact on Emu corridors.
- In relation to criteria “Environmental impacts of changes to hydrological regimes”, related to the length of road through the floodplain and the number of waterway crossings.
  - Bridges: Modified Red – 20; Modified Green – 18; Modified Purple – 27; Orange – 63
  - Kms through floodplain: Modified Red – 9; Modified Green – 10; Modified Purple – 12.5; Orange – 38
  - Healthy Rivers Commission gives a high rating to Lake Wooloweyah and the Clarence River
  - Direction of drainage across land is an issue
  - Shark Creek is significant; also potential acid sulphate soil (PASS).
  - The Orange Option has a high risk to hydrological regimes by increased floodplain length; but also highly modified. Difficult to differentiate between Modified Red, Modified Green and Modified Purple. Modified Green has slightly higher elevation area overall, but also crosses high velocity creeks. Modified Purple crosses lower velocity creeks but close to major wetlands. The Orange Option may have significant flooding impacts at Four Mile Lane (northern end) also impacts on wetlands (Washpen and the Lake). Overall ratings are Modified Green – 5; Modified Purple – 4 (due to construction run-off risk); Modified Red – 4 and the Orange Option – 3.
- In relation to the criteria “Impacts on SEPP 14 and other wetlands”, key points are:
  - SEPP 14 wetland area: Modified Red – 0ha; Orange and Modified Purple – 0.6ha; Modified Green – 3.6ha
  - Concerning wetlands: The Orange Option has least impact and rated as 5 (provided Cowper, Yaegl Nature Reserve and Four Mile Lane are protected); Modified Purple rated as 3 (cuts Chaffin Creek and other small wetlands, also affects Yaegl Nature Reserve); Modified Red and Modified Green both rated as 2 (impacts on either SEPP 14 or other wetlands).
- In relation to criteria “Impacts on water quality and the aquatic environment not assessed in other criteria”, the hydrological regime risk criteria is similar but not the same. There is a concern that Modified Red could impact fish habitat at Lake Wooloweyah (anecdotal evidence from Aunty Elsie Smith) otherwise it presents a low risk if this issue can be managed. Overall ratings are Modified Green – 5 (lowest risk), then Modified Red – 4 (low risk but still impacts on Lake Wooloweyah), Modified Purple – 4 (moderate risk) and then Orange – 3 (highest risk).

Summary of Modified Option Assessment Rankings

Below is a summary of findings of the three focus groups in ranking the various options. This information was combined with strategic cost estimates supplied by the project team for the construction of the highway along the modified options.

It was noted that the costs were strategic in nature with a high level of contingency (50%). The costs included construction, land acquisition and some mitigation measures (i.e. erosion and sedimentation controls, fauna fencing, noise mitigation etc).

Options	Assessment Perspective			
	Functional	Social & Local Economic	Natural Environment	Strategic Cost Estimate ($M)
Orange	1 (372.5)	3 (299)	1 (464)	$1530
Modified Purple	1 (381.5)	3 (311.5)	2 (282)	$970
Modified Green	1 (362)	1 (358)	3 (252)	$830
Modified Red	1 (345.5)	1 (363.5)	4 (214)	$820

[7] See footnote below

[7] As mentioned earlier, some minor arithmetic errors in the social and local economic perspective scores as presented at the workshop were discovered after the workshop. These were caused by an error in calculating the weightings (see page 18) and the transcription error discussed earlier (see page 21) and have been rectified in this report. None of the errors were significant or had a bearing on the conclusions drawn by the workshop group.

Conclusions Drawn from the Workshop

As a result of compiling the tables presented in the preceding sections, and the discussions over the three days of the workshop, the group was able to draw and agree to the following conclusions.

It would appear that:

- The Modified Green performs overall and on balance better than the other options (if strategic cost estimates are included in the comparison). Modified Green Option ranked first from a Social and Local Economic perspective, equal first from a Functional perspective and third from a Natural Environment perspective.
- The Modified Green Option includes the Line 9 component rather than the Line 1+6 component at the southern end of the study area (see **Figure 1**). There was no consensus reached in the workshop as to which offered the better line combination (i.e. Line 1+6 or Line 9 at the southern end) and further work would be required to resolve the issues raised before a recommendation as to the preferred line in this area could be reached.
- There are a number of issues associated with both Line 1+6 and Line 9. Line 1+6 has unresolved environmental issues (i.e. impacts on EECs, impacts on SEPP14 and other wetlands, insufficient information on threatened and regionally significant flora and fauna, etc) whereas Line 9 has a number of social and local economic issues (i.e. impacts on aboriginal heritage and cultural sites, visual impacts, impacts on future land uses and impacts for convenient access to local businesses and Grafton). Also there are some significant ecological issues with Line 9 which may have a cost.
- If strategic cost estimates are excluded from the comparison, Modified Green and the Orange Option are closely ranked. The Orange Option has the least impact on the Natural Environment but has the greatest potential risk to flood impacts.
- Modified Purple, Modified Green and Modified Red Options have more potential scope for improvement than the Orange Option.
- The Orange Option and the Modified Purple Option have greatest impact from the Social and Local Economic perspective.
- There was a larger difference between scores in ranking from a Natural Environment perspective than from a Social and Local Economic perspective.
- There needs to be a further analysis of traffic data before a preferred route is chosen.
- If an eastern option (i.e. options other than Orange/A) is moved forward as the preferred option, improvements to the existing highway will need to be explored to address road corridor safety issues.

Issues to be Resolved as Planning Proceeds

As a result of the discussions, a number of issues arose which require to be resolved as planning proceeds. These were recorded as:

- Undertake further work to resolve which line combination (Line 1+6 or Line 9) at the southern end of the study area should more forward to the next stage. In particular issues such as Aboriginal heritage and cultural site investigations, environmental issues and mitigation measures, economic effects of the various lines on the Grafton community, etc need to be investigated. There is a need to investigate whether the corridor in this area can be modified to better resolve, improve or avoid these issues.
- Confirm the assumptions, decisions, and recommendations made during the workshop (i.e. line combinations, quarry impacts, flooding and noise data, environmental mitigation data, etc).
- Consider environmental mitigation and compensation costs associated with each route and the feasibility of mitigation (including Emu impact mitigation). Also consider the social and economic impact mitigation measures for each route.
- Investigate and consider the quarry issues raised (particularly with respect to the Modified Green Option).
- Consider the impact of the project on the long term supply of quarry products in the region.
- Explore existing highway improvement needs and their associated cost if an eastern option is moved forward as the preferred option (based on the projected traffic split between the new and existing routes).

- Consider a potential interchange at/near Tyndale on a Modified Purple Option as an alternative (pending further investigation regarding the sensitivity of aboriginal issues).
- Undertake a thorough study of impacts of the proposed new highway and potential mitigation measures on the coastal Emu should an eastern option move forward as the preferred option.

Where to From Here?

In closing, the following points were made by Bob Higgins, General Manager, Pacific Highway Office and Diana Loges, Project Development Manager, Pacific Highway Office, RTA:

- The project team now has a direction with which to move forward, subject to resolving the Line 1+6 and Line 9 selection and the issues raised.
- No preferred route has been selected at this stage. There are three elements of the process which will come together to inform the Minister for Roads and assist the decision on the preferred route for this section of the Pacific Highway Upgrade. These are:
  - The public submissions and formal comments received on short listed options
  - The project team's separate Preferred Route Report and recommendations
  - The Value Management Workshop recommendations and further studies following these recommendations
- The Minister for Roads will make a decision on the preferred route.
- It was reinforced that this section of the Pacific Highway is not currently funded for construction. The relative priority for this section still needs to be determined. However planning will proceed and may require the development of a staged approach to the ultimate solution.
- The Federal and State Governments' funding model to complete the upgrade of the Pacific Highway from Hexham to the Queensland border will determine the quantum and opportunity for timing of both the planning and construction of all new works.
- The contributions and critical importance of the Community Liaison Group and all other stakeholders was acknowledged and it is the intention of the RTA to maintain ongoing consultation with stakeholders throughout the next phases of project planning.

Summary of Workshop Outcomes

By the end of the workshop, the participants had:

- **Confirmed** the Pacific Highway Program Objectives which reflect what the project must do to be successful in achieving its purpose and agreed that the objectives would address the problems being experienced along this section of the highway if they were achieved. The program objectives are to:
  - Significantly reduce road accidents and injuries.
  - Reduce travel times.
  - Reduce freight transport costs.
  - Develop a route that involves the community and considers their interests.
  - Have a route that supports economic development.
  - Manage the upgrading of the route in accordance with ecologically sustainable development (ESD) principles.
  - Maximise the effectiveness of expenditure (i.e. provide value for money).
- **Identified** what was important about the project to each of the participants.
- **Identified** assumptions being made about the project from various perspectives and assessed whether it was safe to proceed with planning based on these assumptions or whether they needed to be resolved as planning proceeded.
- **Identified** and **weighted** assessment criteria under three key perspectives (Functional; Social and Local Economic; and Natural Environment) based on what participants considered important and the highway upgrade program objectives. These were used for the assessment of the short listed options and their various line combinations. The criteria to assess the options were agreed as:

  Functional
  - *Travel times within the study area*
  - *Engineering risks*
  - *Effective access to highway and local road network*
  - *Ability to stage (construction)*
  - *Safer "traffic corridor" (meaning traffic using the new route and the existing highway)*
  - *Energy savings*
  - *Visual/Urban design impacts experienced by the road user*

Social and Local Economic
  - *Impact on Aboriginal heritage and culture*
  - *Impact on non-Aboriginal heritage and culture*
  - *Visual/urban design impacts for the community*
  - *Impact of noise on existing and new receivers*
  - *Extent of community severance*
  - *Extent of homes/residences lost*
  - *Impact on future land uses*
  - *Impact on local businesses*
  - *Impact on farms and productive lands (including forests and fragmentation)*
  - *Social and economic risks of changes in flood impacts*
  - *Impacts on lifestyle environment choices*
  - *Impact on DEC estates and State Forest Conservation Zones*

  Natural Environment
  - *Area of native vegetation lost including high value habitat*
  - *Impact on Endangered Ecological Communities (EECs)*
  - *Threatened and regionally significant flora impacts*
  - *Threatened and regionally significant fauna impacts*
  - *Impacts on wildlife corridors*
  - *Environmental impacts of changes to hydrological regimes*
  - *Impacts on SEPP 14 and other wetlands*
  - *Impacts on water quality and the aquatic environment not assessed by other criteria*

- **Assessed** and **comparatively ranked** the following alternative line combinations (as shown on **Figure 1**) in order to build "modified" options:
  - Sub options common to Purple, Green and Red Options:
    - Line **1+6** and Line **9**
  - Purple Sub options:
    - Line **16+4** and Line **8**
  - Green Sub options:
    - Line **17+5**, Line **11+12** and Line **11+15**
  - Red Sub options:
    - Line **18+17+5**, Line **14+12**, Line **14+15**, Line **18+11+12**, and Line **18+11+15**
- **Drew** the following conclusions from the assessment of alternative line combinations:
  - Re Line **1+6** and Line **9** – There was no consensus reached in the workshop as to which offered the better line combination and further work would be required to resolve the issues raised before a recommendation as to the preferred line in this area could be reached. However for the purposes of moving forward in the workshop and subject to further work in order to make a recommendation, the group agreed to move forward with ***Line 9*** since it ranked first from a Natural Environment perspective and Strategic Cost Estimate and equal first from a Functional perspective.
  - Re Line **16+4** and Line **8 (Purple) –** Move ***Line 16+4*** forward to improve the Purple Option because it ranked first from a Functional and Natural Environment perspective and the Strategic Cost Estimates were reasonably similar for the two options. The recommendation was subject to examining ways to improve the Social and Local Economic performance of Line 16+4.
  - Re Line **17+5**, Line **11+12** and Line **11+15 (Green) –** Move ***Line 11+15*** forward to improve the Green Option although it was noted that the Line 15 leg has some significant environmental impacts. The recommendation was subject to examining ways to improve the Functional and Natural Environment performance of Line 11+15.
  - Re Line **18+17+5**, Line **14+12**, Line **14+15**, Line **18+11+12**, and Line **18+11+15 (Red) –** Move ***Line 18+11+15*** forward to improve the Red Option although it was noted that the Line 15 leg still has some significant environmental impacts. The recommendation was subject to examining ways to improve the Functional and Natural Environment performance of Line 18+11+15.
- **Built** a number of modified options for evaluation over the length of the study area from Wells Crossing to Harwood Bridge. These are shown in **Figure 2** and were agreed as:
  - *Orange Option*
  - *Modified Purple Option (being Line 9+7+16+4+5)*
  - *Modified Green Option (being Line 9+10+11+15)*
  - *Modified Red Option (being Line 9+13+18+11+15)*
- **Assessed** the modified options against the assessment criteria and ranked the performance of each option. The Strategic Cost Estimate for each option was also compared.
- **Concluded** the following as a result of undertaking the assessment. It would appear that:
  - The Modified Green Option performs overall and on balance better than the other options (if strategic cost estimates are included in the comparison). Modified Green Option ranked first from a Social and Local Economic perspective, equal first from a Functional perspective and third from a Natural Environment perspective.
  - The Modified Green Option includes the Line 9 component rather than the Line 1+6 component at the southern end of the study area (see **Figure1**). There was no consensus reached in the workshop as to which offered the better line combination (i.e. Line 1+6 or Line 9 at the southern end) and further work would be required to resolve the issues raised before a recommendation as to the preferred line in this area could be reached.
  - There are a number of issues associated with both Line 1+6 and Line 9. Line 1+6 has environmental issues (i.e. impacts on EECs, impacts on SEPP14 and other wetlands, insufficient information on threatened and regionally significant flora and fauna, etc) whereas Line 9 has a number of social and local economic issues (i.e. impacts on aboriginal heritage and cultural sites, visual impacts, impacts on future land uses and impacts for convenient access to local businesses and Grafton). Also there are some significant ecological issues with Line 9 which may have a cost.
  - If strategic cost estimates are excluded from the comparison, Modified Green Option and the Orange Option are closely ranked. The Orange Option has the least impact on the Natural Environment but has the greatest potential risk to flood impacts.

- Modified Purple, Modified Green and Modified Red Options have more potential scope for improvement than the Orange Option.
- The Orange Option and the Modified Purple Option have greatest impact from a Social and Local Economic perspective.
- There was a larger difference between scores in ranking the options from a Natural Environment perspective than from a Social and Local Economic perspective.
- There needs to be a further analysis of traffic data before a preferred option is chosen (to ensure the crash safety rate objectives are met).
- If an eastern option (i.e. options other than Orange/A) is moved forward as the preferred option, improvements to the existing highway will need to be explored to address road corridor safety issues.

- **Identified** a number of issues which are required to be resolved as planning proceeds. These were recorded as a need to:
  - Undertake further work to resolve which line combination (Line 1+6 or Line 9) at the southern end of the study area should more forward to the next stage. In particular issues such as Aboriginal heritage and cultural site investigations, environmental issues and mitigation measures, economic effects of the various lines on the Grafton community, etc need to be investigated. There is a need to investigate whether the corridor in this area can be modified to better resolve, improve or avoid these issues.
  - Confirm the assumptions, decisions, and recommendations made during the workshop (i.e. line combinations, quarry impacts, flooding and noise data, environmental mitigation data, etc).
  - Consider environmental mitigation and compensation costs associated with each route and the feasibility of mitigation (including Emu impact mitigation). Also consider the social and economic impact mitigation measures for each route.
  - Investigate and consider the quarry issues raised (particularly with respect to the Modified Green Option).
  - Consider the impact of the project on the long term supply of quarry products in the region (Comment: Not sure you can delete this as it was said and recorded at the workshop and not challenged!!)
  - Explore existing highway improvement needs and their associated cost if an eastern option is moved forward as the preferred option (based on the projected traffic split between the new and existing routes).
  - Consider a potential interchange at/near Tyndale on a Modified Purple Option as an alternative (pending an Aboriginal archaeological study).
  - Undertake a thorough study of impacts of the proposed new highway and potential mitigation measures on the coastal Emu should an eastern option move forward as the preferred option.
- **Heard** an outline of the process and direction for the project to move forward from here. Key points raised about the next steps in the process included:
  - There are three elements of the process which will come together to inform the Minister for Roads and assist the decision on the preferred route for this section of the Pacific Highway Upgrade. These are:
    - The findings of the technical investigations
    - The public submissions and formal comments received on short listed options.
    - The Value Management Workshop recommendations and further studies following these recommendations.

    The project team will review these three elements in formulating a recommendation on a preferred route.
  - The Minister for Roads will make a decision on the preferred route.
  - It was reinforced that this section of the Pacific Highway is not currently funded for construction. The relative priority for this section still needs to be determined. However planning will proceed and may require the development of a staged approach to the ultimate solution.
  - The Federal and State Governments' funding model to complete the upgrade of the Pacific Highway from Hexham to the Queensland border will determine the quantum and opportunity for timing of both the planning and construction of all new works.
  - The contributions and critical importance of the Community Liaison Group and all other stakeholders was acknowledged and it is the intention of the RTA to maintain ongoing consultation with stakeholders throughout the next phases of project planning.

Appendix 1. List of Participants

PACIFIC HIGHWAY UPGRADE: WELLS CROSSING to ILUKA ROAD

Value Management Workshop for Wells Crossing to Harwood Bridge Section

PARTICIPANTS LIST

Project Stakeholders	
Kerry Lloyd	Councillor, Clarence Valley Council
Doug McKenzie	Councillor, Clarence Valley Council
David Morrison	Manager Strategic Planning, Clarence Valley Council
Jim Spencer	Engineering Officer, Clarence Valley Council
Tony McGrath	Maclean Community Liaison Group
Austin Sheehan (Day 1)	Maclean Community Liaison Group
Bruce Walsh (Days 2 & 3)	Maclean Community Liaison Group
Bill Noonan	Grafton Community Liaison Group
Tony Wade	Grafton Community Liaison Group
Ian Rees	Tucabia Community Liaison Group
Sarah Dunlop	Tucabia Community Liaison Group
Greg Hayes	Business Representative
Pat Battersby	Cane Growers Representative
Rod Duroux	Grafton Ngerrie Local Aboriginal Land Council Representative
Elsie Smith	Birrigan Gargle Local Aboriginal Land Council Representative
Hilary Wise	NRMA
Lisa Mitchell (Days 1 & 2)	Department of Planning
John Finlay	Local Planning Officer, Department of Planning
Josh Chivers	Environmental Officer, Department of Natural Resources
Max Enklaar (Days 1 & 2)	Senior Conservation Manager, Habitat Protection Unit, Department of Primary Industries, Fisheries
Rik Whitehead	Department of Primary Industries, Agriculture
John Murray	Department of Primary Industries, Forests
Jeff Brownlow	Department of Primary Industries, Minerals
Kelly Roche	Senior Threatened Species Officer, Department of Environment and Conservation
Scott Hunter	Senior Regional Operations Officer, Department of Environment and Conservation
Roads and Traffic Authority	
Bob Higgins (Days 2 & 3 only)	General Manager, Pacific Highway Office
Mark Eastwood	Senior Project Development Manager, Pacific Highway Office
Diana Loges	Project Development Manager, Pacific Highway Office
Scott Smith	Project Development Officer, Pacific Highway Office
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PACIFIC HWY UPGRADE: WELLS CROSSING to ILUKA ROAD

Value Management Workshop for Wells Crossing to Harwood Bridge Section

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