

4.5 CHCC Preferred Corridor

Background

In late 2003, following the series of CHCC community forums on the highway planning, CHCC adopted a position of support for a western bypass of Coffs Harbour and Woolgoolga (refer Figure 4.3). The Minister for Roads agreed to CHCC's request to examine potential routes within the CHCC Preferred. An assessment was undertaken to consider the feasibility of potential route options in terms of functional, socio-economic and biophysical parameters. Full details of the investigation are contained in the report *Coffs Harbour City Council Preferred Corridor Feasibility Study* (June 2004).

The CHCC Preferred Corridor lies mainly within the Bucca Valley. CHCC's resolution required it to "diverge from the existing highway at or near Englands Road to Red Hill, and thereafter by the best available option to Grafton with the intention that south and western Boambee and the Orara Valley be excluded from further consideration". As the Corridor ends at the former northern boundary of the LGA, it was necessary to consider options through the Clarence Valley LGA so as to provide access back to the highway. The southern section up to Ulidarra National Park comprises the Coastal Ridge Way (CRW) alignment and this had been subject to previous investigation (refer *Review of the Coastal Ridge Way Proposal*, Feb 2004).

Potential Highway Options

The investigations identified four route options within the CHCC Preferred Corridor (refer Figure 4.3), the common end points being Englands Road in the south and the start of the Pacific Highway Upgrade works at Halfway Creek in the north. The route options comprise:

- Coastal Ridge Way / Option A
- Western Bucca Valley / Option A
- Western Bucca Valley / Corindi River
- Western Bucca Valley / Sherwood Creek

Key assessment findings

Traffic volumes using the various options would be broadly similar. However, due to the long steep gradients associated with each of the bypass options, the travel times and operating costs for heavy vehicles would potentially reduce the attractiveness of such options. The costs for all options are high (\$1,025 to \$1,652M) due to the length, rugged terrain and the need for extensive tunnelling works. All four route options provide very poor economic viability (BCR < 0.5) due to their high cost and the relatively low traffic volumes that would use them.

One of the underlying reasons for CHCC adoption of the Preferred Corridor is to minimise impacts upon existing residential communities. The CRW / Option A route passes predominantly through State Forest and would have the least negative socio-economic impact but the other options all have greater overall negative impacts as they all pass through rural residential and agricultural properties in the Bucca Valley as well as rural lands in the Sherwood / Corindi area. The overall socio-economic impact of these options has been assessed as low to moderate adverse.

All options have very significant adverse biophysical impacts. Approvals from the Commonwealth Department of Environment and Heritage (DEH) and the NSW Department of Environment and Conservation (DEC) would be required for the removal of significant areas of native vegetation, including protected areas within the State Forest. With the high level of impact and the difficulties of achieving effective impact mitigation, this could be a major impediment to obtaining such approval.

All options traverse a culturally sensitive landscape that is well known and highly valued by the Aboriginal community.

Conclusion

Based on the assessment of potential alignments, it was concluded that none of the options within the CHCC Preferred Corridor (including the necessary connections back to the existing highway) would be viable and they do not merit further consideration due to:

- the significant topographical constraints and engineering challenges associated with locating the alignment outside the coastal plain and into the steep and mountainous terrain associated with the coastal ridge
- their poor functional performance
- their high cost and poor economic viability
- their significant adverse impacts on flora and fauna
- their significant impacts upon a landscape of Aboriginal importance

4.6 Coastal Corridor

Background

As a consequence of the findings from the earlier strategy investigations and the Peer Review, the focus of the effort within the southern (Coffs Harbour) section of the Coastal Corridor was on a comparative assessment of an Existing Highway Upgrade with the Inner Bypass.

The concept for an “ultimate” upgrade of the existing highway through Coffs Harbour and Woolgoolga was based on contemporary urban motorway schemes. Design scenarios and concepts were developed to provide a dual-carriageway facility with grade-separated interchanges and overpasses at key locations for access to and from the highway and/or for local east-west traffic movements. An integral component of the schemes would be local service roads to obtain effective separation of through and local traffic along the corridor.

Design development and investigation of these Coastal Corridor options in the main Coffs Harbour area were reported in the *Strategy Report* (Feb, 2004) which was released with *Community Update No4*. It examined future highway development scenarios along the existing highway through town as well as two indicative Inner Bypass options that depart the existing highway south of Englands Road, have a common ‘cross-over point’ in the vicinity of Coramba Road rejoin the Highway near Korora Hill.

The *Route Options Development Report* (Dec 2002) released with *Community Update No 3* examined a future highway development scenario along the existing highway from Sapphire to Woolgoolga (Option D) as well as deviation options around Woolgoolga (Options A, B1, B2, and C). The initial coastal corridor options for the Sapphire to Woolgoolga section are shown in Figure 4.4 and the route options are shown in Figure 4.5.

Option A is the most westerly deviation which departs from the existing highway north of Moonee, traverses the coastal range for most of its length and rejoins the existing highway at Arrawarra Creek. Options B1 and B2 depart from the existing highway at Avocado Heights and generally pass through the foothills that define the edge of the coastal plain running to the west of the Country Club Estate and rejoining the existing highway at Arrawarra Creek. Option C departs from the existing highway near Hearn's Lake Road to traverse mainly fringing urban lands of Woolgoolga before rejoining the highway near Safety Beach Drive. To the south of these deviations the options involve a major upgrade of the existing 2 lane highway to dual carriageway standard.

Key assessment findings

For the southern (Coffs Harbour) section, a series of Working Papers was prepared to assess and compare the impacts of the Inner Bypass and the Existing Highway Upgrade across a range of transportation, socio-economic and environmental planning issues. The purpose of the Strategy Report was to document the overall process of identifying, developing and evaluating the options.

Both the Inner Bypass and the Existing Highway Upgrade options were developed to satisfy the overall objectives of the Pacific Highway Upgrade Program and also the objectives developed for the CHHPS. It was concluded that the Inner Bypass best satisfies most of the objectives.

In terms of functional transportation issues, it was estimated that the Inner Bypass would result in a 16-39% reduction in the amount of the total traffic along the bypassed section of the existing Pacific Highway including a 34-51% reduction in the amount of heavy vehicle traffic in 2021. The Existing Highway Upgrade would retain the main road traffic flows in the existing corridor but would provide separation of local and through traffic on the adjacent service roads and motorway. Of the two schemes, the greatest benefits in terms of local and through traffic movements would be provided by the Inner Bypass. It is estimated that heavy vehicle travel times would be reduced by 20% for the Inner Bypass relative to the existing situation and by 15% for the Existing Highway Upgrade. The total estimated cost for the Existing Highway Upgrade is \$690M and for the Inner Bypass the estimate is \$280 to \$425M depending on the selected route sub-options. The road user benefit cost analysis indicated that the options provide similar economic returns although neither option would yield good economic returns in the short to medium term.

In terms of socio-economic implications, both the Inner Bypass and Existing Highway Upgrade options would require significant acquisition of private property. For the Existing Highway Upgrade scheme, very high adverse impacts are anticipated in terms of urban land use and business activity. There would also be adverse impact in terms of community cohesion due to access restrictions along and across the amplified highway corridor. A variety of adverse amenity impacts would also be experienced by the population along the corridor. In broad terms, the Existing Highway Upgrade would cause dramatic changes to the urban fabric of Coffs Harbour along the corridor including potentially severe impacts on the form and function of the CBD. There would be no impacts upon rural land use with this option.

While the Inner Bypass could have minimal direct impact upon existing urban land use in Coffs Harbour, there would be substantial adverse impacts on rural and rural residential areas in North Boambee, west Coffs Harbour and west Korora. The corridor would also have major implications for the development plans of North Boambee. As these plans are at the early development stage, there is still the opportunity to revise the plans to achieve a compatible land use mix along and adjacent to the corridor. Construction and operation of the Inner Bypass would have a range of adverse impacts on the residential communities near the corridor, most notably in the form of amenity effects such as traffic noise and visual impact. Beneficial impacts are anticipated for local accessibility and amenity along the existing highway corridor, with the removal of through traffic including significantly reduced heavy vehicle movements. This would also provide potentially significant benefits for CBD land use and property, and overall business activity and tourism.

In terms of biophysical impacts, the Existing Highway Upgrade would cause minimal ecological effects. The Inner Bypass traverses several areas of native vegetation that support important ecological functions. It is concluded that the nature and scale of potential impacts are likely to be acceptable, with apparent opportunities to effectively mitigate and or compensate for these impacts.

For the northern (Sapphire to Woolgoolga) section, the *Route Options Development Report* (Dec 2002) concluded that there were no feasible highway deviation options in the southern part of this highway section (ie. from Sapphire to Moonee) and that an existing highway upgrade to dual carriageway was the only realistic development strategy if a Coastal Corridor was adopted.

For the section north from Moonee, a Value Management study (refer Appendix A) was held in April 2003 to review and evaluate the deviation and existing highway upgrade options, using the triple bottom line assessment method. The study findings and subsequent investigations led to the following conclusions:

- Option A (wide bypass) is not favoured due to its severe biophysical impacts, Aboriginal heritage impacts, poor functional performance, high cost and poor value for money. As previously noted, this option was also examined in the context of the CHCC Preferred Corridor (see below).
- Options B1 and B2 (intermediate coastal bypass options) do not merit further consideration due to the need to protect valuable agricultural land
- Option D (existing highway upgrade) is not an acceptable option due to its severe social and economic impacts through the main area of Woolgoolga
- Option C (close bypass) should go forward with further consideration of socio-economic and environmental issues.

The detailed comparative evaluation of these options as completed through the value management study process is presented in full at Appendix A. This involved a workshop with involvement by key government and community stakeholders along with project team members.

Following the Value Management Study, CHCC requested the RTA to investigate options to minimise the potential impact of a bypass on the Woolgoolga urban area generally - including the South Woolgoolga Urban Investigation Area. CHCC was concerned about the impact that Option C would have on the South Woolgoolga Urban Investigation Area, as well as vacant lands in the area generally bounded by the existing highway, Bark Hut Road, the Country Club Estate and the old Woolgoolga dam. Based on the subsequent concept development work, a modified Option C (Option C1) and an additional option that uses parts of the initial Options B and C (Option E) were developed.

Conclusions

Despite the likely benefits to road users with the Existing Highway Upgrade option, it was concluded that the major adverse social impacts (including community disruption), reduced amenity and severe land use and business impacts in the main urban centre of Coffs Harbour would render this option unacceptable for the local community. When considered in tandem with how the options perform against the objectives of the Pacific Highway Upgrade Program, the overall finding was that an Inner Bypass corridor is the most suitable means of meeting future highway needs for Coffs Harbour. As a consequence, it was concluded that the Inner Bypass should be the preferred long term corridor for the highway strategy in the southern(Coffs Harbour) section.

As a consequence of the investigations, it was also concluded that the Coastal Corridor in the northern (Sapphire to Woolgoolga) section should be based on an existing highway upgrade up to south Woolgoolga and then a deviation route around Woolgoolga.

4.7 Summary assessment of corridor options

In light of the somewhat protracted nature of the various phases of corridor planning between early 2001 and the June 2004 release of the *Coffs Harbour City Council Preferred Corridor Feasibility Study*, the project team undertook a review of all previous information and findings so as to confirm a recommendation for the Strategy.

The summary table below (Table 4.1) was compiled to demonstrate the key distinguishing features between the main corridor options, noting that several earlier versions of the options investigated have been consolidated into the three main corridors: Far Western Corridor; CHCC Preferred Corridor; and Coastal Corridor. The Coastal Ridge Way has been incorporated into the CHCC Preferred Corridor as it forms the eastern boundary of that option.

Table 4.1 Summary features of broad corridor options

Feature	Far Western Bypass	CHCC Preferred Corridor route options	Coastal Corridor route options
Physical design features			
Total route length	54.3km	47.5 to 55km	52.7 to 53.8km
Highest point above sea level	160m	242m	97m
Highest embankment			
• without viaducts	40m	48 to 70m	23m
• with viaducts	30m	30 to 40m	na
Deepest cutting			
• without tunnels	65m	81 to 150m	60m
• with tunnels	45m	45m	29m
Tunnels			
• number of tunnels	up to 1	4 to 7	up to 3
• total length	up to 1km	1.82 to 5.42km	up to 1.32km
Maximum grade of new alignment	6%	6%	6%
Longest uphill section	4km	11km	2km
Traffic Function	Poor	Poor	Good
Preliminary estimated cost (\$2003)			
Bypass / upgrade section:			
Englands Road to Halfway Creek	\$930M	na	
Englands Road to Bucca Road	na	\$670M to \$860M	
Bucca Road to Halfway Creek	na	\$355M to \$980M	
Inner bypass of Coffs Harbour	na	na	\$280M to \$425M
Korora to South Woolgoolga	na	na	\$145M
Woolgoolga bypass	na	na	\$120M to \$135M
Arwarra Creek to Halfway Creek	na	na	\$115M
Provision for future grade-separated interchanges	na	na	\$50M to \$80M
Total cost for bypass / highway upgrade	\$930M \$17M / km)	\$1025M to \$1650M \$20M to \$32M / km	\$710M to \$900M \$14M to \$17M / km
Upgrade Bucca Road (8km)		\$40M	
Upgrade bypassed sections of existing highway	\$180M ¹	\$180M ⁽¹⁾	Nil
Total cost	\$1,110M	\$1,245M to \$1,870M	\$710M to \$900M

Feature	Far Western Bypass	CHCC Preferred Corridor route options	Coastal Corridor route options
Ability to stage construction	Very Limited	Limited to very limited	Good
Economic viability	Very poor (BCR < 0.5)	Very poor (BCR 0.25 to 0.49)	Fair (BCR 1.4 to 1.8)
Socio-economic effects	Moderate adverse	Low to moderate adverse	Moderate to high adverse
Biophysical effects	Moderate to very high adverse due to potential impact on Sherwood Nature Reserve, threatened species and wildlife corridors	Very high adverse due to impact on Sherwood Nature Reserve, protected zones in State Forests, threatened species and wildlife corridors	Low to moderate adverse
Indigenous heritage effects	Moderate adverse (inferred)	High adverse	Low adverse

(1) Delayed construction of these bypasses may necessitate capacity improvements between Arthur Street and Sapphire and a full upgrade of the existing highway between Sapphire and Halfway Creek at an estimated cost of \$530M.

This summary of salient findings strongly confirms the conclusion of the project team that the Coastal Corridor is the only feasible long term option for the Pacific Highway and that it should be the adopted corridor for the ongoing development of the CHHPS.

5. Coastal Route Options

5.1 Introduction

This section summarises the process of identification and evaluation of feasible route options within the preferred Coastal Corridor. The identification and description of the options and their development as part of the Strategy has been documented extensively within previous project reports and community updates. In particular, the *Strategy Report* (Feb 2004) examined various options within the Inner Bypass corridor for Coffs Harbour and the *Route Options Development Report* (Dec 2002) and *Supplementary Options Report* (Feb 2004) examined the various deviation route options in the Woolgoolga section.

5.2 Route identification

5.2.1 Initial route options

As the Strategy is being developed to address the need to upgrade the Pacific Highway between Sapphire and Woolgoolga while planning for future traffic needs within the Coffs Harbour urban area, the Coastal Corridor was initially considered in two sections - the southern (Coffs Harbour) section and the northern (Sapphire to Woolgoolga) section. On the basis of well established constraints analysis mapping procedures and highway route planning investigations, numerous route options were identified and developed within each of these sections. The options were developed to a level sufficient for feasibility assessment, to facilitate cost estimating and to enable evaluation against triple bottom line assessment criteria. In both areas, the options included new highway deviations as well as concepts for upgrading along the existing highway to urban motorway conditions. In this way, it was possible to conduct a meaningful comparison of the alternatives.

The route identification process revolved around consideration of detailed technical constraints analysis of the preferred corridor and feedback from the community consultation process. This process led to:

- rejection of the option to upgrade the existing highway through Coffs Harbour to an urban motorway due to the severe socio-economic impacts on the urban area
- a focus on route option identification within the Inner Bypass Corridor for Coffs Harbour that included two routes to both the north and south of a common mid point near Coramba Road
- rejection of the option to upgrade the existing highway through Woolgoolga (Option D) to an urban motorway due to the community and business impacts on the township
- a focus on route option identification for a bypass of Woolgoolga

The identified route options that were short listed for examination in the southern (Coffs Harbour) and northern (Sapphire to Woolgoolga) sections are described below and shown on Figures 5.1 and 5.2.

Southern (Coffs Harbour) section

Inner South 1 (IS1). An option that extends from Englands Road to Coramba Road. This option deviates from the existing highway south of Englands Road, crosses North Boambee Road approximately 300 metres west of Bishop Druitt College and continues north toward the low saddle in the Roberts Hill ridge 100 metres west of Buchanans Road, before proceeding to Coramba Road.

Inner South 2 (IS2). An alternative option to IS1 for the Englands Road to Coramba Road section. This option is initially the same as IS1 but deviates to the west south of North Boambee Road and tracks to Roberts Hill ridge about 800 metres west of the other route. Due to the higher terrain a 560 metre long tunnel would be required under Roberts Hill ridge.

Inner North 1 (IN1). An option for the Coramba Road to Korora Hill section. This option veers north-east from Coramba Road crossing Spagnolas Road and Shepherds Lane before heading east to Mackays Road following close and parallel to the railway line for about 1.6 kilometres. From this point the route deviates to pass through the valley between Sealy Lookout and Gatelays Road before traversing the West Korora basin to rejoin the existing highway at Korora Hill.

Inner North 2 (IN2). An alternative option to IN1 for the Coramba Road to Korora Hill section. This more westerly alignment crosses Shepherds Lane at its western extremity. The route passes through and then to the north of a major ridgeline near the end of Shepherds Lane and traverses a relatively isolated valley to rejoin IN1 opposite the western end of Gatelays Road.

Northern (Woolgoolga) section

As discussed in Section 4, the first phase of assessment for this section of the Coastal Corridor examined four highway deviation options from Moonee to Woolgoolga. The Value Management study held in April 2003 (refer Appendix A) and subsequent investigations concluded that Option C, which comprises a relatively close deviation of Woolgoolga, was the most suitable of the options and should be taken forward for further investigation.

5.2.2 Additional route options

The RTA developed two additional route options for the Woolgoolga deviation in mid to late 2003. This was a direct response to a request from CHCC to the RTA following the April 2003 Value Management workshop to investigate alternative options that reduced the impact on potential urban development areas generally to the west of Woolgoolga. At that time, CHCC was concerned about the impact that Option C would have on the South Woolgoolga Urban Investigation Area, as well as vacant lands in the area generally bounded by the existing highway, Bark Hut Road, the Country Club estate and the old Woolgoolga dam. The additional route options that were developed are known as Option C1 and Option E and they were documented and assessed within the previously released *Supplementary Options Report* (Connell Wagner 2004b). These options are described below and shown on Figure 5.2.

Option C1. Option C1 is a modification of the initial Option C. At its southern end C1 detours around and to the west of the South Woolgoolga urban investigation area and traverses the western side of the dam near Woolgoolga Creek Road before rejoining the initial Option C alignment near Woolgoolga Creek. At a point just north of Woolgoolga Reservoir Option C1 takes a north-easterly route along the eastern boundary of the Country Club Estate and rejoins the Pacific Highway north of Safety Beach Drive. A grade-separated interchange is proposed at Bark Hut Road instead of Safety Beach Drive.

Option E. Option E was developed to reduce impacts on zoned and potential urban/residential land in west and south Woolgoolga and also on banana-growing properties to the west of Sandy Beach. Option E leaves the Pacific Highway at the same point as C1 but veers off in a north-west direction to closely follow the Option B alignment to the west of Woolgoolga. Option E rejoins the existing highway just south of Arrawarra Creek.

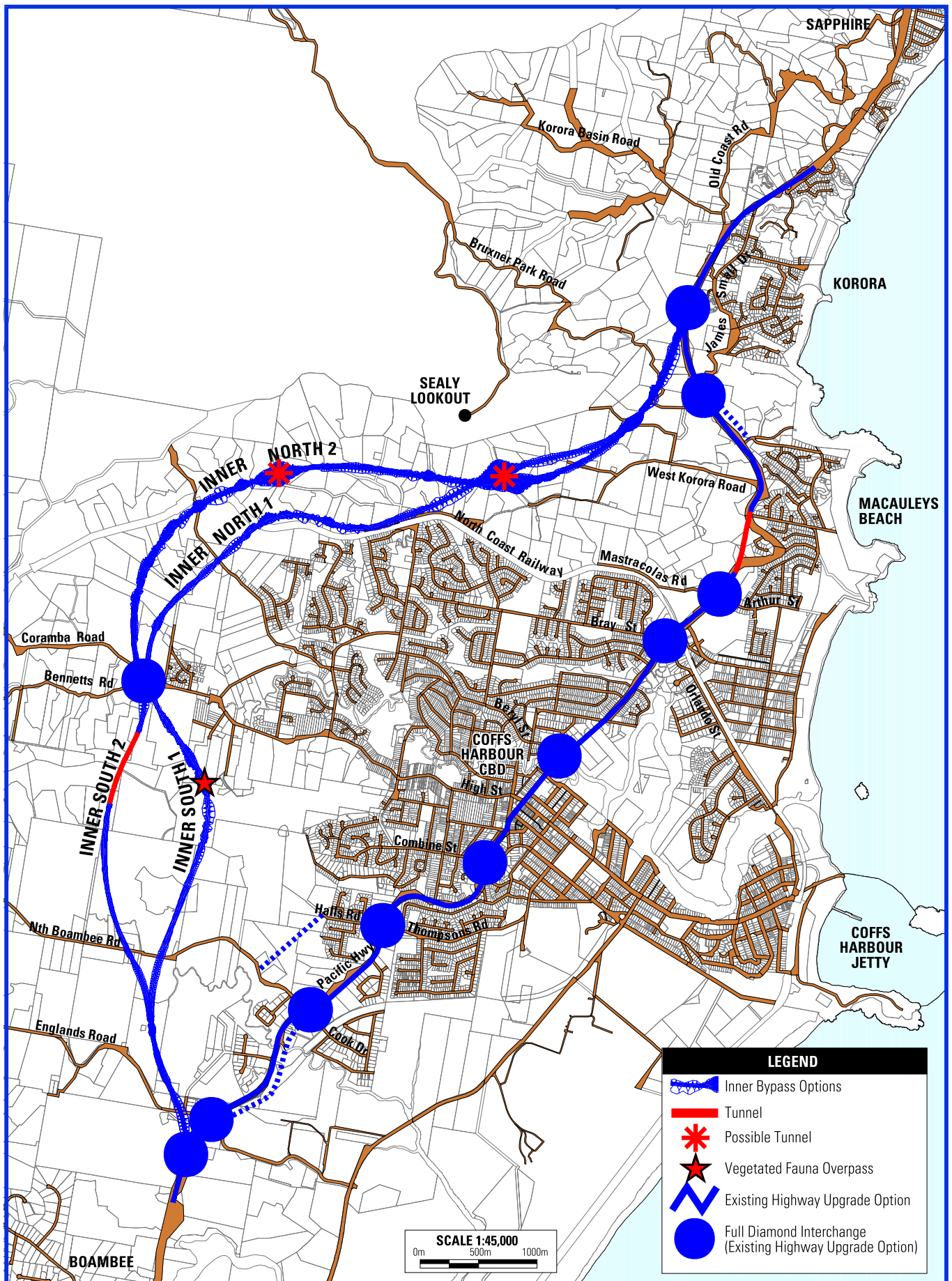


FIGURE 5.1
INNER BYPASS ROUTE OPTIONS AND
EXISTING HIGHWAY UPGRADE

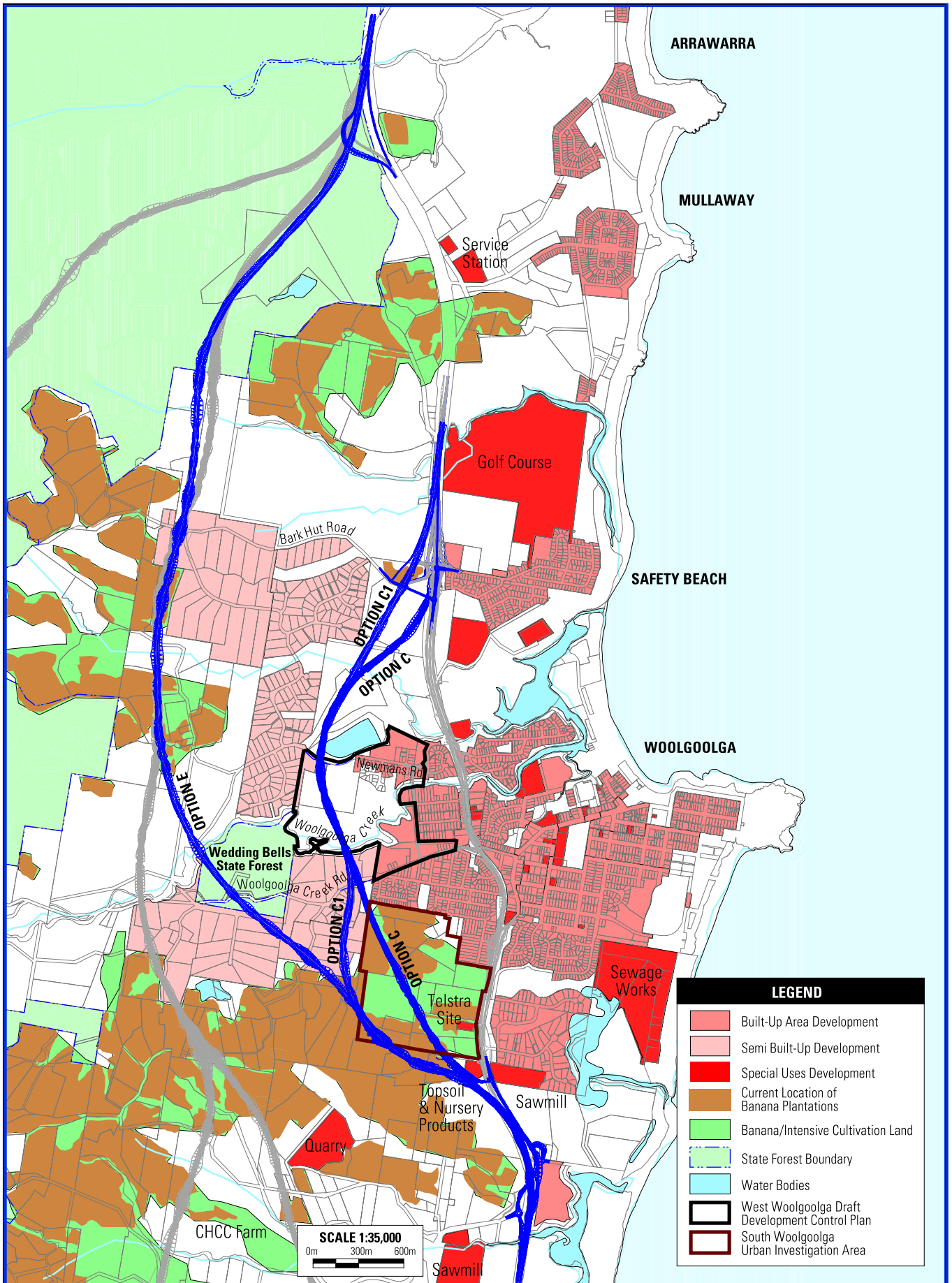


FIGURE 5.2
COASTAL ROUTE OPTIONS
WOOLGOOLGA SECTION

5.3 Evaluation of route options

The detailed comparative evaluation of the short listed route options for the northern and southern sections of the CHHPS was undertaken through a value management study process. This involved separate value management workshops for each section with involvement by key government and community stakeholders along with project team members. The value management study process and all outcomes from the workshops are documented fully within the value management reports presented at Appendix B and Appendix C and they are summarised below.

5.3.1 Value management process

The purpose of the value management process was to bring together representative stakeholders in the CHHPS to evaluate the options developed against the project objectives and agreed assessment criteria. The process set out to identify and prioritise assessment criteria that could be used to measure and compare the performance of the various route options.

The first step in the value management process was to identify and obtain agreement amongst workshop participants on the issues considered important when evaluating options for planning and development of a new highway. The issues raised were then grouped into three broad categories of assessment criteria:

- functional criteria
- environmental criteria
- socio-economic criteria

The assessment criteria within each category were then weighted by workshop participants according to the perceived relative importance or priority of each criterion. Workshop participants contributed to focus groups that undertook a comparative rating assessment of the route options being considered against the agreed assessment criteria using a simple numerical scale. This part of the evaluation relied substantially on the technical material contained in the *Strategy Report* (Feb 2004) for the Coffs Harbour deviation options and the *Route Options Development Report* (Dec 2002) and *Supplementary Options Report* (Feb 2004) for the Woolgoolga deviation options. The total score for each route option was determined and the options were ranked accordingly. On the basis of this approach, the workshop participants reached a position in regard to a preferred route option and documented the reasons for the preference.

5.3.2 Value management workshop outcomes

Southern (Coffs Harbour) section

The value management workshop held on 2-3 August 2004 evaluated the route options within the Inner Bypass Corridor. The options evaluated were IS1 and IS2 from Englands Road to Coramba Road and IN1 and IN2 from Coramba Road through to the reconnection with the existing highway at Korora Hill.

Assessment criteria and weightings

The assessment criteria and weightings developed by the workshop participants to evaluate the route options are set out in Table 5.1.

Table 5.1 Assessment criteria - Coffs Harbour deviation options

Criteria	Explanation	Weighting (%)
Environmental		
A	Impact on water courses/aquatic environment	22
B	Impact on fauna habitat/vegetation	22
C	Impact on wildlife corridors	0
D	Impact on threatened species	56
Functional		
A	Relative horizontal geometric safety Better vertical alignment (grades) Ease of catering for future growth Capacity for incident management	50
B	Risk from dangerous goods transport Consistency of driver experience	50
C	Relative travel time saving	0
Socio-economic		
A	Impact on local air quality	3.6
B	Impact on traffic noise	24.4
C	Extent of community severance	15.8
D	Impact on Aboriginal Heritage	19.5
E	Impact on European Heritage	0
F	Impact on existing land use and business	13.4
G	Impact on future land use planning	4.9
H	Effects on landscape and visual amenity	8.5
I	Impact on agricultural business/viability	19.9

Option evaluation and ranking

The key outcomes of the option evaluation and ranking process were:

- Functional performance - IS1 was considered to perform better than IS2 in regard to long term functionality, safety and flexibility to catering for traffic growth. The difference was largely due to the tunnel that would be required through Roberts Hill ridge as part of IS2 which has the potential to restrict future upgrading of the route and may inhibit its use by vehicles carrying dangerous goods. IN2 was considered to perform better than IN1 in regard to horizontal alignment and proximity to residential areas (existing, released and proposed) and the existing rail corridor.
- Environmental performance - IS2 was considered to perform better than IS1 across all environmental assessment criteria, primarily due to the tunnel that would be required through Roberts Hill ridge as part of IS2. IN2 was considered to perform better than IN1 in regard to impact on fauna habitat / vegetation and threatened species.
- Socio-economic performance - IS2 was considered to perform better than IS1 primarily due to the fact that it is further removed from residential development. IN2 was considered to perform better than IN1 across all socio-economic assessment criteria except in terms of impact on agribusiness viability. The location of the route behind the ridge to the north of urban development would give some useful shielding of nearby residences from noise and visual impacts, but would result in the loss of a significant area of banana and agricultural land associated with the ridge. The impact could be minimised through the use of tunnels but this would still restrict aerial spraying of bananas.

The overall ranking of the southern and northern parts of the Inner Corridor options based on the comparative assessment undertaken in the value management workshop is detailed in Table 5.2 with "1" representing the higher ranking option.

Table 5.2 Option rankings

Option	Functional rank	Environmental rank	Socio-economic rank
Southern			
IS1	1	2	2
IS2	2	1	1
Northern			
IN1	2	2	2
IN2	1	1	1

Preferred option

The workshop participants unanimously selected Option IS2 and IN2 as the preferred options for the southern section. The principal reasons for selection of these options were:

- these options provide the most effective physical separation from existing residential communities
- they have least impact on planned urban development areas
- they have the least traffic noise implications
- they have the lowest visual and landscape impacts and provide greatest opportunity to mitigate adverse effects

In reaching these overall findings, the workshop recorded several key issues that would need to be addressed in any subsequent investigations and taken into consideration in the subsequent selection of the preferred option. These issues included:

- concern that the additional cost of IS2 (approximately \$65M) which is attributable to the 560m tunnel required in that alignment may not merit the benefits obtained
- the availability of funding for the construction of the preferred option
- the need for immediate action to secure the preferred option and replan the future development of the West Coffs Harbour / North Boambee area
- the need to address the impacts on agribusinesses
- concerns regarding the feasibility of tunnels and the resolution of issues associated with the transportation of dangerous goods
- concerns in regard to community acceptance of a preferred option located within the Inner Corridor

Northern (Sapphire to Woolgoolga) section

The value management workshop held in April 2003 (refer Appendix A) had evaluated the initial options north of Moonee (ie. Options A, B1, B2, C and D). The workshop and subsequent investigations led to the conclusion that Option C was the only deviation option that warranted further consideration if a Coastal Corridor was adopted.

The project team developed the modified Option C (Option C1) and an additional Option E in response to CHCC concerns about the impact of Option C on Woolgoolga. A second value management workshop was held on 4 August 2004 to evaluate the remaining route options for the northern section, that is Options C, C1 and E.

Assessment criteria and weightings

The same assessment criteria and weightings developed at the April 2003 workshop were adopted by agreement for the evaluation of Options C, C1 and E. These are detailed in Table 5.3.

Table 5.3 Assessment criteria – Woolgoolga deviation options

Criteria	Explanation	Weighting (%)
Environmental		
	Heritage Impacts	19
	Biodiversity impacts – direct effect on threatened species	19
	Biodiversity impacts – migratory species	12
	Biodiversity impacts – key habitat and movement corridors	28
	Biodiversity impacts – waterways and aquatic environments	22
	Construction impacts	0
Functional		
	Road safety for all road users	38
	Traffic efficiency and long term functionality	33
	Landscape, urban design and scenic quality (view from the road)	0
	Constructability	10
	Achievement of early benefit opportunities through staging	19
Socio-economic		
	Traffic noise impacts	23
	Amenity effects (including visual, excluding noise)	2
	Compatibility with CHCC strategic planning	21
	Rural land impacts	26
	Urban land impacts	19
	Local traffic access and movement impacts	9
	Construction impacts on the community	0

Option evaluation and ranking

The key outcomes of the option evaluation and ranking process were:

- Functional performance - the performance of the three options were indistinguishable except for constructability where Option E was rated slightly higher.
- Environmental performance - the three options were very similar and difficult to separate, however, Options C and C1 performed slightly better due to the fact that these options would require the removal of less habitat and consequently have a lesser impact on threatened species and key habitat and movement corridors.
- Socio-economic performance - Option E performed slightly better in terms of compatibility with strategic planning, urban land impacts and local traffic movement however ranked very poorly against rural land impacts. Options C and C1 were both considered to perform poorly in terms of traffic noise.

The overall ranking of the options based on the comparative assessment undertaken is detailed in Table 5.4 with "1" representing the higher ranking option.

Table 5.4 Option rankings

Option	Functional rank	Environmental rank	Socio-economic rank
C	1	1	2
C1	1	1	2
E	1	1(3)	1

Two rankings of environmental issues for Option E were taken forward - being a rank of "1" and a rank of "3" (indicated by 1 (3) on the table above) and each of these ranks were considered in the final choice of a preferred route.

The sensitivity of the socio-economic ranking of the options to changes to both their performance against the "rural land impacts" assessment criterion and the weighting of this criterion was analysed. The sensitivity analysis found that the ranking of the options was not sensitive to changes to this criterion.

Preferred option

The majority of workshop participants selected Option E as the preferred deviation option for this northern section of the Coastal route. The principal reasons for selection of Option E were because this option was considered to:

- be likely to have a higher degree of community acceptance
- deliver the best overall socio-economic outcome
- better provide for future urban growth and provide greater flexibility for future land use planning decisions
- result in less severance of existing and future communities
- provide safety and noise improvements for Mullaway and Safety Beach

5.4 Summary and conclusion

- The detailed evaluation of highway deviation options for the Coastal Corridor has focused on the short listed Inner Bypass options around Coffs Harbour (IS1/IS2 and IN1/IN2) and the short listed routes around Woolgoolga (C, C1 and E).
- Value Management workshops were important activities in the evaluation process and the key outcomes from those workshops were:
 - Options IS2 and IN2 in combination were identified from the value management workshop as the preferred deviation route within the Inner Corridor
 - Option E is the preferred option for the northern (Sapphire to Woolgoolga) section of the CHHPS.
- Option IS2 which forms the southern part of the Coffs Harbour deviation is a significantly higher cost option by approximately \$65M, and the assessed benefits of that option over IS1 are concluded to be marginal and not sufficient justification for such additional expenditure.
- Option IN2 which forms the northern part of the Coffs Harbour deviation is a higher cost option by approximately \$5-45M (depending on the eventual design option adopted), and the assessed benefits of that option over IN1 are concluded to be of sufficient magnitude so as to justify such additional expenditure.
- Although Option E is a higher cost option by approximately \$15M, the assessed benefits are concluded to justify such additional expenditure.

6. Recommended Strategy

6.1 Identification of preferred route option

Following the Value Management Workshops in early August 2004, senior representatives of the RTA, regional representatives of DIPNR and the project team reviewed the work undertaken to date as part of the process of identifying and confirming a preferred option for the Strategy. The objectives of the review were to:

- review the assessment of the highway corridors and the conclusion of the project team that the Coastal Corridor is the only feasible long term option for the Strategy
- based on the technical investigations undertaken, the outcome of the value management workshops and the results of the community consultation activities, identify the recommended preferred option for consideration by the NSW Minister for Roads
- consider the next steps in the implementation of the Strategy

6.1.1 Review of highway corridors

The highway corridor options reviewed were:

- Far Western Corridor
- CHCC Preferred Corridor
- Coastal Corridor

Although the investigations into the *Far Western Corridor* were of a strategic nature, the review confirmed that it was not a viable corridor option for the Strategy as it:

- has poor functional performance
- has moderate adverse socio economic impacts
- has moderate to very high environmental impacts
- requires high investment (\$930M) with little opportunity for staging
- requires significant investment into upgrading of the existing highway until the Far Western Corridor becomes viable in 20+ years (\$180M to \$530M depending on timing)
- has poor economic performance (BCR < 0.5)
- is likely to have poor community acceptance (noting that when adopting its Preferred Corridor, CHCC opposed any route through the Orara Valley)

The review also confirmed that route options within *Council's Preferred Corridor* were not viable as they:

- traverse the rugged and steep terrain of the Coastal Range
- have poor functional performance (the 11km uphill section and climb to an elevation of 240m is likely to deter trucks from using the bypass)
- have major impacts on natural habitat and threatened species with no certainty of approval
- require high investment (\$1,025M to \$1,650M) with little opportunity for staging
- require significant investment into upgrading of existing highway until they become viable in 50+ years (\$180M to \$530M depending on timing)
- have very poor economic performance (BCR 0.25 to 0.49)

The review agreed that route options within the *Coastal Corridor* are the only viable options for the Strategy as:

- they would have good functional performance (provide substantial road safety improvements and travel time savings) while still providing opportunities to separate through and local traffic
- although they have major socio-economic impacts, they would provide the best balance between functional, environmental, social and economic factors
- they would be lower cost (\$710M to \$900M) than the other corridor options
- they would provide good construction staging opportunities that could be provided within funding program limitations
- they would have fair economic performance (BCR 1.4 to 1.8)

However, the review acknowledged that there is likely to be strong ongoing opposition to the Coastal Corridor options from sections of the community, possibly including CHCC.

6.1.2 Coastal Corridor Options

For the purposes of assessment, the review considered the southern (Coffs Harbour) and northern (Sapphire to Woolgoolga) sections of the Coastal Corridor separately.

Southern (Coffs Harbour) section

As Community Update No.4 (February 2004) announced that the upgrade of the existing highway through Coffs Harbour to motorway standard was not acceptable due to its social and economic impacts, this option was not considered in the review. Consequently, the review considered the route options within the Inner Bypass Corridor for Coffs Harbour, viz:

- Inner South 1 (IS1)
- Inner South 2 (IS2)
- Inner North 1 (IN1)
- Inner North 2 (IN2)

These were the route options considered at the Value Management Workshop held on 2 and 3 August 2004.

Following consideration and discussion of the likely extent of development in the North Boambee Valley and the West Coffs Harbour area before the anticipated construction of the bypass (10+ years), the review recommended IS1 over IS2 for the southern section of the corridor as:

- transport benefits of both options are similar
- overall potential impacts of IS1 on likely future land use are similar to IS2 and can be mitigated by replanning the development of the North Boambee Valley
- given the conceptual design information available, IS1 has the potential to be refined to further reduce potential noise, visual and other environmental impacts
- the opportunity exists to replan the North Boambee Valley and the West Coffs Harbour areas to encourage compatibility between the development of these areas and the road proposal
- IS1 has lower engineering risks with greater flexibility and certainty (a tunnel through Roberts Hill Ridge is not required)
- IS1 is \$65M less expensive than IS2 and provides significantly better value for money
- high ongoing operational cost of the tunnel - indicative estimates suggest this could be in excess of \$1M per year to cover items including energy use, maintenance of lighting / ventilation / messaging / fire systems, operation team labour and a sinking fund for an assumed 15 year replacement of mechanical and electrical equipment / systems.

Although it is up to \$45M more expensive than IN1, the review recommended IN2 for the northern section of the corridor as it:

- has much less impact on existing and proposed development in the West Coffs Harbour area
- makes better use of the ridgelines to reduce potential acoustic and visual impacts on adjacent existing and proposed urban areas
- provides better overall socio-economic performance
- results in less severance of existing and future communities
- is likely to have a higher degree of community acceptance

Northern (Sapphire to Woolgoolga) section

Option A for the Sapphire to Woolgoolga section was assessed at the Value Management Workshop in April 2003. Option A was not one of the options that the workshop recommended to go forward for further consideration. Option A also forms part of two of the route options within Council's Preferred Corridor and was considered during the review of the highway corridors outlined in section 6.1.1.

Community Update No.4 (February 2004) announced that Options B1 and B2 did not merit further consideration due to the need to protect valuable agricultural land and that Option D (upgrade of the existing highway through Woolgoolga) was not acceptable due to its social and economic impacts on the township. Consequently, these options were not considered in this part of the review.

As a result, the review assessed the options considered at the Value Management Workshop on 4 August 2004 (ie. Options C, C1 and E). Although it is \$15M more expensive, the review recommended Option E as it:

- provides the best overall socio-economic benefits
- better provides for future urban growth and with greater flexibility in planning decisions
- results in less severance of existing and future communities
- provides safety and amenity (including noise) benefits for Mullaway and Safety Beach
- is likely to have a higher degree of community acceptance

Option E will necessarily include the upgrading of the existing highway from Sapphire to south Woolgoolga to a dual carriageway standard (estimated cost \$145M with at grade intersections or \$200M to \$230M with grade separated interchanges and service / local access roads).

6.2 Preferred route option

The overall future highway route option recommended for the CHHPS is therefore a coastal route that combines the following three sections:

- the Inner Bypass deviation around Coffs Harbour comprising a combination of Options IS1 and IN2
- upgrading of the existing highway from Korora to South Woolgoolga to dual carriageway standard
- the Option E deviation around Woolgoolga to Arrawarra Creek

This recommended coastal route is shown in Figure 6.1.

The recommendation of this route is based on the technical investigations undertaken, the outcomes of the value management workshops, assessment of the feedback from the community consultation activities and the review of the work undertaken by the project team. In summary, the preferred coastal route option is selected because this option would: