3. Traffic and Transport Issues

3.1 Traffic

In order to assess the viability of any potential bypass option to the west of Coffs Harbour, such as the CRW proposal, both from the point of view of whether it achieves the desired transport objectives for the region and also whether it provides an acceptable economic return on the investment required, it is necessary to identify the volume of traffic that would likely be attracted to the facility. Coffs Harbour City Council (CHCC) has in recent years developed a transport model from a software package called TRACKS to assist with its future road planning. For consistency with earlier studies completed in March 2002 as part of the initial route planning activities for the Coffs Harbour Strategy, it was decided that the TRACKS model would be used for the CRW investigations. The results of this traffic modelling, undertaken by CHCC on behalf of the RTA (CHCC, 2003), are presented in this section.

The TRACKS model is a conventional, four-step transport network model with features suited to strategic planning applications. It uses road network models established by the modeller for a particular evaluation year, in conjunction with land use data and associated trip estimation (generation), distribution and assignment models to provide corresponding estimates of 24-hour traffic volumes and travel statistics for the evaluation year.

An origin-destination survey (OD) survey was conducted to identify the existing volumes of traffic travelling through the urban area of Coffs Harbour. Survey sites were located south of Lyons Road and at Opal Cove on the Highway and west of Spagnolos Road on Coramba Road. Vehicles which passed any two of these survey sites within a time period of 2 hours were identified as through vehicles. Details of the survey are presented in a report by Traffic and Transport Surveys Pty Ltd entitled *Coffs Harbour Traffic Study, Origin-Destination Survey & Auto-count Survey, Final Report, September 2001 (TTS, 2001).*

The volumes of through traffic identified from these surveys were used to establish the base through trip matrices within CHCC's model, from which changes in the level of through trips along specific routes arising from the addition of each of the road improvement options could then be identified.

Table 3.1 shows the modelled total and through traffic volumes at selected locations along the CRW corridor and the existing highway, with and without the CRW, for the years 2001 and 2021. The modelled through traffic volumes are shown in brackets next to the total traffic volumes predicted to use each link.

Table 3.1 Modelled 2-Way Traffic Volumes in 2001 and 2021 (Total and Through Traffic)[1]

Location	Average Daily Traffic Volumes– without CRW (veh/day)		Average Daily Traffic Volumes– with CRW (veh/day)[2]	
	2001	2021	2001	2021
CRW Corridor				
Between Englands Road and Coramba Road	N/A	N/A	4,418 (3,829)	9,234 (8,256)
Between Coramba Road and Bucca Road	N/A	N/A	3,450 (3,362)	7,647 (7,389)
Pacific Highway				
South of Englands Road	25,486 (4,443)	38,328 (8,256)	25,530 (4,443)	38,213 (8,256)
South of Halls Road	22,031 (2,387)	27,993 (2,093)	20,118 (614)	25,890 (0)
North of Coff Street	25,496 (1,407)	35,566 (2,331)	25,158 (614)	33,521(0)
North of Bray Street	34,347 (2,856)	45,074 (3,915)	30,472 (614)	41,319(0)
North of Arthur Street	28,306 (3,976)	44,095 (7,389)	24,849 (614)	36,480(0)
North of James Small Drive (S)	20,752 (3,976)	35,693 (7,389)	17,302 (614)	28,045(0)
North of Headland Road	18,084 (3,976)	31,745 (7,389)	14,634 (614)	24,097(0)
North of Moonee Beach Road	16,020 (3,976)	26,509 (7,389)	12,580 (614)	18,890(0)
North of Bucca Road	15,566 (3,976)	26,161 (7,389)	15,566 (3,976)	26,161(7,389)
Hogbin Drive Extension				
Along the Coffs Creek link	17,074 (2,056)	22,083 (3,822)	14,521 (0)	17,754 (0)

[1] Figures in brackets are "through traffic" volumes
[2] Note that the traffic predicted to use the Coastal Ridge Way is expected to experience a lower crash rate than the traffic using the existing highway, due to the improved road geometry.

Based on Table 3.1, it is evident that:

- For the Base Case scenario (i.e. the existing highway without the Coastal Ridge Way proposal) in 2001, modelled traffic volumes on the existing Pacific Highway between Englands Road and Bucca Road range between approximately 16,000 vehicles per day (vpd) north of Moonee Beach Road and 34,000 vpd north of Bray Street. These volumes are predicted to increase to between 26,500 vpd and 45,000 vpd by the year 2021.
- With the addition of the Coastal Ridge Way proposal to the road network, traffic volumes decrease on most sections of the bypassed Pacific Highway in 2001 by between 11% north of Bray Street to 21% north of Moonee Beach Road. The resulting volumes of traffic using the existing highway in 2001 range from approximately 12,500 vpd north of Moonee Beach Road to 30,000 vpd north of Bray Street. By 2021 reductions in traffic volumes are predicted to occur at all locations, ranging between 8% north of Bray Street to 29% north of Moonee Beach Road. The resulting volumes of traffic using the highway in 2021 range from approximately 19,000 vpd north of Moonee Beach Road to 41,000 vpd north of Bray Street.
- Estimated traffic volumes on the Coastal Ridge Way range from approximately 3,500 vpd to 4,400 vpd in the year 2001, depending on the section of the bypass being considered. By 2021, the volumes are predicted to increase to between approximately 7,600 vpd and 9,200 vpd.
- For the Base Case (i.e. without the CRW) modelled traffic volumes on the Hogbin Drive Extension at the section passing over Coffs Creek are estimated to be of the order of 17,000

vpd in 2001, increasing to approximately 22,000 vpd by 2021. These volumes are also expected to reduce by between 15% and 20% with the addition of the CRW to the network, to levels of 14,500 vpd and 18,000 vpd in 2001 and 2021 respectively. Some of this traffic is attracted to the CRW, while the balance would be attracted to the Pacific Highway and other parallel links to replace traffic attracted from these roads to the CRW.

- The levels of through traffic currently using the Highway are also shown in the table. Through traffic constitutes only 5% to 25% of the total volumes on the Pacific Highway between Englands Road and Bucca Road for the Base Case in 2001, ranging between approximately 1,400 vpd north of Coff Street and 4,000 vpd north of Moonee Beach Road. By 2021 these volumes are predicted to double (although as a proportion of the total traffic the through traffic remains approximately the same), with through traffic on the Pacific Highway ranging from approximately 2,300 vpd north of Coff Street to 7,400 vpd north of Moonee Beach Road. Through traffic also uses the parallel route of Hogbin Drive, with volumes at the Coffs Creek link estimated to range from approximately 2,100 vpd (12% of the total traffic) in 2001 to 3,800 vpd (17%) by 2021.
- The impact of adding the Coastal Ridge Way to the network is to divert through traffic from both the bypassed section of the Pacific Highway and also Hogbin Drive to the Coastal Ridge Way. At 2001 some through traffic (614 vpd) is predicted to remain on the Pacific Highway although the majority is attracted to the CRW. However, by 2021 the model indicates that all through traffic would transfer from the highway to the CRW. In addition, all through traffic on the Hogbin Drive Extension is attracted to the CRW in both 2001 and 2021.
- The resulting volumes of through traffic predicted to use the CRW range from approximately 3,400 vpd to 3,800 vpd in 2001, representing 87% to 97% of the total traffic predicted to use the bypass, and from 7,400 vpd to 8,300 vpd in 2021 representing 89% to 97% of the total traffic. The balance of the traffic is local traffic with origins/destinations in the Coffs Harbour area.

For comparison purposes, the TRACKS model was also used to predict traffic volumes for the Central Corridor option which was “ruled out” in March 2002.

Table 3.2 shows the modelled traffic volumes at selected locations for the Central Corridor and CRW options.

Table 3.2 Modelled 2-Way Daily Traffic Volumes for the Central Corridor and Coastal Ridge Way in 2001 and 2021 (Total and Through Traffic)

Location	Average Daily Traffic Volumes – Central Corridor (veh/day)[1]		Average Daily Traffic Volumes – Coastal Ridge Way (veh/day)[1]	
	2001	2021	2001	2021
Upgrade Corridor				
Between Englands Road and Coramba Road	4,754 (4,443)	9,260 (8,256)	4,418 (3,829)	9,234 (8,256)
Between Coramba Road and Smiths Road/Bucca Road	4,127 (3,976)	7,869 (7,389)	3,450 (3,362)	7,647 (7,389)
Pacific Highway				
South of Englands Road	25,499 (4,443)	38,245 (8,256)	25,530 (4,443)	38,213 (8,256)
South of Halls Road	19,459 (0)	25,536 (0)	20,118 (614)	25,890 (0)
North of Coff Street	24,078 (0)	32,976 (0)	25,158 (614)	33,521 (0)
North of Bray Street	29,566 (0)	40,854 (0)	30,472 (614)	41,319 (0)
North of Arthur Street	24,151(0)	36,257 (0)	24,849 (614)	36,480 (0)
North of James Small Drive (S)	16,625 (0)	27,823 (0)	17,302 (614)	28,045 (0)
North of Headland Road	13,963 (0)	23,884 (0)	14,634 (614)	24,097 (0)
North of Moonee Beach Road	11,919 (0)	18,692 (0)	12,580 (614)	18,890 (0)
North of Smiths Road/Bucca Road [2]	15,584 (3,976)	26,253 (7,389)	15,566 (3,976)	26,161 (7,389)
Hogbin Drive Extension				
Along the Coffs Creek link	14,924 (0)	18,028 (0)	14,521 (0)	17,754 (0)

[1] Figures in brackets are "through traffic" volumes

[2] The traffic volumes at this location are for the point north of the connection of each scheme (Central Corridor or CRW) to the Pacific Highway

Based on Table 3.2, it is evident that traffic volumes for both the Central Corridor and the Coastal Ridge Way are similar and that consequently, both options perform similar functions.

3.2 Estimated Heavy Vehicle Volumes

The TRACKS model used by CHCC is a strategic transport model developed to examine the effects of land use, population and network changes at a relatively broad level. As such, the CHCC model in its current form does not provide estimates of heavy vehicle movements, and how these might change with the Coastal Ridge Way proposal.

A spreadsheet-based assessment of heavy vehicle movements has therefore been undertaken for the future modelling year of 2021 only. This has been done using the model outputs in Table 3.1 in conjunction with vehicle classification surveys undertaken along the existing Pacific Highway at 3 sites in 2001 as follows:

- Site 1 – South of Lyons Road
- Site 2 – At Opal Cove
- Site 3 – North of Bucca Road

The vehicle classification surveys were undertaken in accordance with the Austroads Vehicle Classification System which assigns each vehicle to 1 of 12 classes (or 'bins') based on its axle configuration. Classes 1 and 2 represent light vehicles comprising cars, vans, wagons, 4WDs, utilities, motorcycles, bicycles and towed vehicles (trailers, caravans, boats). Classes 3 to 12 represent heavy vehicles, with classes 3 to 5 comprising rigid vehicles (flatbed trucks, buses and other medium commercial vehicles) and classes 6 to 12 comprising articulated vehicles (trucks and buses), semitrailers, B doubles and road trains. Based on an average of the survey results, rigid vehicles and articulated vehicles comprised approximately 41% and 57% respectively of the total number of heavy vehicles surveyed, while B-Doubles represented less than 2% of the total number of heavy vehicles at the time of the survey.

Night time (i.e. between 10.00pm and 7.00am) heavy vehicle volumes were extracted from the survey results for the above locations. Total heavy vehicle traffic volumes during the night time were similar for the three locations, ranging between 462 vpd and 489 vpd. The data confirms the expectation that the majority of the night time heavy vehicle traffic is longer distance through traffic.

Based on these survey results, it was estimated that, during the night time period (10.00 pm to 7.00 am) in 2001, approximately 450 heavy vehicles per day were through traffic which would be attracted to the CRW. The balance of night time heavy vehicle traffic (estimated to be approximately 30 vpd) was estimated to be vehicles servicing Coffs Harbour which would remain on the existing highway with the addition of the CRW to the network. The night time heavy vehicle volumes on the CRW and on the highway in the future year of 2021 were then estimated from the 2001 volumes by applying a compound growth rate of 3% per annum.

The volume of heavy vehicle traffic during the daytime (i.e. between 7.00 am and 10.00 pm) using either the existing highway or the CRW was estimated by assuming that the average proportion of heavy vehicle traffic currently using the existing highway during this period, would also use the existing highway and the CRW with the inclusion of the CRW in the road network. The average proportion of daytime heavy vehicle traffic was then applied to the total traffic volumes predicted from the modelling undertaken by CHCC to use the CRW and the existing highway, as summarised in Table 3.1, to estimate the corresponding daytime heavy vehicle volumes.

The daytime and night time heavy vehicle volumes were subsequently combined to yield the total daily heavy vehicle volumes predicted to use either the existing highway or the CRW in 2021. The results are presented in Table 3.3 and represent the maximum volumes that could be expected on the CRW in the absence of other external effects (refer Section 3.4).

Table 3.3 Estimated 2-Way Daily Heavy Vehicle Volumes in 2021 with and without CRW

Location	Average Daily Volumes -without CRW (veh/day)	Average Daily Volumes -with CRW (veh/day)(1)
CRW Corridor		
Between Englands Road and Coramba Road	N/A	1,493
Between Coramba Road and Bucca Road	N/A	1,364
Pacific Highway		
South of Englands Road	3,901	3,891
South of Halls Road	3,061	2,143
North of Coff Street	3,659	2,746
North of Bray Street	4,462	3,402
North of Arthur Street	4,366	3,004
North of James Small Drive (S)	3,684	2,320
North of Headland Road	3,365	2,000
North of Moonee Beach Road	2,941	1,579
North of Bucca Road	2,920	2,920
Hogbin Drive Extension		
Along the Coffs Creek Link	n.a.(2)	n.a.(2)

1 Note that the traffic predicted to use the Coastal Ridge Way is expected to experience a lower crash rate than the traffic using the existing highway, due to the improved road geometry.
2 n.a. = not available

Based on Table 3.3, the following conclusions can be drawn:

- The levels of heavy vehicle traffic in the Base Case (i.e. without CRW) at 2021 are estimated to range between approximately 2,900 vpd north of Moonee Beach Road (approximately 11% of total daily traffic volumes) to slightly less than 4,500 vpd north of Bray Street (approximately 10% of total daily traffic volumes).
- The addition of the Coastal Ridge Way is predicted to result in a reduction of 24%-45% in the levels of heavy vehicle traffic along the bypassed section of the existing Pacific Highway. The resulting heavy vehicle volumes along the bypassed section of the Highway in 2021 are estimated to range between slightly less than 1,600 vpd north of Moonee Beach Road to 3,400 vpd north of Bray Street (approximately 8% of total daily traffic volumes). These compare with a maximum estimated volume of heavy vehicles of 3,900 vpd south of Englands Road (approximately 10% of total daily traffic volumes).
- Estimated heavy vehicle volumes on the CRW in 2021 range from approximately 1,400 vpd to 1,500 vpd depending on the section of the bypass being considered. This represents approximately 16-18% of the total daily traffic predicted to use the CRW.

3.3 Future Intersection Performance

A detailed analysis of the future performance of the intersections for the Base Case (i.e. without CRW) and the CRW option has not been undertaken for this strategic-level assessment. However, some general observations can be made based on the TRACKS modelling undertaken and by considering the proposed form of the new intersections for the CRW scheme.

The operation of the Highway through Coffs Harbour, now and projecting into the future, will be primarily governed by the operation of the intersections, most of which are currently at-grade and result in delays to all traffic as it passes through and across the area. With the substantial growth in local

traffic in future years arising from developments in areas such as the North Boambee Valley and also further to the north in the Moonee Urban Release areas, a considerable strain will be placed on the existing infrastructure within Coffs Harbour, requiring improvements to be made to a number of the intersections.

The strategic network modelling undertaken using TRACKS identified a number of intersections where "Do-Minimum" improvements were required in order to address excessive delays that were otherwise predicted to occur. These improvements would need to be implemented progressively as the performance of the intersections deteriorates. Consequently, these improvements have been considered to be minor projects in their own right and the estimated cost of these improvements has not been included in the estimates prepared for the CRW proposal.

3.4 Heavy Vehicle Travel Time and Travel Speed

The effect of long climbs on average speeds would be expected to be more significant for the CRW than the Existing Highway, particularly for heavy vehicles. This would increase the travel times and operating costs for these vehicles, potentially reducing the attractiveness of such a bypass option to these vehicles (heavy vehicles prefer to use routes which provide travel time and cost savings).

An analysis of the effects of grade on the average speed of heavy vehicles, and hence their travel times, has been carried out for the CRW based on a formula developed by Austroads (2002). Based on this analysis, the following information has been obtained in relation to heavy vehicle travel time.

- Estimated travel time for heavy vehicles between south of Englands Road and Bucca Road – 15.3 minutes
- Estimated average travel speed for heavy vehicles between south of Englands Road and Bucca Road – 81km/hr

A recent survey of truck travel times between south of Englands Road and Bucca Road under free flow conditions also recorded a time of 15.3 minutes. On this basis, heavy vehicles would not achieve travel time benefits if they choose the CRW bypass.

3.5 Crash Rates

A reduction in the existing crash rate along the Pacific Highway, which is currently in the order of 51 crashes per 100 million vehicle kilometres travelled (100MVKT), is anticipated to occur with the implementation of the CRW upgrade option. This is because under this option a proportion of the traffic would transfer from the existing Highway, with its multiple at-grade intersections, local access provisions and mix of vehicle types and trip purposes, to a new high-standard dual carriageway with improved alignment and grade-separated interchanges at all key intersections.

The traffic modelling results presented in Table 3.1 indicate that the CRW attracts between approximately 7,600 vpd and 9,200 vpd from the Pacific Highway and other parallel routes in the year 2021 depending on the section of CRW under consideration. This traffic would be expected to experience a lower crash rate than if it remained on the existing highway network, with a crash rate of 15 crashes per 100MVKT typically targeted for new dual carriageway alignment sections where limited access is provided.

Based on this simple comparative analysis, it is evident that the crash rate experienced within the Coffs Harbour LGA as a whole would be expected to reduce with the implementation of the CRW scheme.

3.6 Transport of Dangerous Goods

A preliminary risk assessment for the transport of Dangerous Goods indicated that removing traffic from the existing highway would relocate some of the risks from the community adjacent to the Pacific Highway, to the community adjacent to the CRW. Dangerous goods vehicles would, however, continue to use the Pacific Highway if they are prevented from entering tunnels along the CRW. In addition, dangerous goods vehicles servicing the local community would also continue to use the existing highway.

This assessment made no quantitative estimate of the probability of incidents involving dangerous goods vehicles and the level of associated risk for the road users and the surrounding community. A quantitative risk assessment would need to be conducted to determine the level of risk associated with the transport of dangerous goods through tunnels and the acceptability of that risk for road users.

4. Cost and Economic Evaluation

4.1 Approach to Cost Estimating

The RTA requires that project cost estimates be prepared in accordance with the RTA Project Estimating Manual (December 2001). This manual sets out current RTA methodology and procedures for preparing strategic, concept and detailed estimates of cost and provides guidance on the selection of appropriate contingencies for the various stages of development of the project and the identified risks. The Manual also specifies the review and concurrence roles of the RTA Project Management Office (PMO), to project cost estimates.

Given the level of design development for the proposals, the cost estimate format adopted for this report corresponds to the RTA Strategic / Preliminary Concept Cost Estimate. Accordingly provision for contingencies in the range of 30% to 35% of the base estimate is considered appropriate. The RTA specified format for a Strategic Cost Estimate divides the project cost into six (6) major cost components as follows:

1. Project Development (covering the work required to obtain project approval)
2. Investigation and Design (covering the design and documentation of the project for construction)
3. Property Acquisitions
4. Public Utility Adjustments
5. Construction (typically the main cost component which often accounts for 80% to 90% of a major rural road project). The main elements are earthworks, pavements, structures and drainage. Also included are environmental works, site management during construction, client representation etc
6. Handover (covering project completion and the handing over of completed assets to the responsible maintaining Authority).

The strategic cost estimates for the Coastal Ridge Way have adopted contingency allowances ranging between 25% and 50% with contingencies averaging 32% and 33%, respectively, of the base cost. Contingency allowances for non-construction items are generally in the order of 35% to 40%, with public utility adjustments having contingencies of 50%.

4.2 Scope Definition

The scope definition for the proposed CRW is determined by the length of the project and the key construction quantity calculations associated with any future road construction. Table 4.1 summarises the Scope Definition of the major work elements for the CRW and establishes the parameters on which the cost estimates are based.

Table 4.1 also provides a baseline of information on which future estimates can be prepared and / or varied if the intended scope of the CRW proposal changes.

Table 4.1 Coastal Ridge Way – Scope Definition

CRW Scope Definition	
Starting Point	Englands Road
Finishing Point	Bucca Road
Length	21.5 km
Clearing	180ha
Noise Walls	6,000 m^2
Earthworks (Cut to Fill) Volume	7.3 million m^3

Pavement Area	541,800 m^2
Bridge Deck Area	9,325 m^2
Viaduct Deck Area	15,678 m^2
Length of Tunnels	2.38 km
Interchanges	3
No. of Local Road Crossings	18
Realigned Local Roads	8.7 km

4.3 Cost Estimate

A spreadsheet version of the Preliminary Concept Estimates for the CRW proposal, prepared in accordance with current RTA guidelines, is provided in Appendix C. Table 4.2 summarises the costs under the main cost elements detailed in the attached concept estimates for the CRW over its whole project length. The amounts shown have been rounded to the nearest $0.1M.

Table 4.2 Coastal Ridge Way (Englands Road to Bucca Road) – Cost Estimate Summary Breakdown

Item	Description	Base Cost ($M)	Contingency Cost ($M)	Total Cost ($M)
1	Project Development	11.1	4.4	15.5
2	Investigation and Design	12.9	5.1	18.0
3	Property Acquisitions	17.2	6.9	24.1
4	Public Utility Adjustments	4.2	2.1	6.3
5	Construction Infrastructure	596.5	199.0	795.4
6	Handover	0.8	0.3	1.1
	Totals	**642.7**	**217.8**	**860.5**

This table shows that the estimated total cost for the Coastal Ridge Way is approximately $860 M, inclusive of contingencies. This equates to a very high average cost of $39.5 M per kilometre. This is primarily due to the very rugged terrain though which the route passes and the need for extensive earthworks in addition to major tunnelling and viaduct structures. The estimate makes no provision for climbing lanes or truck arrestor beds which may be required due to the long grades.

Table 4.3 provides a breakdown of the costs for the Construction component of the estimate. As this represents the major portion of the total estimate it is provided for the main cost elements detailed in the attached concept estimates for the CRW over its whole project length. The amounts shown have been rounded to the nearest $0.1M.

Table 4.3 Coastal Ridge Way – Construction Cost Breakdown

Item	Description	Base Cost	Contingency Cost	Total Cost
5.1	Environmental Works	18.0	6.3	24.3
5.2	Noise Mitigation	4.0	1.4	5.4
5.3	Earthworks	141.9	49.7	191.6
5.4	Drainage	22.2	7.8	30.0
5.5	Pavement	47.0	11.7	58.7

5.6	Structures – Bridges	65.8	16.5	82.3
5.6	Structures – Tunnels	239.0	83.7	322.7
5.7	Interchanges & Local Roads	13.3	4.7	18.0
5.8	Miscellaneous	5.8	2.0	7.9
5.9	General Activities	10.0	3.5	13.5
5.10	Site Management	25.0	10.0	35.0
5.11	Project Management Services	4.0	1.6	5.6
5.12	Client Representation	0.4	0.2	0.6
	Totals	**596.5**	**199.0**	**795.4**

4.4 Economic Analysis

4.4.1 Economic Evaluation

This section of the report presents the key inputs and outputs of a conventional Road User Cost Benefit Cost Analysis (RUBCA) undertaken to assess the economic viability of the CRW. The economic analysis has been undertaken with reference to the RTA's Economic Analysis Manual (2001) using a spreadsheet-based method developed by Connell Wagner. The analysis provides results for the key economic indicators used to assess these types of projects, including Net Present Value (NPV) and Benefit Cost Ratio (BCR). The analysis has not attempted to quantify, in dollar terms, intangible factors such as environmental or social costs and benefits. These are addressed in qualitative terms elsewhere in the review.

The analysis is based on information from a number of sources as follows:

- Strategic project cost estimates as outlined above and from assumed likely cashflow scenarios as nominated below
- Network travel statistics including vehicle-kilometres travelled (VKT) and vehicle-hours travelled (VHT) from the CHCC TRACKS Model.
- Unit costs and other economic parameters obtained or derived from the RTA Economic Analysis Manual (2002).

4.4.2 Basic Parameter Values

- Base Year - The base year considered for discounting purposes is 2018.
- Discount Rate - A discount rate of 7% has been used to discount future capital costs and road users benefits to the base year. No sensitivity analysis was carried out in relation to discount rates.
- Modelling Period - Traffic modelling was carried out by CHCC using TRACKS for a twenty year period from 2001 to 2021. Models were run for the base case (do nothing) in each year and for the option under consideration.
- Evaluation Period - An evaluation period of 30 years from opening has been used for the economic analysis.
- Annualisation Factor - An annualisation factor of 350 has been used to convert the average weekday travel statistics output by the TRACKS model to annual figures. The factor was derived from the analysis of a nearby permanent counting site operated by the RTA, and accounts for the daily and seasonal departures from an average weekday traffic volume that are known to occur in the area.

Traffic Growth and Extrapolation of Travel Statistics

Growth in local traffic is accounted for within the traffic model, based on the future land use projections within the Coffs Harbour LGA and associated assumptions about traffic generation. For through-traffic, values of 4.5% per year compound from 2001 to 2006 and then 2.7% compound until 2021 have been used based on the results obtained from strategic traffic analysis completed by the RTA for the Pacific Highway.

The level of traffic growth that occurs in the traffic model translates into changes in the key travel statistics (vehicle hours travelled and vehicle kilometres travelled) between the modelling years. The annual rate of change so-calculated has been used as the basis for extrapolating the travel statistics beyond 2021 in order to provide annual statistics over the entire '30 years beyond opening' evaluation period.

4.4.3 Travel Cost Parameters

The rural composite values used in this study were $23.03 per vehicle hour for travel time and 27.00c per vehicle kilometre for vehicle operating cost (VOC) (both values in September 2002 prices).

The travel time value has been derived by adjusting the weighted average value calculated in Appendix B, Table 12 of the RTA Economic Analysis Manual to reflect the actual proportion of vehicle types (light vehicle and heavy vehicle proportions) exhibited in the study area. Traffic counts undertaken in 2001 as part of the original Coffs Harbour Strategy investigations were used for this purpose.

The VOC value was derived using the same vehicle classification data in conjunction with the Austroads Arterial Stop/Start Model. This has the form:

$C = A + B/V$
where,

A, B are model coefficients (assessed to be 24.03 and 140.59 respectively)
C = cents/km
V = travel speed.

An average network speed of 48km/hr was adopted for the composite value, based on the average network speeds derived from the travel statistics output by the CHCC model.

4.4.4 Accident Rate Values

A composite value across all road types has been adopted for this economic analysis on the basis that accident savings are expected to make only a small contribution to the total benefits and are therefore not a critical element in the analysis. A value of $61,500 per million vehicle kilometres travelled has been used in the assessment.

4.4.5 Project Cost and Cash Flow Scenarios

The project costs associated with CRW are shown in Table 4.2. With respect to the construction timeframe, it was assumed that the CRW project would be constructed as an accelerated project and would be constructed with a higher annual budget compared to the highest annual budget for a typical Pacific Highway bypass project which is approximately $80-$90M. The adopted cash flow for the CRW assuming a six year construction period is shown in Table 4.4. The cash flow for a four year construction period was also examined to test the sensitivity of the proposed opening year.

Table 4.4 Proposed Construction Cash Flows

Year	Project Cost ($M)	
	6 Year Construction Period	4 Year Construction Period (sensitivity analysis)
2018	140	200
2019	140	200
2020	140	200
2021	140	260
2022	140	-
2023	160	-
Total	**860**	**860**

Maintenance Costs

An allowance for future routine and periodic maintenance has been made in the analysis based on a typical maintenance schedule and associated unit costs for a concrete pavement surface specified in the *RTA Economic Analysis Manual*. The maintenance schedule and unit costs used are summarised in Table 4.5.

Table 4.5 Maintenance Schedule and Unit Costs

Treatment	Year	Cost Per m2 of pavement
Routine Maintenance	1-30 inclusive	$0.15
Cross stitching 20m cracks	2, 6, 12, 20	$0.06
0.5% slab replacement	2, 5, 10, 15, 20, 25, 28, 30	$1.03
Cross stitching 40m cracks	28	$0.12
Remove and Replace Sealant	10, 20, 30	$2.19
30% retexture	20	$0.84

4.4.6 TRACKS Output

The key network travel statistics produced by the TRACKS model that are used directly in the economic analysis are vehicle hours travelled (VHT) and vehicle kilometres travelled (VKT). These statistics are provided for each of the modelling years for the base case (do nothing) and the CRW option modelled. A summary of the network travel statistics obtained from the TRACKS model is provided in Table 4.6.

Table 4.6 Network Travel Statistics

	Base		Coastal Ridge Way Option	
	2001	2021	2001	2021
Vehicle Kilometres of Travel (VKT)				
Vehicle Travel	1,729,672	2,605,764	1,734,803	2,629,313
Vehicle Hours of Travel (VHT)				
Vehicle Hours	35,477	54,103	35,923	53,428
Average Speed (km/hr)	48.8	48.2	48.3	49.2

4.4.7 Summary Results of Economic Analysis

A summary of the results for the economic analysis in terms of Net Present Value (NPV) and Benefit Cost Ratio (BCR) is provided in Table 4.7. The First Year Rate of Return (FYRR) is also provided. Spreadsheets used in the analysis are attached in Appendix D.

Table 4.7 Results of the Economic Analysis

Parameters	Results of Economic Analysis	
	6 Year Construction Period	4 Year Construction Period (sensitivity analysis)
Discount Rate	7%	
Present Value of Costs ($M)	$728	$774
First Year Rate of Return (FYRR)	0.35%	0.30%
10 Year Period		
Present Value of Benefits ($M)	$26	$25
Net Present Value / (Loss) ($M)	($704)	($750)
Benefit Cost Ratio	0.04	0.03
20 Year Period		
Present Value of Benefits ($M)	$47	$48
Net Present Value / (Loss) ($M)	($683)	($728)
Benefit Cost Ratio	0.06	0.06
30 Year Period		
Present Value of Benefits ($M)	$63	$65
Net Present Value / (Loss) ($M)	($668)	($712)
Benefit Cost Ratio	0.09	0.08

From Table 4.7, it is evident that the CRW is not economically viable in terms of road user benefits since the BCR value over the full 30 year evaluation period is less than 0.1 and the First Year Rate of Return is less than 1%. The results of the analysis also indicate that no significant change in the BCR values occurs for different construction programs. For decisions on new highway infrastructure in NSW, the Government typically has a desirable BCR of 2. The CRW proposal therefore represents a poor investment opportunity as the costs significantly outweigh the benefits to the users of the facility.

5. Socio-Economic Issues

This section of the report presents findings from the strategic review of the CRW proposal in relation to a range of socio-economic matters.

5.1 Statutory and Strategic Planning

Statutory planning in NSW is controlled by the *Environmental Planning & Assessment Act* and local planning controls in the study area are contained in the Coffs Harbour LEP 2000. Land use zones that are traversed by the CRW are shown in Figure 5.1 and include the following:

- 1(a) Rural Agricultural
- 1(f) Rural State Forest
- 4(a) Industrial
- 5(a) Special Uses Community Purposes (Railway)
- 7(a) Environmental Protection Habitat and Catchment.

Under the provisions of the Coffs Harbour LEP, the CRW would be permissible within all of these zones, except the areas of State Forest. Construction of the route through a State Forest would require authorisation under the *Forestry Act 1916*.

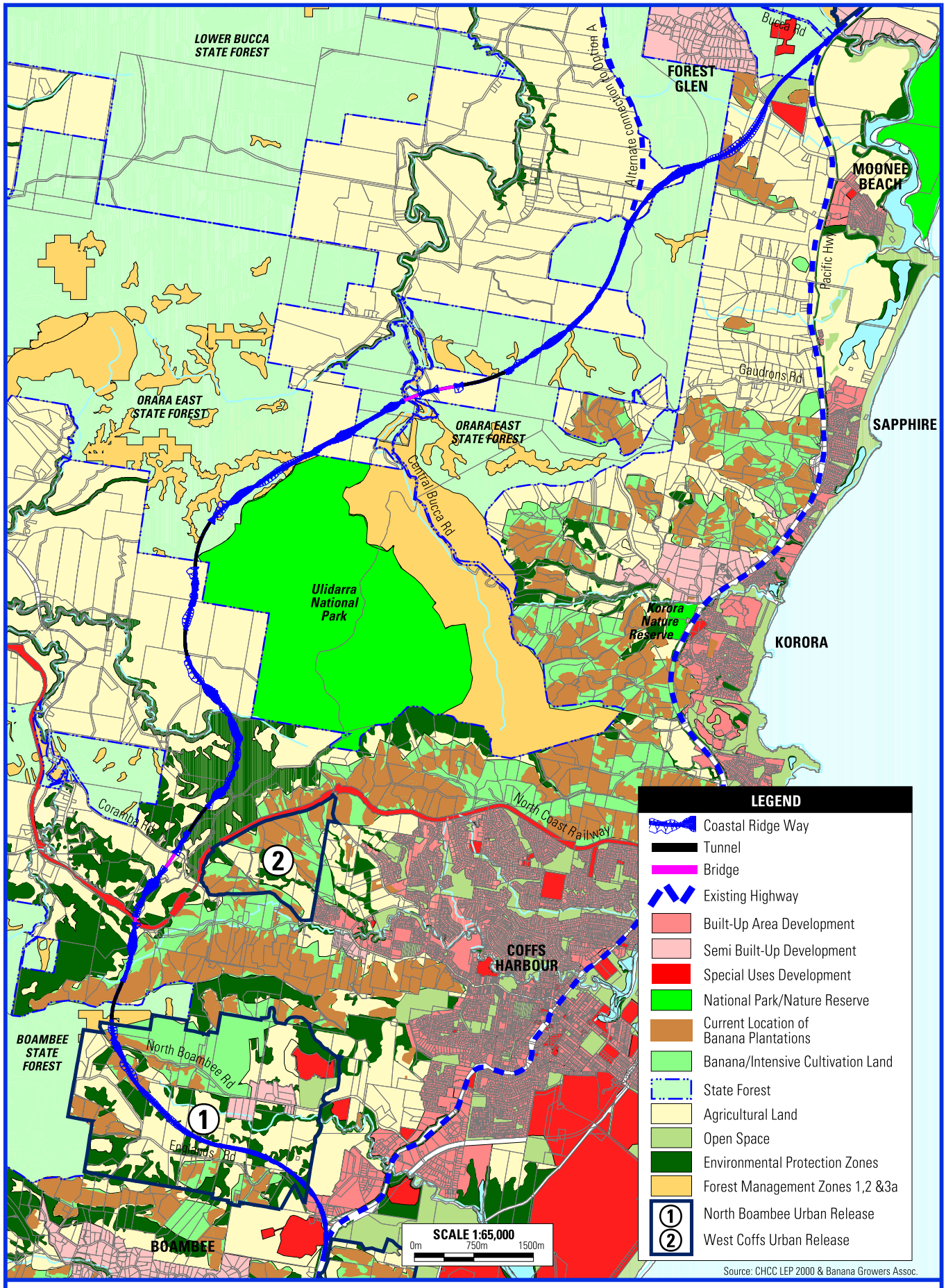
As the CRW proposal would cause significant environmental impacts within the meaning of the EP&A Act, an Environmental Impact Statement (and probably a Species Impact Statement) would need to be prepared and publicly exhibited. The proposal would then need to be approved by the Minister for Infrastructure, Planning and Natural Resources in accordance with the provisions of Part 5 of the Act

A range of other environmental approvals and/or licences may be required for the proposal. Examples of these include an Environment Protection Licence (EPL) under the *Protection of the Environment Operations Act 1997*, permit to work in proximity of watercourses under *the Rivers & Foreshores Management Act,* consent to destroy or disturb items of indigenous heritage under the *National Parks and Wildlife Act 1974*, and approvals under the *Water Management Act 2000*. If a Species Impact Statement (SIS) is required, the concurrence of the Director-General for the Department of Environment and Conservation (DEC) (formerly National Parks and Wildlife Service) under the provisions of the *Threatened Species Conservation Act 1995* and/or concurrence of the Director of Fisheries under the *Fisheries Management Act 1994* needs to be obtained.

In terms of strategic planning, policies and strategies, the following have been reviewed in terms of their relationship to the CRW proposal:

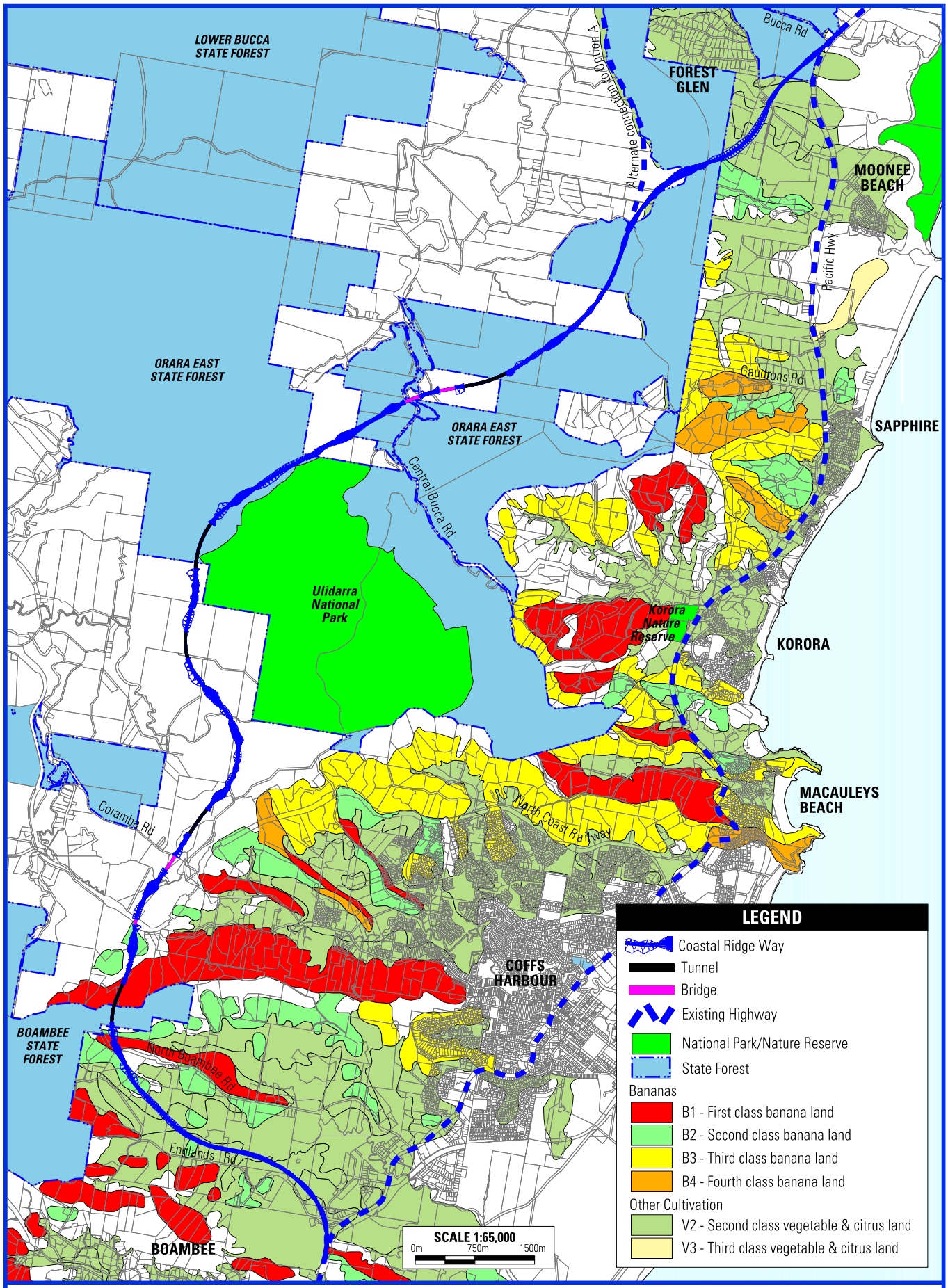
- Action for Transport 2010
- Action for Air
- Road Safety 2010
- State Environmental Planning Policies (SEPPs)
- North Coast Regional Environmental Plan (NCREP)
- North Coast Urban Planning Strategy – Into the 21st Century
- North Coast Road Strategy (1993)
- Korora Draft Local Environmental Plan (2001)
- Coffs Harbour Urban Development Strategy (1996)
- Coffs Harbour Council Rural Residential Strategy
- Draft Rural Lands Strategic Plan (November 2001)

The southern end of the CRW would traverse the North Boambee Urban Release Area and in particular the Stage 3 section. As this area would be fundamentally affected by the route, it would be necessary for CHCC and the community to reconsider the most appropriate land use mix for the area



COFFS HARBOUR HIGHWAY PLANNING
COFFS HARBOUR SECTION
REVIEW OF COASTAL RIDGE WAY

FIGURE 5.1
LAND USE



COFFS HARBOUR HIGHWAY PLANNING
COFFS HARBOUR SECTION
REVIEW OF COASTAL RIDGE WAY

FIGURE 5.2
AGRICULTURAL LAND CLASSIFICATION