

The key constraints identified within the study area include:

- ▶ Access from private property, businesses and local roads;
- ▶ Blueberry Farms Australia – it is a significant operation with considerable capital investment;
- ▶ Dirty Creek Range – the topography of this part of the study area presents some significant challenges in meeting the project design criteria;
- ▶ Halfway Creek duplication – this recently completed piece of the Pacific Highway Upgrade Program should be incorporated into the new route;
- ▶ Corindi floodplain – the floodplain would provide challenges in overcoming flooding issues and would dictate the form of the upgrade in this area;
- ▶ Heritage sites – the various cultural heritage sites that have been identified should be avoided where possible;
- ▶ National parks / conservation areas – these reserves should be avoided;
- ▶ SEPP 14 designated areas – these reserves should be avoided; and
- ▶ Project start and end points and the study area – these are key constraints for all route options.

Analysis of these issues and constraints was initially undertaken using INCA.

5.3 Summary of Characteristics of Route Options

A broad summary of the key characteristics of each route option in each of the sections of the study area is contained in Tables 5.2 to 5.5.

The characteristics include:

- ▶ Engineering and Operational;
- ▶ Economic;
- ▶ Community; and
- ▶ Environmental.

Table 5.2 Route Option Characteristics – Section A

| Section A | | | | |
|---|--|--|--|---|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| Engineering and Operational | | | | |
| Cross Section of New Highway | <p>Outside shoulder widths to be increased to either 2.5 metres (with no barrier) or three metres with barrier. Existing widths range between one and two metres.</p> <p>The northbound carriageway crossfall to be modified to 3%, existing is generally 1.5%.</p> | | <p>Two new carriageways will replace existing alignment.</p> <p>Existing highway can be used as a local access road, possibly permitting a Class M upgrade initially.</p> | |
| Access Rationalisation | <p>The location of a grade separated interchange in the vicinity of Corindi Beach will depend on the preferred route and the Sapphire to Woolgoolga project.</p> <p>There are currently 11 accesses along Section A.</p> <p>Initially, the six public road intersections in addition to the private roads and driveways may be converted to left in / left out only. Ultimately all access to the highway would be provided via a grade separated interchange.</p> | | | |
| | <p>Up to three kilometres of the old Pacific Highway (Eggins Drive) may require upgrading to sustain expected local traffic volumes for use as a local access road.</p> <p>A 600 metre extension of the old Pacific Highway (Eggins Drive) may be required to connect to the highway south of Arrawarra Creek.</p> | | <p>Local access road connection not required on the eastern side of the highway in Class M upgrade.</p> <p>Adopting a consolidated Sapphire – Woolgoolga and Corindi Beach interchange at the start of Section B, a western local access road will be required between Upper Corindi Road and Corindi Beach.</p> | |
| Constructability | <p>Poor due to the significant portions of reconstruction on the existing alignment.</p> <p>High potential for impact on public utility plant.</p> | <p>Good as a large proportion of the new construction would be separate to the existing highway.</p> | | <p>Good as constructed separate to the existing highway.</p> <p>Minimal impact on public utility plant.</p> |

| Section A | | | | |
|--|--|--------------|---|---------------|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| Geotechnical | <p>Alluvial soils will impact on embankment design (slopes no steeper than 2H:1V), and trafficability (bridging layers are expected). Acid sulphate soils are expected in the eastern half of the study area through this section.</p> <p>Existing highway rock cuttings are performing adequately at batter angles of around 45° (1H:1V). Some localised instability including small scale slumping of weathered materials and localised toppling failures may require stabilisation.</p> <p>A duplication upgrade has issues for subsidence and differential settlement of new road embankment adjacent to existing embankments.</p> | | | |
| Public Utilities | <p>Telecommunications: Telstra optic fibre adjacent to existing highway and crossing will require 40 metres of protection.</p> <p>Electrical Infrastructure: Overhead powerlines cross the highway in proximity to Arrawarra Headland. The powerlines continue along the eastern side of the road for approximately 750 metres before crossing back to the western side of the road. This line would require relocation to suit the route option.</p> <p>Currently there is an 11kV line running on the western side of the existing highway. This is proposed to be upgraded to 33kV. If this was to occur, an additional 11kV line would be installed preferably along the edge of the road corridor.</p> <p>Water and Sewerage Services: These options do not impact upon water and sewerage infrastructure within this section.</p> | | | |
| | <p style="text-align: right;">Electrical Infrastructure: In addition to the above, this option would require the relocation of 19 11kV poles.</p> | | | |
| Road User Delay (Construction) | <p>The length of Section A will require construction under traffic. Therefore road user delay during construction may be considerable. Some interaction between through and construction traffic.</p> | | <p>The construction of two new carriageways adjacent to the existing highway will permit construction independent from traffic. Therefore road user delay should be reduced. There will also be reduced interaction between through and construction traffic.</p> | |
| Road User Delay (Operation) | <p>Currently through traffic represents approximately one third of all vehicles within Section A. The proportion of heavy vehicles at night can be almost double the daytime proportion.</p> <p>Section A had a level of service (LoS) D in 2004. Assuming that no upgrading were to occur, LoS E will be experienced at 2016 and LoS F at 2036. LoS F means that the highway will experience serious queuing and delays as it will be operating over capacity.</p> | | | |

| Section A | | | | |
|---|--|----------------------------|--|----------------------------|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| Level of Service (Intersections) | <p>Current traffic conditions for Tasman Street indicate that the intersection operates satisfactorily. The level of service was B in 2004.</p> <p>Projected traffic increases indicate that in 2016 the Tasman Street intersection will operate at LoS C and in 2036 will operate at LoS F (even if upgraded to a seagull type intersection).</p> | | | |
| Route Length | 3.5 km (same as existing). | 3.5 km (same as existing). | 3.5 km (same as existing). | 3.5 km (same as existing). |
| Hydrology (Flood Immunity) | Major flooding will not occur within Section A. The alignment crosses Arrawarra Creek at the commencement of Section A. | | | |
| Economic | | | | |
| Vehicle Operating Cost (Heavy Vehicles) | Section A does not contain any notable grades that will adversely impact on operating costs. | | | |
| Economic Development | Based on discussions with Coffs Harbour City Council and a review of relevant planning instruments, there are no plans for significant economic development in this section. | | | |
| Economic Impact | Potential economic benefits to tourist resources including increased patronage at Arrawarra Beach Holiday Park, Darlington Beach Resort and Lorikeet Tourist Park and Home Village through provision of improved safety of access. | | <p>Potential economic benefits to tourist resources including increased patronage at Arrawarra Beach Holiday Park, Darlington Beach Resort and Lorikeet Tourist Park and Home Village through provision of improved safety of access.</p> <p>Potential limited economic impacts to Wedding Bells State Forest due to property acquisition.</p> | |
| Cost to Construct | | | | |
| Class A (\$M) | 35 | 35 | 40 | 45 |
| Class M (\$M) | 40 | 40 | 55 | 45 |
| Use of Existing Road Reserve | <p>The old Pacific Highway may be re-used as a local access road between Corindi Beach and Arrawarra.</p> <p>The existing highway would be reconstructed as a new southbound carriageway in the existing road reserve.</p> | | The existing highway may be used as a local access road between Corindi Beach and Arrawarra and possibly further south. | |

| Section A | | | | | | | | | | |
|---|---|---------------------|---|----------------------|--|--|---|--|--|--|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option | | | | | | |
| Ease of Upgrade | The duplication of the existing highway will require construction under traffic. | | Minimal construction would be required under traffic. | | | | | | | |
| Staging | Section A can be constructed independently from the remaining other sections. Staged construction between Class A and Class M may be possible within Section A. | | | | | | | | | |
| Community | | | | | | | | | | |
| Vehicular Access | Interchange options in this area include: <ul style="list-style-type: none"> ▶ The partial interchange proposed as part of the Sapphire to Woolgoolga project at the start of this section; ▶ Likely changed general access arrangements during construction and operation; and ▶ Improved safety of access provided at all intersections with upgraded highway. <hr/> <table border="0" style="width: 100%;"> <tr> <td style="width: 50%;">Possible minor accessibility impacts during construction to Wedding Bells State Forest and Upper Corindi Road.</td> <td style="width: 50%;">Likely accessibility impacts during construction to Wedding Bells State Forest and Upper Corindi Road.</td> </tr> <tr> <td colspan="2">Likely accessibility impacts to Darlington Beach Resort, Lorikeet Tourist Park and Home Village and Arrawarra Beach Holiday Park during construction.</td> </tr> </table> <hr/> <table border="0" style="width: 100%;"> <tr> <td style="width: 50%;">Possible use of old Pacific Highway (Eggins Drive) as a local access road between Corindi Beach and Arrawarra, and possibly further south.</td> <td style="width: 50%;">Possible use of existing highway as a local access road between Corindi Beach and Arrawarra, and possibly further south.</td> </tr> </table> | | | | Possible minor accessibility impacts during construction to Wedding Bells State Forest and Upper Corindi Road. | Likely accessibility impacts during construction to Wedding Bells State Forest and Upper Corindi Road. | Likely accessibility impacts to Darlington Beach Resort, Lorikeet Tourist Park and Home Village and Arrawarra Beach Holiday Park during construction. | | Possible use of old Pacific Highway (Eggins Drive) as a local access road between Corindi Beach and Arrawarra, and possibly further south. | Possible use of existing highway as a local access road between Corindi Beach and Arrawarra, and possibly further south. |
| Possible minor accessibility impacts during construction to Wedding Bells State Forest and Upper Corindi Road. | Likely accessibility impacts during construction to Wedding Bells State Forest and Upper Corindi Road. | | | | | | | | | |
| Likely accessibility impacts to Darlington Beach Resort, Lorikeet Tourist Park and Home Village and Arrawarra Beach Holiday Park during construction. | | | | | | | | | | |
| Possible use of old Pacific Highway (Eggins Drive) as a local access road between Corindi Beach and Arrawarra, and possibly further south. | Possible use of existing highway as a local access road between Corindi Beach and Arrawarra, and possibly further south. | | | | | | | | | |
| Community Severance / Consolidation | Provision of a possible local access road between Arrawarra and Corindi Beach may improve community cohesion. Potential stress impacts on members of the community caused by changed access, reduced environmental amenity and property acquisition. Potential for reduced environmental amenity for Darlington Beach Resort and Lorikeet Tourist Park and Home Village due to noise, air quality and visual impacts during construction and operation. These impacts would be fewer for the Purple and Orange options as the existing highway would remain in use during construction and would revert to a local access road following construction. For the Blue and Green options the old Pacific Highway would be re-used as a local access road and would therefore potentially increase traffic volumes in proximity to these developments. | | | | | | | | | |

| Section A | | | | |
|---|--|---------------------|--|----------------------|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| Noise Impact | The total number of potential receivers in this section within 500 metres of the existing highway is 137. | | | |
| | The total number of potential receivers within 500 metres of the centreline of these options is 136. | | The total number of potential receivers within 500 metres of the centreline of these options is 129. | |
| | Distances to potential receivers from the centreline of these options are <100 metres (nil), 100 metres to 200 metres (4) and 200 metres to 500 metres (132), which is very similar to the existing highway. | | Distances to potential receivers from the centreline of these options are <100 metres (nil), 100 metres to 200 metres (1) and 200 metres to 500 metres (128), which is a slight decrease relating to the existing highway. | |
| | All potential receivers are expected to be subject to the “Redeveloped Highway” criteria. | | | |
| | The weighted noise impact (without mitigation) score for the existing highway in this section is 138. | | | |
| | The weighted noise impact (without mitigation) score for these options is 137, indicating a similar noise impact relative to the existing highway. | | | |
| Property Impact – Number of Properties Affected | 8 | 8 | 16 | 18 |
| Property Impact – Approximate Area Affected (ha) | 1.0 | 1.0 | 7.8 | 16.1 |

| Section A | | | | |
|---|---|---------------------|---|--|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| Property Impact – Description of Properties Affected | These options may involve minor strip acquisition of rural properties to the east of the existing highway at the northern end of this section. | | Possible strip acquisition to the west within Wedding Bells State Forest. Depending on the presence of any special values within Zone 8 that may qualify these areas for classification as a special management zone (Zone 1 or Zone 2) and subject to concept design, it is possible that any area required by this option would be less than 20 ha, and that revocation could be effected by a notice in the Gazette. | Possible strip acquisition to the west within Wedding Bells State Forest. Acquisition and severance of land upon which the sewerage treatment plant (Kangaroo Trail Road) is located. However this is not expected to affect the operation of the plant. |
| Amenity – Bus Access | Under a Class A scenario, the provision of bus stops and access arrangements for buses would generally remain the same as existing. However, the provision of improved clear zones and possibly designated bus bays would improve the current situation. | | Under a Class M scenario, all local bus operations will be on local access roads. | |
| | | | | Under a Class M scenario, no bus stops would be provided on the upgraded highway, however inter-city / interstate buses will use the upgraded highway. Local bus routes and bus stops would be provided via local access roads. |
| Amenity – Pedestrian and Cyclist Access | For safety reasons, pedestrian access across the upgraded highway would be limited under a Class A scenario and banned under a Class M scenario. Cyclists would be permitted to use the left hand shoulder on the upgraded highway. Pedestrian needs will be further assessed following selection of the preferred route. | | | |
| Visual Amenity | The potential visual impact in this area would result from the vegetation clearance required for the widening of the highway to the west for one new carriageway. | | The potential visual impact would be from the clearance to the woodland and state forest vegetation to widen the corridor for two new carriageways to the west of the existing highway. | |

| Section A | | | | |
|---|--|---------------------|--|---|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| | | | | Towards the end of this section where this option deviates to the west, a new cleared corridor for the width of two carriageways would be created, introducing a new visual disturbance in the landscape. |
| Indigenous Heritage | <p>No known listed indigenous heritage items within or in immediate proximity of this option.</p> <p>The entire coastal zone is an area of high heritage potential, particularly in undisturbed areas, around watercourses and swamps. Midden sites have potential to occur in association with present or remnant water sources in the coastal zone.</p> <p>Much of the land in the southern part of this section contains areas of cultural sensitivity to the local Aboriginal community in the form of corridors of movement, historical campsites and a men's ceremonial site.</p> <p>All options would traverse the corridors of movement along the existing highway alignment, but are not expected to affect the historical campsites or men's ceremonial place.</p> | | | |
| Non-Indigenous Heritage | <p>No known listed non-indigenous heritage items within or in immediate proximity of this option.</p> <p>Potential historical relics include those relating to the themes of timber cutting, farming and transport. The former Great Northern Timber Company tramline route is located to the south and is not impacted.</p> | | | |
| Land Use – Statutory Planning | <p>Coffs Harbour City LEP 2000: Within the boundaries of the Coffs Harbour City LEP 2000 these options pass through or immediately adjacent to land zoned Rural 1A Agriculture, Rural 1F State Forest, Special Uses 5A Community Purposes – Classified Road, Environmental Protection 7A Habitat and Catchment and Environmental Protection 7B Scenic Buffer.</p> | | <p>Coffs Harbour City LEP 2000: Within the boundaries of the Coffs Harbour City LEP 2000 these options pass through or immediately adjacent to land zoned Rural 1A Agriculture, Rural 1F State Forest and Special Uses 5A Community Purposes – Classified Road.</p> | |

| Section A | | | | |
|--|--|--------------|---|---|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| | <p>Ulmarra LEP 1992: Within the boundaries of the Ulmarra LEP 1992 these options pass through or immediately adjacent to land zoned 1(a) (General Rural Zone), 1(e) (Rural 'E' (Urban Investigation) Zone), and 1(f) (Rural (Forests) Zone).</p> | | <p>Ulmarra LEP 1992: Within the boundaries of the Ulmarra LEP 1992 this option passes through or immediately adjacent to land zoned 1(a) (General Rural Zone), 1(e) (Rural 'E' (Urban Investigation) Zone), and 1(f) (Rural (Forests) Zone).</p> | <p>Ulmarra LEP 1992: Within the boundaries of the Ulmarra LEP 1992 this option passes through or immediately adjacent to land zoned 1(a) (General Rural Zone) and 1(f) (Rural (Forests) Zone).</p> |
| | <p>Summary of Statutory Position: Pending clarification of the application of the new state planning reforms within this section, these options would be:</p> <ul style="list-style-type: none"> ▶ Pursuant to SEPP 4 and clause 7 of the LEP, permitted without development consent within the area covered by the Coffs Harbour City LEP 2000; and ▶ Potentially prohibited within the area covered by the Ulmarra LEP unless Coffs Harbour City Council decides that the project is consistent with one or more of the objectives of the affected zones. | | | |
| <p>Land Use – Residential</p> | <p>Adjacent residences are predominantly located in the caravan parks to the east of the existing highway.</p> <p>Coffs Harbour City Council's <i>Urban Development Strategy 1996</i> identifies land in the vicinity of Arrawarra as a long-term urban investigation area. However, council has advised that due to environmental constraints this area is unlikely to be developed.</p> | | | |
| <p>Land Use – Productive Land</p> | <p>Within this section these options are not likely to result in any land use impacts to productive lands.</p> | | <p>Potential rural land (currently owned by Coffs Harbour City Council as part of the sewage treatment plant site) and rural properties located to the west of the existing highway and to the north of Wedding Bells State Forest would be impacted by these options, as a result of land acquisition.</p> <p>These options involve the strip acquisition from Wedding Bells State Forest, and may impact on productive forest management zones.</p> | |

| Section A | | | | |
|--|--|--------------|---|---------------|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| Environmental | | | | |
| Wetlands | <p>All options avoid the mapped SEPP 14 wetlands in the vicinity, which are located to the east, and downstream of, the existing highway.</p> <p>The mapped SEPP 14 wetland immediately south of Corindi Beach extends close to the eastern edge of the existing highway.</p> <p>There are also known estuarine wetlands in the area, including those associated with Arrawarra Creek and Arrawarra Gully, downstream of the existing highway.</p> | | | |
| Water Quality | <p>Waterway Crossings: Arrawarra Creek and Arrawarra Gully drain into a downstream SEPP 14 wetland, and then into the Solitary Islands Marine Park. No adverse water quality impacts have been envisaged to occur provided the RTA standard management measures are applied during both construction and operation. The proximity of SEPP 14 wetlands would require the application of specific management measures.</p> | | | |
| Native Flora | <p>Key Vegetation Communities: Forest ecosystems (as mapped by the NPWS Comprehensive Regional Assessment (CRA)) identified as within the route corridor with high conservation value include: Swamp Oak.</p> | | <p>Key Vegetation Communities: Forest ecosystems (as mapped by CRA) identified as within the route corridor with high conservation value include: Swamp Oak and Wet Flooded Gum-Tallowwood.</p> | |
| | <p>NPWS Reserves: None present within this section.</p> | | | |
| | <p>State Forests: These options are not expected to require any vegetation clearance within Wedding Bells State Forest.</p> | | <p>State Forests: These options would involve vegetation clearance along the eastern edge of Wedding Bells State Forest.</p> | |
| | <p>Vegetation Clearing: These options would involve clearing of vegetation to the west of the existing highway for the width of one new carriageway. This clearing would be within the existing road corridor.</p> | | <p>Vegetation Clearing: These options would involve clearing of vegetation to the west of the existing highway for the full width of two new carriageways. This would include some clearing in Wedding Bells State Forest.</p> | |
| | <p>Potential Endangered Ecological Communities: Much of the low lying vegetation in this area on both sides of the existing highway is dominated by Melaleuca species which is considered likely to be a listed endangered ecological community.</p> | | | |
| | <p>Possible Threatened Species Present: Swamp orchid (<i>Phaius australis</i>).</p> | | | |

| Section A | | | | |
|--|--|--------------|---|---|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| | Confirmed Threatened Species Sighted Within Option Corridor (250 metres wide): Nil. | | | |
| | Approximate total area of vegetation clearing is 22 ha. | | Approximate total area of vegetation clearing is 27 ha. | Approximate total area of vegetation clearing is 30 ha. |
| | Approximate area of clearing of potential endangered ecological communities is 22 ha. | | Approximate area of clearing of potential endangered ecological communities is 27 ha. | Approximate area of clearing of potential endangered ecological communities is 30 ha. |
| | Approximate area of clearing of high conservation value vegetation community is 0.5 ha. | | Approximate area of clearing of high conservation value vegetation community is 0.5 ha. | Approximate area of clearing of high conservation value vegetation community is 0.5 ha. |
| Native Fauna | NPWS Designated Wildlife Corridors: None affected. | | | |
| | NPWS Designated Key Habitats: None affected. | | | |
| | Other Habitats: Wetland communities and estuarine wetlands. Secondary koala habitat, as mapped (within the boundaries of the Coffs Harbour City LEP 2000 only) by Coffs Harbour City Council occurs generally throughout this section on the eastern edge of the existing highway. | | | |
| | Possible Threatened Species Present: Glossy black cockatoo, black-necked stork, osprey, square-tailed kite, powerful owl, grass owl, koala, squirrel glider, spotted-tailed quoll, grey-headed flying-fox, little bent-wing bat, hoary wattled bat, common blossom bat, variety of insectivorous bats, wallum froglet and eastern chestnut mouse. | | | |
| | Confirmed Threatened Species Sighted Within Option Corridor (250 metres wide): Nil. | | | |

Table 5.3 Route Option Characteristics – Section B

| Section B | | | | |
|---|---|---------------------|---|----------------------|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| Engineering and Operational | | | | |
| Cross Section of New Highway | <p>Shoulder widths to be increased to 2.5 metres (with no barrier) and three metres with barrier. Existing widths range between one and two metres.</p> <p>Carriageway crossfall is to be modified to 3%, existing is generally 2% to 3%.</p> <p>The realignment from Coral Street to Corindi is essential given the poor existing geometry and flooding history. Two new carriageways will be constructed in this area.</p> <p>Regrading of the existing alignment is required from Corindi to the end of Section B.</p> <p>New bridges or major drainage culverts required at Corindi River, Blackadder Gully and Cassons Creek.</p> | | <p>Orange option follows a new alignment to the west of the existing highway.</p> <p>Under this option, the existing highway would remain largely in its present condition for use as a local access road.</p> | |
| Access Rationalisation | <p>There are currently 25 accesses along Section B.</p> <p>Initially, the eight public road intersections in addition to the private roads and driveways may be converted to left in / left out only. Ultimately all access to the highway would be via local access roads to a grade separated interchange.</p> <p>Interchange options in Section B include the extension of Coral Street and Kangaroo Trail Road at Corindi Beach, as the existing cutting on the highway is a suitable location for such an interchange.</p> <p>Initially, the crossroad intersection at Corindi may need to be converted to left in / left out on both sides of the highway to maintain safety.</p> | | <p>All existing accesses would be retained in the Orange option with the existing highway retained as a local access road.</p> <p>The Orange option also provides the possibility for a consolidated Sapphire to Woolgoolga / Corindi Beach interchange to be located between Upper Corindi Road and Kangaroo Trail Road.</p> | |

| Section B | | | | |
|---|---|---|---|---|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| | <p>A new three kilometre western access road may be required between Corindi and the foot of the Dirty Creek Range.</p> <p>A new 1.5 km eastern local access road north of Corindi may be required.</p> | <p>The existing highway to the north of Coral Street would be retained as a local access road for the residents of Corindi.</p> <p>The new cross-drainage bridge (essentially relocated Blackadder Gully bridge) on the Corindi floodplain could be utilised as an underpass for the local access road.</p> | <p>The Purple option allows for the rationalisation of intersections and private accesses south of Corindi.</p> <p>A new three kilometre western access road may be required between Corindi and the foot of the Dirty Creek Range.</p> <p>A new 1.6 km eastern access road may be required at Corindi.</p> | |
| Constructability | <p>Poor due to the significant portions of reconstruction on the existing alignment.</p> <p>High potential for impact on public utility plant.</p> | <p>Reasonable as a large proportion of the new construction would be separate to the existing highway.</p> <p>Moderate potential for impact on public utility plant.</p> <p>New alignment across Corindi floodplain may require preload embankments for soft soil conditions. Given this is away from the existing highway there will be minimal impact on through traffic during construction.</p> | <p>To the north of Corindi, this option presents traffic management issues, as the existing highway is reconstructed.</p> <p>Skew on Blackadder Gully bridge may present a less than optimum construction solution.</p> | <p>Good as constructed separate to the existing highway.</p> <p>Minimal impact on public utilities plant, apart from fibre optic cable crossings.</p> |

| Section B | | | | |
|---|---|--|--|---|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| Geotechnical | <p>Alluvial soils will impact on embankment design (slopes no steeper than 2H:1V) and trafficability (bridging layers are expected). The extent and depth of alluvial soils will be greater in the east of the study area. Settlement of the new carriageway due to the alluvial soft soils would require specialist construction techniques. Residual soil gullies would incorporate conventional embankment construction for the embankment heights expected of less than two metres.</p> <p>Rock cuttings are expected to be of shallow depth (less than three metres). Existing cuttings are performing adequately at batter angles of around 45° (1H:1V). Localised instability may require stabilisation including small scale slumping of weathered materials and localised toppling failures.</p> <p>Acid sulphate soils are expected with high risk identified in the east of the study area and low risk in the west.</p> <p>The existing carriageway may be impacted by the settlement of the new carriageway at the start of this section initiating heaving. The widening of the median from that detailed in the typical cross-section may be required to reduce this effect.</p> | | | |
| Public Utilities | <p>Telecommunications: Telstra optic fibre adjacent to the existing highway may require either protection and minor relocations, or full relocations, depending on final detail design. An exchange would also require protection.</p> | <p>Telecommunications: The length of Telstra optic fibre adjacent to the alignment is approximately two kilometres. However, various road crossings and parallel lines underneath batter slopes and carriageways would require protection, as well as the exchange.</p> | <p>Telecommunications: The length of Telstra optic fibre adjacent to the alignment is approximately 1.5 km. However, various road crossings and parallel lines underneath batter slopes and carriageways would require protection, as well as the exchange.</p> | <p>Telecommunications: This option crosses the Telstra optic fibre in five locations and would require protection. The exchange would require either protection or relocation.</p> |

| Section B | | | | |
|--|--|--|--|---|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| | <p>Electrical Infrastructure: Overhead powerlines run adjacent to the western side of the highway, and cross the Pacific Highway six times within this section. Relocations would be required.</p> | <p>Electrical Infrastructure: The length of overhead powerlines adjacent to the carriageway is reduced, and there is an additional crossing of 11kV powerlines. Relocations would be required.</p> | <p>Electrical Infrastructure: The length of overhead powerlines adjacent to the carriageway is reduced in this option by approximately one kilometre when compared to the Blue option. Relocations would be required, which includes the relocation of two pole mounted sub-stations.</p> | <p>Electrical Infrastructure: The length of overhead powerlines adjacent to the carriageway is reduced in this option to approximately 500 metres, and there are three crossings of 11kV lines. Relocations would be required.</p> |
| | <p>Water Services: A 100 mm diameter water main runs from the intersection of Blackadder Road to the intersection of Coral Street, a distance of approximately one kilometre. Relocations would be required. A 300 mm diameter water main runs in an eastwest direction from Tasman Street to the Corindi Reservoir located on Kangaroo Trail Road.</p> | <p>Water Services: Water relocations are the same as the Blue option in terms of the highway crossing at Coral Street, with the addition of the relocation of a crossing through Blackadder Road.</p> | <p>Water Services: A 100 mm diameter water main runs from the intersection of Blackadder Road to the intersection of Coral Street, a distance of approximately one kilometre. Relocations would be required. A 300 mm diameter water main runs in an eastwest direction from Tasman Street to the Corindi Reservoir located on Kangaroo Trail Road.</p> | <p>Water and Sewerage Services: This option does not impact upon water and sewerage infrastructure within this section.</p> |

| Section B | | | | |
|---|--|--|--|--|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| | <p>Sewerage Services: A 150 mm sewer rising main crosses the highway in an eastwest direction at Tasman Street, Corindi. This rising main connects Corindi to the Sewerage Treatment Plant, which is located down Kangaroo Trail Road.</p> | | <p>Sewerage Services: A 150 mm sewer rising main crosses the highway in an eastwest direction at Tasman Street, Corindi. This rising main connects Corindi to the Sewerage Treatment Plant.</p> | |
| Road User Delay (Construction) | <p>The majority of Section B will require construction under traffic. Therefore road user delay during construction may be considerable.</p> | <p>Construction under traffic would be required from the start of Section B to Coral Street. Therefore road user delay during construction may be considerable in this area.</p> | <p>Construction of two new carriageways from Tasman Street. Approximately 800 metres north of Corindi would be constructed away from traffic.</p> | <p>Entire length of Section B, including preloading of embankments, would be constructed away from traffic, therefore minimal impact on road users should occur during construction.</p> |
| | <p>Duplication of the existing highway from north of Corindi to the end of Section B requires construction under traffic. This may result in high road user delay in this area.</p> | | | |
| Road User Delay (Operation) | <p>Currently through traffic represents approximately a third of all vehicles within Section B. The proportion of heavy vehicles at night can almost double that of during the day.</p> <p>Section B had a level of service (LoS) D in 2004. Assuming that no upgrading were to occur; LoS E will be experienced at 2016 and LoS F at 2036. LoS F means that the highway will experience serious queuing and delays as it will be operating over capacity.</p> | | | <p>Local traffic would be separated from through traffic as the existing highway would remain over the length of Section B as a local access road.</p> <p>Shorter alignment would reduce travel times.</p> |
| Level of Service (Intersections) | <p>Current traffic conditions for Coral Street indicate that the intersection operates satisfactorily at LoS C. The Coral Street leg will most likely experience increased traffic congestion as the Corindi Beach area develops.</p> <p>Projected increases indicate that in 2016 and 2036 the intersection will operate at LoS F.</p> | | | <p>The existing Coral Street intersection would remain due to proposed highway alignment.</p> |

| Section B | | | | |
|---|--|--|---|---|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| Route Length | 5.6 km (130 metres shorter than existing) | 5.7 km (30 metres shorter than existing) | 5.6 km (130 metres shorter than existing) | 5.3 km (430 metres shorter than existing) |
| Hydrology (Flood Immunity) | <p>One carriageway along the existing alignment would need to be raised by up to 1.5 metres to achieve 20% flood immunity.</p> <p>A new waterway structure would be required at Corindi floodplain to mitigate the impact of the raised alignment.</p> | The new alignment would be located further downstream across the Corindi floodplain than the existing highway alignment. This is expected to reduce the upstream impact of raising the road and hence be a smaller impact than the raising of the road along the existing alignment. | | This option is located further upstream, hence reduced flooding impact and less bridging or raising required. |
| Economic | | | | |
| Vehicle Operating Cost (Heavy Vehicles) | Section B does not contain any notable grades that will adversely impact on operating costs. | | | |
| Economic Development | Based on discussions with Coffs Harbour City Council and a review of relevant planning instruments, there are no plans for significant economic development in this section. | | | |
| Economic Impact | Potential to increase road user awareness of Corindi Beach and Red Rock through improved signage where appropriate and access provided by a possible grade separated interchange. | | | |
| | Possible loss of potential agricultural productivity of rural properties predominantly at Blackadder Gully. | Possible loss of potential agricultural productivity from rural properties located at Blackadder Gully and to the east of Corindi and the existing highway generally including the orchards in Blackadder Road and the small blueberry farm north of Corindi. | | Large loss of potential agricultural productivity from rural properties located to the west of Corindi including the horticultural operation west of the existing highway north of Corindi. Potential severance of a number of affected properties. |

| Section B | | | | |
|---|--|--|---|--|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| Cost to Construct | | | | |
| Class A (\$M) | 115 | 105 | 95 | 100 |
| Class M (\$M) | 135 | 130 | 110 | 100 |
| Use of Existing Road Reserve | Re-use of existing highway as one carriageway where duplication occurs (between Tasman Street and Coral Street). | Re-use of existing highway as one carriageway where duplication occurs (between Tasman Street and Coral Street). The existing highway is utilised from Coral Street to the north of Corindi as a local access road. | Good use of the existing highway either as a carriageway in the duplication (from north of Corindi) or as a local access road where realignment is to occur (from Tasman Street to north of Corindi). | The existing highway, including all bridges, is retained as a local access road over the full length of Section B. |
| Ease of Upgrade | The duplication of the existing highway will require construction under traffic. | Duplication of the existing highway, and hence construction under traffic, occurs between the start of Section B and Coral Street. | If upgraded to Class A initially, construction will occur under traffic except for the realignment between Coral Street and approximately 800 metres north of Corindi. If upgraded to Class M initially construction under traffic will only occur from approximately 800 metres north of Corindi. | Construction of new alignment would occur away from traffic. |

| Section B | | | | |
|---|---|--|---|----------------------|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| Staging | Section B can be built in its entirety independently of the other sections. The realignment between Coral Street and Corindi can be constructed independently to the duplication of the remainder of Section B. | Section B can be constructed independently to the other sections. The duplication to Coral Street can also be constructed independently to the new alignment north of Corindi that in turn can be constructed independently to the realignment for the remainder of Section B. | Section B can be constructed independently from the other sections. Construction of the highway within Section B cannot be staged. | |
| Community | | | | |
| Vehicular Access | Improved access to Corindi Beach provided by possible grade separated interchange. Improved safety of access provided at all intersections with the upgraded highway. Likely changed general access arrangements during construction and operation. | Accessibility impacts at Blackadder Gully and generally for those properties east of the existing highway around Corindi during construction. Potential use of parts of the existing highway as a local access road, allowing some private accesses and intersections to be retained, including possible connection directly to Coral Street. This may involve local traffic being directed through Corindi Beach to access the upgraded highway. | Accessibility impacts for properties generally to the west of this option during construction. The existing highway is utilised in full as a local access road, allowing private accesses and intersections to be retained, and avoids any redirection of local traffic through Corindi Beach. | |

| Section B | | | | |
|---|---|---|---|--|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| Community Severance/Consolidation | Possible grade separated interchange would improve connection between Kangaroo Trail Road residents and Corindi Beach. | | | |
| | Likely increased severance of residences within and immediately surrounding Corindi. | Likely improved community cohesion within and between Corindi, Blackadder Gully and Corindi Beach. | | |
| | | Potential perceived isolation of properties located east of these options from Corindi, particularly for those in Blackadder Road. | | |
| Noise Impact | The total number of potential receivers in this section within 500 metres of the existing highway is 149. | | | |
| | <p>The total number of potential receivers within 500 metres of the centreline of this option is 147.</p> <p>Distances to potential receivers from the centreline of this option are <100 metres (14), 100 metres to 200 metres (33) and 200 metres to 500 metres (100). Relative to the existing highway this is very similar with a slight reduction in the number of potential receivers within 100 metres.</p> | <p>The total number of potential receivers within 500 metres of the centreline of this option is 144.</p> <p>Distances to potential receivers from the centreline of this option are <100 metres (7), 100 metres to 200 metres (29) and 200 metres to 500 metres (108). Relative to the existing highway this represents a significant reduction in the number of potential receivers within 100 metres.</p> | <p>The total number of potential receivers within 500 metres of the centreline of this option is 131.</p> <p>Distances to potential receivers from the centreline of this option are <100 metres (15), 100 metres to 200 metres (19) and 200 metres to 500 metres (97). Relative to the existing highway this is similar with a slight reduction in the number of potential receivers within 100 metres, and a moderate reduction within 200 metres.</p> | <p>The total number of potential receivers within 500 metres of the centreline of this option is 42.</p> <p>Distances to potential receivers from the centreline of this option are <100 metres (9), 100 metres to 200 metres (5) and 200 metres to 500 metres (28). Relative to the existing highway this represents a significant reduction in the number of potential receivers within 100 metres.</p> |

| Section B | | | | |
|---|--|--|--|---|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| | The majority (145) of potential receivers are expected to be subject to the “Redeveloped Highway” criteria, with two likely to be subject to the “New Highway” criteria. | The majority (114) of potential receivers are expected to be subject to the “Redeveloped Highway” criteria, with 30 likely to be subject to the “New Highway” criteria. | The majority (95) of potential receivers are expected to be subject to the “Redeveloped Highway” criteria, with 36 likely to be subject to the “New Highway” criteria. | All of the potential receivers are expected to be subject to the “New Highway” criteria. |
| | The weighted noise impact (without mitigation) score for the existing highway in this section is 147. | | | |
| | The weighted noise impact (without mitigation) score for this option is 142, indicating a similar noise impact relative to the existing highway. | The weighted noise impact (without mitigation) score for this option is 136, indicating a similar noise impact relative to the existing highway. | The weighted noise impact (without mitigation) score for this option is 140, indicating a similar noise impact relative to the existing highway. | The weighted noise impact (without mitigation) score for this option is 69, indicating a significantly lower noise impact relative to the existing highway. |
| Property Impact – Number of Properties Affected | 41 | 33 | 38 | 21 |
| Property Impact – Approximate Area Affected (ha) | 23.4 | 28.5 | 27.7 | 52.5 |
| Property Impact – Description of Properties Affected | A number of rural residential properties throughout this section would require varying degrees of acquisition. | Varying degrees of acquisition of residential properties on the western edge of Corindi Beach associated with possible grade separated interchange. Acquisition impacts to rural residential properties and strip acquisition of rural properties on Corindi River floodplain and to the east of Corindi. | | Acquisition, severance and amenity impacts to rural residential properties located on the Corindi River floodplain. |

| Section B | | | | |
|---|--|---|--|--|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| | Strip acquisition of rural properties, particularly between Corindi Beach and Corindi. | | Potential loss of some dwellings in Blackadder Road on the eastern side of the existing highway. | |
| Amenity – Bus Access | <p>Under a Class A scenario, the provision of bus stops and access arrangements for buses would generally remain the same as existing. However, the provision of improved clear zones and possibly designated bus bays should improve the current situation.</p> <p>Under a Class M scenario, no bus stops would be provided on the upgraded highway. Local bus routes and bus stops would be provided via local access roads.</p> | | | Existing bus stops would be retained on the existing highway as it would become a local access road. |
| Amenity – Pedestrian and Cyclist Access | <p>For safety reasons, pedestrian access across the upgraded highway would be limited under a Class A scenario and banned under a Class M scenario. Cyclists would be permitted to use the left hand shoulder on the upgraded highway. Pedestrian needs will be further assessed following selection of the preferred route.</p> <p>Continued severance of Corindi would restrict any pedestrian or cyclist movements across the upgraded highway.</p> | | Pedestrian and cyclist amenity within the village of Corindi will be improved. | |
| | | | | Proposed pedestrian facilities over the highway between Coral Street and Kangaroo Trail Road if possible Corindi Beach interchange location adopted. Further assessment in preferred route phase of the project. |
| Visual Amenity | <p>The possible Corindi Beach grade separated interchange would be a prominent feature. The potential change to the landscape would depend on the interchange location, design and associated landscape treatments.</p> <p>The upgraded highway would be a prominent visual feature at Corindi, where this option continues the existing highway configuration, bisecting this village.</p> | <p>These options would be less prominent (than the existing highway) from Corindi and would no longer bisect the village.</p> | | This option is located to the west of Corindi and therefore not visually prominent from the village. |

| Section B | | | | |
|---|---|--|---|--|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| | <p>The landscape character is primarily flat pastureland associated with the floodplain of Corindi River and the village of Corindi.</p> <p>Some clearing to widen the existing corridor would be required along the existing highway alignment.</p> | <p>These options would result in landscape impacts by creating a new cleared corridor through the forested area immediately north east of Corindi, and widening of the existing cleared corridor on the eastern side towards the end of the section.</p> <p>Overall visual impact likely to be reduced by achieving separation from Corindi.</p> | | <p>The adjacent landscape is a mosaic of woodland and pastureland. Sporadic clearing would be required, most noticeably in the woodland area west and southwest of Corindi.</p> <p>As this option deviates substantially from the existing highway alignment, it has potential to result in new visual disturbance in the landscape through which it passes.</p> |
| Indigenous Heritage | <p>There are no known listed indigenous heritage items within or in the immediate proximity of these options.</p> | | | |
| | <p>Artefacts have been recorded adjacent to these options on a hill-slope bordered by Corindi River and Coral Street, which are not listed on the DEC State heritage register.</p> | | <p>There are no known listed indigenous heritage items within this option. However, artefacts from site #22-1-0076 may extend to within close proximity of this option.</p> | |
| | <p>The entire coastal zone is an area of high heritage potential, particularly in undisturbed areas, around watercourses and swamps. Midden sites have potential to occur in association with present or remnant water sources in the coastal zone. The potential also exists for sites within older sediment deposits of the Corindi River floodplain.</p> | | | |
| | <p>The entire area generally encompassed by the study area boundaries, Corindi and Corindi Beach, is an area of high cultural sensitivity to the local Aboriginal community. Sensitive sites within this area include a massacre site, burials, corridors of movement, campsites, and sacred men's and women's sites and story places.</p> | | | |

| Section B | | | | |
|--|---|--|--|--|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| | These options would traverse or pass along the edge of a number of these sensitive sites, generally in the vicinity of the existing highway alignment. | | | The area traversed by this option north of Kangaroo Trail Road to the Corindi River contains an area of known burials. |
| Non-Indigenous Heritage | There are no known listed non-indigenous heritage items within or in the immediate proximity of these options. Potential historical relics include those relating to the themes of timber cutting, farming, transport and social / communal. | | | |
| | Two sets of ruins marked on topographic mapping north of Redbank Creek and between Redbank and Cassons Creeks on the eastern side of the existing highway may be impacted by this option. | These options may impact on a set of ruins marked on topographic mapping north of Redbank Creek on the eastern side of the existing highway. | | |
| Land Use – Statutory Planning | Ulmarra LEP 1992: Within the boundaries of the Ulmarra LEP 1992 these options pass through or immediately adjacent to land zoned 1(a) (General Rural Zone) and 1(e) (Rural 'E' (Urban Investigation) Zone). Subject to concept design and the location of the possible grade separated interchange for Corindi Beach, this option may also affect land zoned 2 (Village Zone). | | Ulmarra LEP 1992: Within the boundaries of the Ulmarra LEP 1992 this option passes through or immediately adjacent to land zoned 1(a) (General Rural Zone). Subject to concept design and the location of the possible grade separated interchange for Corindi Beach, this option may also affect other land zones. | |
| Summary of Statutory Position: Pending clarification of the application of the new State planning reforms within this section, these options would be potentially prohibited unless Coffs Harbour City Council decides that the project is consistent with one or more of the objectives of the affected zones. | | | | |

| Section B | | | | |
|---|--|---|----------------------|---|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| Land Use – Residential | It is understood that Coffs Harbour City Council, as part of an ongoing review of their urban development strategy, may identify areas in the vicinity of Corindi Beach for further urban investigation. | | | |
| | Adjacent residences are located in the villages of Corindi Beach and Corindi, and scattered rural residences. | | | Adjacent residences are located in Kangaroo Trail Road and scattered rural residential properties. |
| | The possible Corindi Beach grade separated interchange, which may be located at the start of this section, may impact on residences in the vicinity. | | | |
| | This option may impact on the dwellings located closest to the existing highway within Corindi. | These options may impact on rural residential properties in Blackadder Road. | | Impacts on rural residential properties on Kangaroo Trail Road, but no impact on Corindi Beach or Corindi residential properties. |
| Land Use – Productive Land | The Corindi River floodplain has been identified as containing some of the better quality agricultural land within the study area. All options would most likely require varying degrees of acquisition from rural properties, and may result in severance of some properties where options deviate from the existing highway. | | | |
| | These options would involve acquisition and severance of rural properties west of the existing highway near Blackadder Gully. | | | |
| | Minimises impact on rural land as option generally follows the existing highway. | These options would involve acquisition and severance of rural properties where they deviate east of the existing highway around Corindi, including the orchards in Blackadder Road, and small blueberry farm north of Corindi. | | Acquisition and severance of rural properties for the length of the section, including horticultural land north of Corindi on the western side of the existing highway. |

| Section B | | | | |
|--|--|--|--|--|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| Environmental | | | | |
| Wetlands | Two mapped SEPP 14 wetlands occur downstream of the existing highway to the north of Corindi Beach, the nearest of which is approximately 1.5 km northeast of the existing highway. The SEPP 14 wetland located south of Corindi Beach is also located at the start of this section. None of these options would directly impact on these areas. | | | |
| Water Quality | <p>Waterway Crossings: Corindi River, Blackadder Gully, Cassons Creek and two unnamed creeks.</p> <p>All creeks within this section drain into the Yuraygir National Park and areas of SEPP 14 wetlands, and then via the Corindi River drain into the Solitary Islands Marine Park.</p> <p>The Corindi River is considered likely to be a Class 1 or 2 fish habitat (NSW Fisheries) indicating a bridge is the preferred means of crossing.</p> <p>No adverse water quality impacts have been envisaged to occur provided RTA standard management measures are applied during construction and operation.</p> <p>The proximity of SEPP 14 wetlands near Corindi Beach would require application of specific management measures.</p> | | | |
| Native Flora | <p>Key Vegetation Communities: Forest ecosystems (as mapped by the NPWS Comprehensive Regional Assessment (CRA)) identified as within the route corridor with high conservation value include: Wet Flooded Gum-Tallowwood.</p> | <p>Key Vegetation Communities: Forest ecosystems (as mapped by CRA) identified as within the route corridor with high conservation value include: Swamp Oak and Wet Flooded Gum-Tallowwood.</p> | <p>Key Vegetation Communities: Forest ecosystems (as mapped by CRA) identified as within the route corridor with high conservation value include: Wet Flooded Gum-Tallowwood.</p> | <p>Key Vegetation Communities: Forest ecosystems (as mapped by CRA) identified as within the route corridor with high conservation value include: Swamp Oak and Wet Flooded Gum-Tallowwood.</p> |
| | NPWS Reserves: None present in this section. | | | |
| | State Forests: None present in this section. | | | |

| Section B | | | | |
|---|--|--|---|--|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| | <p>Vegetation Clearing: Clearing is generally limited to widening of existing corridor for the width of one new carriageway.</p> | <p>Vegetation Clearing: The Green and Purple options are generally the same as the Blue option as far as Corindi River. Thereafter, clearing of remnant isolated trees until Corindi. There are likely to be small patches of floodplain wetlands and floodplain forests associated with Cassons Creek. North of Corindi clearing for the full width of two carriageways is required.</p> | | <p>Vegetation Clearing: Where this option passes through forest, clearing for the full width of two carriageways would be required.</p> |
| | <p>Potential Endangered Ecological Communities: None affected.</p> | <p>Potential Endangered Ecological Communities: Low-lying areas of Swamp Oak are considered likely to be listed as endangered ecological communities.</p> | <p>Potential Endangered Ecological Communities: None affected.</p> | <p>Potential Endangered Ecological Communities: Low-lying areas of Swamp Oak are considered likely to be listed as endangered ecological communities.</p> |
| | <p>Possible Threatened Species Present: None known.</p> | | | |
| | <p>Confirmed Threatened Species Sighted Within Option Corridor (250 metres wide): Nil.</p> | | | |
| | <p>Approximate total area of vegetation clearing is 8 ha.</p> <p>Approximate area of clearing of high conservation value vegetation community is 0.5 ha.</p> | <p>Approximate total area of vegetation clearing is 12 ha.</p> <p>Approximate area of clearing of high conservation value vegetation community is 0.5 ha.</p> | <p>Approximate total area of vegetation clearing is 9 ha.</p> <p>Approximate area of clearing of high conservation value vegetation community is nil.</p> | <p>Approximate total area of vegetation clearing is 18 ha.</p> <p>Approximate area of clearing of high conservation value vegetation community is 1.5 ha.</p> |

| Section B | | | | |
|--|---|---|--|---|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| Native Fauna | <p>NPWS Designated Wildlife Corridors: This section passes through the “Dirty Creek Subregional Corridor” (approximately 800 metres wide) and the “Corindi River Subregional Corridor” (approximately one kilometre wide). The end of the section occurs within the latter corridor.</p> | | | |
| | <p>These options would involve widening of the existing cleared corridor through both of these wildlife corridors.</p> | | <p>This option would involve widening of the existing cleared corridor through the “Corindi River Subregional Corridor” and creation of a new cleared corridor through the “Dirty Creek Subregional Corridor.”</p> | |
| | <p>NPWS Designated Key Habitats: None affected.</p> | | | |
| | <p>Other Habitats: These options pass through the floodplains of Corindi River and Redbank Creek. These areas contain strips of remnant vegetation of various widths that could provide habitat and a movement corridor for a number of species of threatened fauna. Isolated habitat trees within cleared farmland could provide potential roost sites for threatened bats.</p> | | | |
| | <p>Possible Threatened Species: Known or potential habitat occurs for the following threatened fauna species: the black-necked stork, brolga, osprey, square-tailed kite, grey-headed flying-fox, little bent-wing bat, hoary wattled bat, southern myotis, east-coast freetail-bat and yellow-bellied sheath-tail-bat.</p> | | | |
| | <p>Confirmed Threatened Species Sighted Within Option Corridor (250 metres wide): Black-necked stork (1) and brolga (3).</p> | <p>Confirmed Threatened Species Sighted Within Option Corridor (250 metres wide): Black-necked stork (1), brolga (2) and square-tailed kite (1).</p> | <p>Confirmed Threatened Species Sighted Within Option Corridor (250 metres wide): Black-necked stork (1) and brolga (3).</p> | <p>Confirmed Threatened Species Sighted Within Option Corridor (250 metres wide): Black-necked stork (2) and osprey (1).</p> |

Table 5.4 Route Option Characteristics – Section C

| Section C | | | | |
|---|---|--|---|----------------------|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| Engineering and Operational | | | | |
| Cross Section of New Highway | <p>Shoulder widths to be increased to 2.5 metres with no barrier and three metres with barrier. Existing widths range between one metre and two metres.</p> <p>Carriageway crossfall is to be modified to 3%, existing is generally 2% to 3%.</p> <p>The horizontal and vertical curves are deficient in this section, therefore the upgrade will require the realignment of the existing highway from Barcoongere Way to the top of Dirty Creek Range.</p> <p>The longitudinal grade up the Dirty Creek Range is to be modified to a maximum of 6%. The existing highway has a maximum longitudinal grade of 7%.</p> | | | |
| | <p>The Blue option includes realignment south then north of the existing highway to cross Dirty Creek Range near a lowpoint / saddle.</p> | <p>The Green option would include realignment to the west of the 190 metre highpoint within Dirty Creek Range, minimising longitudinal grades and length of the section.</p> | <p>Purple option and Orange option follows a new alignment to the west of the existing to a point 600 metres north of Range Road where it rejoins the existing highway. Therefore limited upgrade of the existing highway is required.</p> <p>The deficiencies of the existing highway alignment are the same as the Blue option.</p> | |
| | <p>It is envisaged that the existing highway will remain largely in its present condition for use as a local access road with the exception of the northern end of the section.</p> | | | |

| Section C | | | | |
|---|--|--|--|----------------------|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| Access Rationalisation | <p>There are currently 11 accesses along Section C.</p> <p>Initially, the four public road intersections in addition to the private roads and driveways may be converted to left in / left out only. Initially, an option for access rationalisation at the base of Dirty Creek Range is to combine Dirty Creek Road and Barcoongere Way intersections with a new 600 metre local access road.</p> | <p>Most of the 11 accesses will remain in their current form as the existing highway will be retained as a local access road between the vicinity of Barcoongere Way and Falconers Lane.</p> | <p>Most of the 11 accesses would remain in their current form as the existing highway will be retained as a local access road between the start of Section C and approximately 300 metres south of Range Road.</p> <p>Range Road would cross above the new highway and connect to the existing highway which would become a local access road.</p> | |
| | <p>Ultimately all access to the highway would be via a grade separated interchange. The likely location for an interchange is at the bottom of Dirty Creek Range. This is a suitable location for heavy vehicles from Barcoongere Way and the adjacent quarry to access the highway and for Yuraygir National Park users.</p> | | | |
| Constructability | <p>Constructability of this option is poor due to the lengths requiring reconstruction and traffic switches at three locations.</p> | <p>Constructability of this option is reasonable as a large proportion of the new construction is separate to the existing highway carriageway.</p> | <p>Constructability of the Purple option and Orange option is poor at top of Dirty Creek Range due to portions of existing highway requiring reconstruction.</p> | |
| | <p>Up to 20 metres cuts and fills on Dirty Creek Range.</p> <p>Potential impact on public utility plant.</p> | <p>This alignment requires cuts of up to 40 metres depth through the range, which will require consideration of cutting instability.</p> | <p>Up to 22 metre cuts and shallower fills.</p> | |

| Section C | | | | |
|--|--|---|---|---------------|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| Geotechnical | <p>There are some high fill embankments in excess of five metres and a number of smaller embankments that will traverse residual soil gullies. Some embankment foundation preparation may be required to remove shallow colluvium that could be subject to instability and soil creep. An embankment slope angle of no steeper than 2H:1V should be considered.</p> <p>Minor drainage depressions within this section may contain some localised waterlogged ground. However, bridging layers are not expected to be required in this section.</p> | | | |
| | <p>Rock cuttings generally less than 10 metres. The major rock cutting of some 25 metres depth is located within the Lower Marburg formation. The geological structure within this unit provides a potential mechanism for large-scale rock cutting instability. Localised instability in the form of undercutting, ravelling and sliding associated with the presence of erodible siltstone seams is expected.</p> | <p>This option generally encounters cuts of less than 10 metres. A major cut of up to 35 metres depth will be encountered within the Lower Marburg formation. The geological structure within this unit provides a potential mechanism for large-scale rock cutting instability. Localised instability in the form of undercutting, ravelling and sliding associated with the presence of erodible siltstone seams is expected.</p> | <p>The route includes three cuttings from 10 metres to 22 metres height located within the generally more competent Corindi Conglomerate unit.</p> <p>Excavations within the quarry adjacent to the route within the Corindi Conglomerate unit includes subvertical cut batters to 40 to 50 metres. These excavations indicate minimal rock mass instability with the exception of small scale fretting and erosion of siltstone beds.</p> <p>A number of shallower cuttings (<10 metres) located within the Lower Marburg Formation will encounter inclined bedding within a jointed rock mass. The combination of these geological structures provides a potential mechanism for large-scale rock cutting instability.</p> <p>Cuttings in this section can expect localised instability in the form of undercutting, ravelling and sliding associated with the presence of erodible siltstone seams.</p> | |

| Section C | | | | |
|--|--|---|---|---------------|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| Public Utilities | <p>Telecommunications: This option crosses the Telstra optic fibre in five locations and this infrastructure would require protection or relocation.</p> <p>Electrical Infrastructure: The 11kV overhead line which runs generally up the old Pacific Highway route through Dirty Creek Range would be affected by the southern end of this option. Pole relocations required.</p> | <p>Telecommunications: The length of Telstra optic fibre adjacent to the alignment is approximately 1.5 km in length. Approximately one kilometre of adjacent line would require protection and 400 metres requiring relocation. Various crossings would require protection or relocation.</p> <p>Electrical Infrastructure: Overhead powerlines run adjacent to the western side of the highway, and cross the highway. Relocations would be required.</p> | <p>Telecommunications: The length of Telstra optic fibre adjacent to the alignment is approximately 1.5 km in length.</p> <p>Electrical Infrastructure: Overhead powerlines run adjacent to the western side of the highway, and cross the highway. Relocations would be required.</p> | |
| | <p>Water and Sewerage Services: All options do not impact upon water and sewerage infrastructure within this section.</p> | | | |
| Road User Delay (Construction) | <p>The realignment of the existing highway between Barcoongere Way and the top of Dirty Creek Range will occur substantially within the existing road reserve. Road user delay during construction may be considerable.</p> | <p>Road user delay for this option is reasonable as a large proportion of the new construction is separate to the existing highway carriageway.</p> | <p>The majority of the Purple and Orange options would be constructed away from traffic hence road user delay during construction should be reasonable. Road user delay may be high at the northern end of the section where duplication occurs.</p> <p>The crossing of the existing highway adjacent to the blueberry farm may cause delays to road users during its construction.</p> | |

| Section C | | | | |
|---|--|---|---|---|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| Road User Delay (Operation) | <p>Section C had a level of service (LoS) D in 2004. Assuming that no upgrading were to occur, LoS E will be experienced at 2016 and LoS F at 2036. LoS F means that the highway will experience serious queuing and delays as it will be operating over capacity.</p> <p>The proportion of local traffic increases during the picking season at the blueberry farm, which employs up to 500 people during this time.</p> <p>Dirty Creek Range has an existing longitudinal grade of 7%. The climb is northbound with a fully loaded B-double currently having a speed of approximately 22 km/h at the top of the range.</p> | | | |
| | Lowest speed is 36 km/h for a B-double and 52 km/h for a semi trailer. | Lowest speed is 33 km/h for a B-double and 54 km/h for a semi trailer | Lowest speed is 33 km/h for a B-double and 54 km/h for a semi trailer | Lowest speed is 33 km/h for a B-double and 54 km/h for a semi trailer |
| | This option includes 480 metres at 5.2% and 300 metres at 4.3%. | This option includes 460 metres at 5.0% and 330 metres at 2%. | The options include 665 metres at 5% and 660 metres at 3.5%. | |
| Level of Service (Intersections) | <p>Current traffic conditions for Range Road indicate that the intersection operates satisfactorily at LoS C.</p> <p>Projected traffic increases indicate that in 2016 the intersection will operate at LoS E and in 2036 will operate at LoS F (even if upgraded to a seagull type intersection).</p> | | | |
| | | | Range Road would cross above the new highway and connect to the existing highway, which would become a local access road. | |
| Route Length | 4.4 km (430 metres shorter than existing) | 4.1 km (730 metres shorter than existing) | 4.6 km (230 metres shorter than existing) | 4.6 km (230 metres shorter than existing) |
| Hydrology (Flood Immunity) | New waterway structures would be required at Dirty Creek and at several minor watercourses. | | | |

| Section C | | | | |
|---|--|--|---|----------------------|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| Economic | | | | |
| Vehicle Operating Cost (Heavy Vehicles) | <p>The longitudinal grade up the Dirty Creek Range is to be modified to a maximum of 6%. The existing is 7% for 700 metres with overall climbing length of approximately 3.78 km.</p> <p>Range Road intersection may cause delays in the future if no upgrade occurs.</p> | | | |
| | <p>The Blue option has two climbing sections, 5.2% for 480 metres and 4.3% for 300 metres. The overall length of climb in Section C is approximately 2.4 km, however this is broken by a 400 metres length of slight decline.</p> | <p>The Green option has two climbing sections; 5% for 460 metres and 2% for 330 metres (this may be steepened to improve performance). The overall length of climbing in the Green option is 3.2 km.</p> | <p>The Purple option and Orange option have three climbing sections; 5% for 385 metres, 5% for 280 metres and 3.5% for 660 metres. The overall length of climbing in the Purple option is 3.2 km.</p> | |
| Economic Development | <p>Based on discussions with Coffs Harbour City Council and Clarence Valley Council, and a review of relevant planning instruments, there are no plans for significant economic development in this section.</p> | | | |
| Economic Impact | <p>Possible minor loss of potentially productive agricultural lands.</p> | | | |
| | <p>Likely economic impacts to Newfoundland State Forest, due to property acquisition.</p> <p>Possible impacts on operations within Barcoongere State Forest due to accessibility issues during construction.</p> <p>Possible minor tourism impacts for Yuraygir National Park as a result of accessibility changes at Barcoongere Way during construction, but improved access after construction.</p> | | <p>Possible economic impacts to blueberry farm through loss of non-horticultural land and possible restrictions on accessibility during construction.</p> | |
| Cost to Construct | | | | |
| Class A (\$M) | 45 | 55 | 50 | 50 |
| Class M (\$M) | 65 | 60 | 60 | 50 |

| Section C | | | | |
|---|---|---|---|----------------------|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| Use of Existing Reserve | Approximately half the length of the existing highway would be used as a local access road. | The majority of the length of the highway would be utilised as a local access road maximising asset re-use. | The existing highway would be utilised as a local access road for approximately half the length of the Purple option and the Orange option. | |
| Ease of Upgrade | <p>The majority of this option would require construction under traffic.</p> <p>The realignment up Dirty Creek Range including deep rock cuttings may present construction challenges including steep terrain.</p> | <p>The majority of this option would be constructed away from traffic.</p> <p>The realignment up Dirty Creek Range may present construction challenges. This option includes cuts up to 40 metres deep and fills up to 10 metres in height.</p> | Approximately half the length of these options would be constructed away from traffic. | |
| Staging | <p>Section C can be built independently to the other sections.</p> <p>Staging of construction activities within Section C may not be possible.</p> | | | |
| Community | | | | |
| Vehicular Access | <p>Likely changed general access arrangements during construction and operation. Improved safety of access provided at all intersections with upgraded highway. Possible retention of sections of existing highway as a local access road would improve safety for local traffic.</p> | | | |
| | <p>Accessibility impacts for isolated rural dwellings both at the base and top of Dirty Creek Range during construction.</p> <p>Possible accessibility impacts for logging operations and recreational users at Barcoongere Way during construction.</p> | | <p>Accessibility impacts for rural properties and large blueberry farm along Range Road during construction.</p> | |

| Section C | | | | |
|---|--|---|--|--|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| | Likely improved safety of access for vehicles, including logging trucks, using Barcoongere Way during operation. | Severance of portion of Newfoundland State Forest likely to result in access issues for forestry management activities and emergency response operations. | | |
| Community Severance/Consolidation | No substantial community severance impacts are considered likely. | | | |
| | This option may result in minor separation of isolated rural properties along Dirty Creek Road. | This option may create a barrier to movement between rural properties along Dirty Creek Road and Range Road East at the top of Dirty Creek Range. | | |
| Noise Impact | The total number of potential receivers in this section within 500 metres of the existing highway is 14. | | | |
| | The total number of potential receivers within 500 metres of the centreline of these options is 14. | | The total number of potential receivers in this section within 500 metres of the centreline of these options is six. | |
| | Distances to potential receivers from the centreline of this option are <100 metres (3), 100 metres to 200 metres (2) and 200 metres to 500 metres (9). Relative to the existing highway this is very similar with a slight increase in the number of potential receivers within 100 metres. | Distances to potential receivers from the centreline of this option are <100 metres (nil), 100 metres to 200 metres (1) and 200 metres to 500 metres (13). Relative to the existing highway this represents a significant reduction in the number of potential receivers within 200 metres. | | Distances to potential receivers from the centreline of these options are <100 metres (nil), 100 metres to 200 metres (2) and 200 metres to 500 metres (4). Relative to the existing highway this represents a significant reduction in the number of potential receivers within 200 metres. |

| Section C | | | | |
|---|--|---|----------------------|--|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| | All of the potential receivers are expected to be subject to the “New Highway” criteria. | | | |
| | The weighted noise impact (without mitigation) score for the existing highway is 17. | | | |
| | The weighted noise impact (without mitigation) score for this option is 18, indicating a similar noise impact relative to the existing highway. | The weighted noise impact (without mitigation) score for this option is 16, indicating a similar noise impact relative to the existing highway. | | The weighted noise impact (without mitigation) score for these options is six, indicating a substantially lower impact relative to the existing highway. |
| Property Impact – Number of Properties Affected | 31 | 15 | 33 | 33 |
| Property Impact – Approximate Area Affected (ha) | 28.1 | 29.3 | 35.1 | 34.8 |
| Property Impact – Description of Properties Affected | Land acquisition to varying degrees from a number of rural properties. | | | |
| | Land acquisition from the southern tip of Newfoundland State Forest. | Land acquisition and severance impacts to Newfoundland State Forest. | | Strip acquisition from the large blueberry farm operated by Blueberry Farms of Australia but is not expected to include any areas subject to production. |
| | Depending on the presence of any special values within Zone 8 of Newfoundland State Forest that may qualify these areas for classification as a special management zone (Zone 1 or Zone 2) and subject to concept design, it is possible that any area required by these options would be less than 20 ha, and that revocation could be effected by a notice in the Gazette. | | | These options would require the acquisition of the non-operational quarry at the base of Dirty Creek Range. |

| Section C | | | | |
|---|--|---|---|----------------------|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| | <p>Strip acquisition of land from a property upon which a non-operational quarry is located.</p> <p>Acquisition of land from and severance of the travelling stock reserve (TSR 47349) located at the base of Dirty Creek Range.</p> | | | |
| Amenity – Bus Access | <p>Bus stops would not be provided on the upgraded highway. Local bus routes and bus stops would be provided via local access roads.</p> | <p>The Green option, Purple option and Orange option would retain some of the existing highway as a local access road and therefore existing local bus routes and bus stops would remain.</p> <p>No provision for bus stops would be made on the new highway alignment.</p> | | |
| Amenity – Pedestrian and Cyclist Access | | <p>For safety reasons, pedestrian access across the upgraded highway would be limited under a Class A scenario and banned under a Class M. Cyclists would be permitted to use the left hand shoulder on the upgraded highway. Pedestrian needs will be further assessed following selection of the preferred route.</p> | | |
| Visual Amenity | <p>This option passes through the relatively steep forested landscape of the Dirty Creek Range. The clearing would vary, with a newly cleared corridor required where the alignment deviates from the existing highway.</p> | <p>The majority of this option is located within the steep forested landscape that characterises the Dirty Creek Range, and therefore a new cleared corridor would be created through this landscape for most of this section where the alignment deviates from the existing highway.</p> | <p>These options traverse the characteristic forested landscape of the Dirty Creek Range, but also runs along the eastern edge of the extensive blueberry farms along Range Road.</p> | |

| Section C | | | | |
|---|--|--|---|----------------------|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| | <p>A fill in excess of 10 metres and a cut in excess of 20 metres are proposed. Alternating (but less) cuts and fills would occur for the remainder of the section. These cuts and fills would be prominent features on the landscape. It would also widen the width of clearing required.</p> | <p>This option takes a relatively direct route up Dirty Creek Range. Fill embankments in excess of 10 metres high are followed by a major cut potentially 40 metres in height around the summit. A series of cut and fill embankments then occur for the remainder of the section.</p> | <p>Large amounts of cut (approximately 20 metres) and fill would be required in the crossing of Dirty Creek Range, creating a series of prominent visual features that would be primarily viewed by road users, and possibly from a small number of rural residences.</p> | |
| | <p>This cut and fill would result in a relatively large change to the landscape requiring a greater width of corridor clearance.</p> <p>Road users would constitute the largest source of potential viewers.</p> | | <p>The visual impact of clearing would be reduced somewhat by the partial location in this forest / cultivated land mosaic. A newly cleared corridor through the forest in the southern part of the section and widening of the existing cleared corridor where these options rejoin the existing highway would be required.</p> | |
| Indigenous Heritage | <p>There are no known listed indigenous heritage items within or in the immediate proximity of the options.</p> <p>High potential for stone artefacts to occur, particularly in undisturbed ground and around watercourses. Generally low potential for other types of Aboriginal objects.</p> | | | |
| Non-Indigenous Heritage | <p>There are no known listed non-indigenous heritage items within or in the immediate proximity of the options.</p> <p>Potential historical relics include those relating to the themes of timber cutting, farming and transport.</p> | | | |
| Land Use – Statutory Planning | <p>Ulmarra LEP 1992: Within the Coffs Harbour LGA these options pass through or immediately adjacent to land zoned 1(a) (General Rural Zone) and 1(f) (Rural (Forests) Zone).</p> <p>Within the Clarence Valley LGA these options pass through or immediately adjacent to land zoned 1(a) (General Rural Zone).</p> | | <p>Ulmarra LEP 1992: Within the Coffs Harbour LGA these options pass through or immediately adjacent to land zoned 1(a) (General Rural Zone) and 1(h) (Rural (Horticultural Holdings) Zone).</p> <p>Within the Clarence Valley LGA these options pass through or immediately adjacent to land zoned 1(a) (General Rural Zone).</p> | |

| Section C | | | | |
|--|---|---|---|---------------|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| | <p>Summary of Statutory Position: Pending clarification of the application of the new State planning reforms, within this section these options would be potentially prohibited unless Coffs Harbour City Council and Clarence Valley Council decide that the project is consistent with one or more of the objectives of the affected zones.</p> | | | |
| Land Use – Residential | Residential land use in this section is limited to scattered rural residential properties, which would be affected to varying degrees. | | | |
| Land Use – Productive Land | <p>This option would result in the severance of a number of rural properties and a small portion of the Newfoundland State Forest requiring acquisition of lands zoned for forestry production.</p> <p>This option would involve acquisition and severance impacts to a travelling stock reserve (TSR 47349) located at the base of Dirty Creek Range.</p> | <p>The option would result in the severance of a number of rural properties and Newfoundland State Forest requiring acquisition of lands zoned for forestry production.</p> | <p>This option would impact on rural properties to the east and west of the existing highway with minor impacts on a portion of the large blueberry farm operation in Range Road.</p> | |
| Environmental | | | | |
| Wetlands | <p>There are no mapped SEPP 14 wetlands in the vicinity.</p> <p>This option crosses several creeks but does not impact on known significant aquatic ecological habitats.</p> | | | |
| Water Quality | <p>Waterway Crossings: Dirty Creek (numerous crossings) and Dundoo Creek and their upper tributaries.</p> <p>Dirty Creek drains into the Yuraygir National Park, and then via Saltwater Creek and Corindi River into the Solitary Islands Marine Park. Construction of bridges in this section is likely to represent potential water quality issues due to steep terrain. Dundoo Creek drains to the west.</p> <p>No adverse water quality impacts have been envisaged to occur, provided RTA standard management measures are applied during both construction and operation. The steep terrain through Dirty Creek Range would most likely require water retention basins during construction. These structures would most likely be used for sedimentation basis during the operation of the road.</p> | | | |

| Section C | | | | |
|--|--|---|---|---|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| Native Flora | <p>Key Vegetation Communities: Forest ecosystems (as mapped by the NPWS Comprehensive Regional Assessment (CRA) project) identified as within the option corridor with high conservation value include: Wet Flooded Gum-Tallowwood.</p> <hr/> <p>NPWS Reserves: None present in this section.</p> <hr/> <p>State Forests: These options pass in an entirely new alignment through Newfoundland State Forest to the east of the existing highway.</p> <hr/> <p>Vegetation Clearing: All options would involve large sections of clearing for the full width of two carriageways, on new alignments, thus creating a new cleared corridor.</p> <hr/> <p>Potential Endangered Ecological Communities: None known.</p> <hr/> <p>Possible Threatened Species Present: None affected.</p> <hr/> <p>Confirmed Threatened Species Sighted Within Option Corridor (250 metres wide): Nil.</p> | <p>Key Vegetation Communities: Forest ecosystems (as mapped by CRA) identified as within the option corridor with high conservation value include: Wet Flooded Gum-Tallowwood.</p> | <p>Key Vegetation Communities: Forest ecosystems (as mapped by CRA) identified as within the option corridor with high conservation value include: Wet Flooded Gum-Tallowwood.</p> | <p>Key Vegetation Communities: Forest ecosystems (as mapped by CRA) identified as within the option corridor with high conservation value include: Wet Flooded Gum-Tallowwood.</p> |
| | <p>Approximate total area of vegetation clearing is 35 ha.</p> <p>Approximate area of clearing of high conservation value vegetation community is 0.5 ha.</p> | <p>Approximate total area of vegetation clearing is 30 ha.</p> <p>Approximate area of clearing of high conservation value vegetation community is 0.5 ha.</p> | <p>Approximate total area of vegetation clearing is 27 ha.</p> <p>Approximate area of clearing of high conservation value vegetation community is 0.5 ha.</p> | |

| Section C | | | | |
|--|--|--|--|---------------|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| Native Fauna | <p>All options commence in the “Dirty Creek Subregional Corridor”, pass through the “Lazyman Creek Subregional Corridor”, and end in the “Newfoundland – Sherwood Regional Corridor”.</p> <p>All options would generally involve widening of the existing cleared corridor through the “Dirty Creek Subregional Corridor” and the “Newfoundland – Sherwood Regional Corridor”.</p> | | | |
| | <p>This option would involve widening of the existing cleared corridor through the “Lazyman Creek Subregional Corridor”.</p> | <p>This option would involve creation of a new cleared corridor near the end of the “Lazyman Creek Subregional Corridor”.</p> | <p>This option would involve widening of the existing cleared corridor through the “Lazyman Creek Subregional Corridor”.</p> | |
| | <p>NPWS Designated Key Habitats: None affected.</p> | | | |
| | <p>Possible Threatened Species: Potential habitat occurs for the koala and yellow-bellied glider. No other threatened species records could be found for this section of the road, however, the following species could occur; the glossy black cockatoo, sooty owl, powerful owl, spotted-tailed quoll, grey-headed flying-fox, little bent-wing bat, greater broad-nosed bat, golden-tipped bat, Stephens banded snake and stuttering frog.</p> | <p>Possible Threatened Species: Potential habitat occurs for the koala and yellow-bellied glider. No other threatened species records could be found for this section, however, the following species could occur; the glossy black cockatoo, powerful owl, squirrel glider, grey-headed flying-fox, little bent-wing bat, greater broad-nosed bat and hoary wattled bat.</p> | | |
| | <p>Confirmed Threatened Species Sighted Within Option Corridor (250 metres wide): Nil.</p> | <p>Confirmed Threatened Species Sighted Within Option Corridor (250 metres wide): Koala (1).</p> | <p>Confirmed Threatened Species Sighted Within Option Corridor (250 metres wide): Nil.</p> | |

Table 5.5 Route Option Characteristics – Section D

| Section D | | | | |
|---|--|---|----------------------|----------------------|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| Engineering and Operational | | | | |
| Cross Section of New Highway | Shoulder widths to be increased to 2.5 metres (with no barrier) and three metres (with barrier). Existing widths are generally two metres. | | | |
| | Carriageway crossfall is to be modified to 3%, existing is generally 2.5%. | | | |
| | The connection to the Halfway Creek duplication requires realignment as the two preceding horizontal curves are substandard. | | | |
| | A new northbound carriageway is proposed south of the existing highway prior to the Halfway Creek duplication. | All options use the existing northbound carriageway in the Halfway Creek duplication as the southbound carriageway. Two new carriageways are provided to the west of the existing elsewhere. The southbound carriageway of the Halfway Creek duplication and the existing highway east of the duplication would be used as a local access road. | | |
| Access Rationalisation | There are currently 12 accesses along Section D. | | | |
| | Initially, the five public road intersections in addition to the private roads and driveways may be converted to left in / left out only. | | | |
| | In a Class M upgrade the proximity of Halfway Creek and Yuraygir State Conservation area would require the local access road to cross the highway to the southern side of the alignment. | In a Class A upgrade the number of access onto the highway will be reduced with the provision of a local access road (utilising the southbound carriageway of the Halfway Creek duplication and the existing highway) on the northern side of the alignment. | | |
| Constructability | Constructability is good because a large proportion of the new construction is separate to the existing highway carriageway and does not require reconstruction of southern carriageway of the Halfway Creek duplication tie-in. | | | |

| Section D | | | | |
|--|---|--------------|---------------|---------------|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| Geotechnical | <p>There are some embankments up to five metres high and a number of smaller scale embankments that will be required to traverse residual soil gullies within this section. An embankment slope angle of no steeper than 2H:1V should be considered.</p> <p>The elevated alluvial domains and drainage depressions within this area may contain some localised waterlogged ground. However, bridging layers are only expected to be required for short sections of the route in this area.</p> <p>The significant issue for rock cuttings within this section of the route is the inclined bedding and jointed rock mass. Where the road alignment is adversely oriented to this geological structure, a mechanism could exist for cutting instability.</p> <p>It is noted that the cuttings in this section include erodible siltstone, claystone and coal seams. These may experience minor localised instability in the form of undercutting, ravelling and sliding associated with their erodibility.</p> | | | |
| Public Utilities | <p>Telecommunications: Telstra optic fibre adjacent to existing highway may require either protection and minor relocations, or full relocation up to the Halfway Creek duplication, depending on final design.</p> <p>Telecommunications: Relocation of approximately 0.39 km of Telstra optic fibre adjacent to the alignment may be required under these options.</p> <p>Electrical infrastructure: Numerous overhead powerlines and substations service many properties. Minor relocations to overhead powerlines would be required, which include four pole-mounted sub-stations.</p> <p>Water and Sewerage Services: All options do not impact upon water and sewerage infrastructure within this section.</p> | | | |
| Road User Delay (Construction) | Construction would be away from traffic and hence delays during construction should be minimal. | | | |
| Road User Delay (Operation) | Section D had a level of service (LoS) C in 2004. Assuming that no upgrading were to occur, Los D will be experienced at 2016 and LoS F at 2036. LoS F means that the highway will experience serious queuing and delays as it will be operating over capacity. | | | |
| Level of Service (Intersections) | Intersections within Section D were not the subject of traffic surveys and subsequent analysis due to their low traffic usage. | | | |

| Section D | | | | |
|---|--|--|--|--|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| Route Length | 5.8 km (80 metres shorter than existing) | 5.8 km (80 metres shorter than existing) | 5.8 km (80 metres shorter than existing) | 5.8 km (80 metres shorter than existing) |
| Hydrology (Flood Immunity) | No major flooding issues exist within Section D. | | | |
| Economic | | | | |
| Vehicle Operating Cost (Heavy Vehicles) | Section D does not contain any notable grades that will adversely impact on operating costs. | | | |
| Economic Development | Based on discussions with Clarence Valley Council, and a review of relevant planning instruments, there are no plans for significant economic development in this section. | | | |
| Economic Impact | <p>Possible economic impacts for Halfway Creek truck stop and motel due to changed access, mainly during construction, and due to potential land acquisition.</p> <p>Possible minor impacts to Newfoundland State Forest due to property acquisition.</p> <p>Potential minor economic impacts caused by changed access arrangements during construction, and possibly during operation for Rainbow's End Holiday Farm (Grays Road) and Archery Supplies (McPhillips Road).</p> <p>Possible further impact in Class M from the provision of local access roads.</p> | | | |
| Cost to Construct Class A (\$M) | 30 | 70 | 60 | 55 |
| Class M (\$M) | 55 | 60 | 85 | 80 |
| Use of Existing Reserve | The existing highway reserve would be used for the full length of Section D. The options maximise the re-use of the existing highway by conversion of the highway and the Halfway Creek duplication southbound carriageway to a local access road. | | | |
| Ease of Upgrade | The existing highway reserve would be used for the full length of this section. This option will mostly be constructed away from traffic. In a Class M upgrade, one overhead bridge likely to be at Grays Road. | | | |
| Staging | Section D can be built independently to the other sections. Staging of the duplication within Section D is possible. An initial upgrade to Class A may be possible. | | | |

| Section D | | | | |
|---|---|--|----------------------|----------------------|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| Community | | | | |
| Vehicular Access | <p>Possible accessibility impacts for all existing properties and intersections during construction and operation including the Halfway Creek truck stop and motel and rural fire brigade at Lemon Tree Road.</p> <p>Likely changed general access arrangements during construction and operation. Improved safety of access provided at all intersections with the upgraded highway.</p> | | | |
| | <p>The proximity of Halfway Creek and Yuraygir State Conservation Area limit the opportunity for local access roads on the eastern side of the highway. In the Class M scenario a local access road would need to switch sides, requiring a bridge / underpass at or near Grays Road.</p> | <p>These options would involve the retention of the existing southbound carriageway at the Halfway Creek duplication as a local access road, resulting in many accesses and roads (e.g. Grays Road and McPhillips Road) remaining unaltered.</p> | | |
| Community Severance/Consolidation | <p>No substantial community severance impacts are considered likely.</p> <p>No substantial change in environmental amenity for all properties currently fronting the existing highway during operation, and minor impacts during construction.</p> | | | |
| Noise Impact | <p>The total number of potential receivers in this section within 500 metres of the existing highway is 27.</p> <p>The total number of potential receivers in this section within 500 metres of the centreline of these options is 27.</p> | | | |
| | <p>Distances to potential receivers from the centreline of this option are <100 metres (1), 100 metres to 200 metres (10) and 200 metres to 500 metres (16).</p> | <p>Distances to potential receivers from the centreline are <100 metres (2), 100 metres to 200 metres (9) and 200 metres to 500 metres (16).</p> | | |
| | <p>All of the potential receivers are expected to be subject to the "Redeveloped Highway" criteria.</p> | | | |

| Section D | | | | |
|---|---|--|----------------------|----------------------|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| | The weighted noise impact (without mitigation) score for the existing highway in this section is 34. | | | |
| | The weighted noise impact (without mitigation) score for the option is 27, indicating a lower noise impact relative to the existing highway. | The weighted noise impact (without mitigation) score for the option is 28, indicating a lower noise impact relative to the existing highway. | | |
| Property Impact – Number of Properties Affected | 61 | 51 | 51 | 51 |
| Property Impact – Approximate Area Affected (ha) | 31.9 | 35.8 | 35.8 | 35.8 |
| Property Impact – Description of Properties Affected | <p>Land acquisition to varying degrees from a number of rural residential properties and rural properties. Strip acquisition from Newfoundland State Forest.</p> <p>Depending on the presence of any special values within Newfoundland State Forest Zone 8 that may qualify these areas for classification as a special management zone (Zone 1 or Zone 2) and subject to concept design, it is possible that any area required by these options would be less than 20 ha, and that revocation could be effected by a notice in the Gazette.</p> <p>Strip acquisition of land from Halfway Creek truck stop and motel.</p> | | | |

| Section D | | | | |
|---|--|---|----------------------|----------------------|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| Amenity – Bus Access | <p>Under a Class A scenario, the provision of bus stops and access arrangements for buses would generally remain the same as existing. However, the provision of improved clear zones and possibly designated bus bays should improve the current situation.</p> <p>Under a Class M scenario, no bus stops would be provided on the upgraded highway. Local bus routes and bus stops would be provided via local access roads.</p> | | | |
| Amenity – Pedestrian and Cyclist Access | <p>Pedestrian access across the upgraded highway would be limited, resulting in potential removal of the existing pedestrian access from the northbound rest area to the Halfway Creek truck stop and motel near Lemon Tree Road. In the Class M scenario, pedestrian access will be denied. Cyclists would be permitted to use the left hand shoulder on the upgraded highway.</p> | | | |
| Visual Amenity | <p>All options would traverse an undulating forested landscape in this section. There are some significant cleared areas for agricultural uses however the only significant cleared areas adjacent to the highway is at Halfway Creek where there is a service station, motel and rural fire brigade shed. The cleared corridor would therefore be widened.</p> | | | |
| | <p>Clearing is generally limited to widening of the existing corridor for the width of one new carriageway only until the existing Halfway Creek duplication.</p> | <p>Clearing is generally required for the width of two new carriageways until the existing Halfway Creek duplication and thereafter for the width of one new carriageway.</p> | | |
| | <p>Except for the southern part of the section, where there is some cut and fill on the northern side of Dirty Creek Range, this option closely follows the existing flat to undulating topography. The small amount of cut and fill required for the majority of the section would result in a negligible change to the landscape.</p> <p>The number of potential viewers, other than highway users, is relatively low.</p> | | | |

| Section D | | | | |
|--|---|--------------|---------------|---------------|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| Indigenous Heritage | <p>One indigenous heritage item listed on a State register, an isolated artefact (DEC site #13-4-0092) occurs within or in close proximity to these options in the vicinity of the existing Halfway Creek duplication.</p> <p>There is a high potential for stone artefacts to occur in a widespread distribution, particularly in undisturbed areas and around watercourses.</p> <p>An area of this section generally bounded by the start of the section, Grays Road and the study area boundaries, contains sites of cultural sensitivity to the local Aboriginal community including a number of historical campsites. All options traverse this area generally along the existing highway alignment.</p> | | | |
| Non-Indigenous Heritage | <p>There are no known listed non-indigenous heritage items within or in the immediate proximity of this option.</p> <p>Potential historical relics include those relating to the themes of timber cutting, farming and transport.</p> | | | |
| Land Use – Statutory Planning | <p>Ulmarra LEP 1992: Within this section these options pass through or immediately adjacent to land zoned 1(a) (General Rural Zone) and 1(f) (Rural (Forests) Zone).</p> <p>Summary of Statutory Position: Pending clarification of the application of the new State planning reforms, within this section these options would be potentially prohibited unless Clarence Valley Council decide that the project is consistent with one or more of the objectives of the affected zones.</p> | | | |
| Land Use – Residential | <p>Residential land use in this section is limited to scattered rural residential properties, with small clusters generally between McPhillips Road and the start of the Halfway Creek duplication, and at Grays Road.</p> | | | |
| Land Use – Productive Land | <p>Mainly rural land uses would be affected in this area, with acquisition required along the edges of the existing corridor.</p> <p>Newfoundland State Forest would be impacted through corridor widening, including lands zoned for production.</p> | | | |
| Environmental | | | | |
| Wetlands | <p>There are no mapped SEPP 14 wetlands in the vicinity.</p> <p>There are a number of freshwater wetlands generally associated with Halfway Creek which may include endangered ecological communities (listed under the NSW <i>Threatened Species Conservation Act 1995</i>) and threatened aquatic species (listed under the NSW <i>Fisheries Management Act 1994</i> and Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i>).</p> | | | |
| Water Quality | <p>Waterway Crossings: Halfway Creek (numerous crossings).</p> | | | |

| Section D | | | | |
|---|--|--|---------------|---------------|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| | No adverse water quality impacts have been envisaged to occur, provided RTA standard management measures are applied during construction and operation. | | | |
| Native Flora | Key Vegetation Communities: Forest ecosystems (as mapped by the NPWS Comprehensive Regional Assessment (CRA) project) identified as within the option corridor with high conservation value include and Wet Flooded Gum-Tallowwood. | | | |
| | NPWS Reserves: The boundary of Yuraygir State Conservation Area occurs along the eastern side of the existing highway alignment. The project is unlikely to intrude into the state conservation area. | | | |
| | State Forests: All options pass along the boundary of Newfoundland State Forest on the western side of the existing highway alignment. The options would require widening of the existing highway alignment along this section. | | | |
| | Vegetation Clearing: Clearing is generally limited to widening of the existing corridor for the width of one new carriageway only until the existing Halfway Creek duplication. | Vegetation Clearing: Clearing is generally required for the width of two new carriageways until the existing Halfway Creek duplication and thereafter for the width of one new carriageway. | | |
| | Possible Threatened Species: The following threatened flora species have been recorded within two kilometres of the existing highway and therefore have potential to occur: <i>Eucalyptus tetrapleura</i> ; <i>Olearia stilwelliae</i> ; <i>Plectranthus suaveolens</i> ; and <i>Leucopogon confertus</i> . | | | |
| | Confirmed Threatened Species Sighted Within Option Corridor (250 metres wide): Nil. | | | |
| | Approximate total area of vegetation clearing is 20 ha. | Approximate total area of vegetation clearing is 22 ha. | | |
| Approximate area of clearing of high conservation value vegetation community is 1 ha. | Approximate area of clearing of high conservation value vegetation community is 1 ha. | | | |

| Section D | | | | |
|--|---|--------------|---------------|---------------|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| Native Fauna | <p>NPWS Designated Wildlife Corridors: All options commence within the “Newfoundland Sherwood Regional Corridor”, pass through the “Yuraygir Sherwood Regional Corridor” and along the edge of the “Yuraygir CR Regional Corridor”. The existing highway already passes through, or adjacent to these wildlife corridors, and all options would involve widening of the existing cleared corridor.</p> | | | |
| | <p>NPWS Designated Key Habitats: An area of key habitat associated with the “Yuraygir Sherwood Regional Corridor” generally located adjacent to Grays Road extends to the edge of the existing highway. Subject to concept design, it is expected that there would be no clearing of this key habitat.</p> | | | |
| | <p>Possible Threatened Species: Potential habitat may occur for the koala and other threatened fauna species, particularly in the areas with tallowwoods and the moist forest with rainforest elements. Species previously recorded near the road easement of this section include the glossy black cockatoo, powerful owl, yellow-bellied glider, squirrel glider, common planigale, brush-tailed phascogale, spotted-tailed quoll, grey-headed flying-fox and little bent-wing bat. Other species recorded further from this section of the road easement that could occur are the rufous bettong, sooty owl, masked owl, wompoo fruit-dove and giant barred frog.</p> | | | |
| | <p>Confirmed Threatened Species Sighted Within Option Corridor (250 metres wide): common planigale (2), grey-headed flying-fox (1), spotted-tailed quoll (1) and yellow-bellied glider (5).</p> | | | |

Table 5.6 Route Option Characteristics – Section E

| Section E | | | | |
|---|--|--|----------------------|----------------------|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| Engineering and Operational | | | | |
| Cross Section of New Highway | Shoulder widths to be increased to 2.5 metres with no barrier and three metres with barrier. Existing widths are generally one metre with a 300 metres section of 0.5 metres. | | | |
| | The section of existing highway between Kungala Road and Bald Knob Tick Gate Road has substandard vertical and horizontal alignment and requires realignment to achieve the 110 km/h design speed. | These options would include the construction of two new carriageways on the eastern side of the existing alignment over the majority of the section. Some lengths of the existing highway would be utilised in the upgrade between Lemon Tree Road and Kungala Road and where the alignment deviates to the north. | | |
| | The horizontal curve that connects to the northern end of the Halfway Creek duplication is substandard. | | | |
| | There are two existing bridges within this section. These are located at Halfway Creek and Wells Crossing. Both bridges do not comply with design standards and hence would require replacement. | | | |
| Access Rationalisation | There are currently 21 accesses along Section E. | | | |
| | Ultimately, local access roads may be required on both sides of the alignment for part of Section E. New bridges would be required for these local access roads in the Blue option in order to cross Halfway Creek and Wells Crossing. All other options would utilise the existing highway. | | | |

| Section E | | | | |
|---|--|--|----------------------|----------------------|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| | An overpass would be required at Kungala Road connecting new local access roads and Kungala Road to possible grade separated interchanges in Section C or in the Wells Crossing to Iluka Road project. | The existing highway will be used as a local access road from Lemon Tree Road for two kilometres and from Kungala Road to Bald Knob Tick Gate Road. A grade separated interchange may be provided at Luthers Road in the Class M scenario. | | |
| Constructability | <p>Constructability of this option is poor due to the significant portions of reconstruction on the existing alignment.</p> <p>High potential for impact on public utility plant.</p> | Constructability of these options is reasonable as most of the new construction is separate to the existing highway carriageway. | | |
| | Swamp area to the east of the highway opposite Kungala Road and across Halfway Creek likely to be poor foundation conditions. | | | |
| Geotechnical | <p>Given the relatively gentle slopes in this section the rock cuttings are generally less than three metres in height with a typical height of less than one metre. Given the shallow depth of cuttings that will be encountered, the cuts will be predominately in soil. Evidence of dispersive erosion of existing cuttings.</p> <p>Low height embankments would be required to traverse shallow residual soil gullies and the elevated alluvial creek channels. Elevated alluvial areas are not expected to contain soft soils. An embankment slope angle of no steeper than 2H:1V should be considered.</p> <p>The elevated alluvial domains within this area are expected to contain some waterlogged ground. These areas would require bridging layers.</p> | | | |

| Section E | | | | |
|--|---|--|---|---|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| Public Utilities | <p>Telecommunications: Telstra optic fibre (twin lines) adjacent to existing highway north to Kungala Road may require relocation of 0.92 km depending on final design.</p> <p>Electrical infrastructure: Numerous overhead powerlines and substations service many properties. Minor relocations to overhead powerlines would be required.</p> | <p>Telecommunications: The length of Telstra optic fibre next to the alignment in this option is two kilometres and may require relocation.</p> <p>Electrical infrastructure: Overhead powerlines run adjacent to the western side of the highway, and cross the highway. Relocations would be required.</p> | | |
| | Water and Sewerage Services: All options do not impact upon water and sewerage infrastructure within this section. | | | |
| Road User Delay (Construction) | Construction will occur under traffic and delays may be considerable. | The majority of construction would occur away from traffic, hence road user delay would be minimal. Some delays may be experienced between Lemon Tree Road and Kungala Road in the areas where the existing alignment is being used in the upgrade. | | |
| Road User Delay (Operation) | Section E had a level of service (LoS) C in 2004. Assuming that no upgrading were to occur, LoS D will be experienced at 2016 and LoS F at 2036. LoS F means that the highway will experience serious queuing and delays as it will be operating at over capacity. | | | |
| Level of Service (Intersections) | Current traffic conditions for Kungala Road indicate that the intersection operates satisfactorily with LoS C. Projected traffic increases indicate that in 2016 the intersection would operate at LoS E and in 2036 would operate at LoS F (even if upgraded to a seagull type intersection). Despite the LoS F in 2036, the delays in Kungala Road may be acceptable given the priority given to through highway traffic. | | | |
| Route Length | 7.9 km (30 metres shorter than existing) | 7.8 km (130 metres shorter than existing) | 7.8 km (130 metres shorter than existing) | 7.8 km (130 metres shorter than existing) |
| Hydrology (Flood Immunity) | Flooding impacts across the Halfway Creek floodplain will require larger bridges or culverts. | | | |

| Section E | | | | |
|---|---|---|----------------------|----------------------|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| Economic | | | | |
| Vehicle Operating Cost (Heavy Vehicles) | Section E does not contain any notable grades that would adversely impact on operating costs. | | | |
| Economic Development | Based on discussions with Clarence Valley Council, and a review of relevant planning instruments, there are no plans for significant economic development in this section. | | | |
| Economic Impact | <p>This option has the potential to impact upon the existing service station and general store located at the intersection of Kungala Road.</p> <p>This would potentially impact Benefields Rose Farm which has a shopfront at the service station site.</p> <p>This option would require acquisition of a large area from Banana Coast Wreckers.</p> | <p>Likely business impacts for highway businesses (Benefield's Rose Farm, service station and general store (Kungala Road), Big Garden Furniture and Banana Coast Wreckers) by separation from highway through traffic.</p> | | |
| | All options would involve possible minor economic impacts due to property acquisition from Glenugie State Forest and rural activities on some of the higher quality agricultural lands (in terms of unimproved value) in the Halfway Creek floodplain, although much of the latter is currently heavily vegetated. | | | |
| Cost to Construct | | | | |
| Class A (\$M) | 75 | 75 | 75 | 70 |
| Class M (\$M) | 125 | 80 | 80 | 75 |

| Section E | | | | |
|---|--|--|----------------------|----------------------|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| Use of Existing Reserve | <p>This option includes reconstruction of a large section of the existing highway, hence use of the existing reserve is good but use of asset is poor.</p> <p>Additionally this option will require the demolition and reconstruction of Halfway Creek and Wells Crossing bridges.</p> | <p>Apart from a 500 metre section south of Kungala Road, the existing highway is utilised in full as a local access road, allowing the retention of existing intersections and accesses.</p> <p>The two existing bridges spanning Halfway Creek and Wells Crossing can remain in their current format and remain as local access road bridges.</p> | | |
| Ease of Upgrade | <p>This option is difficult to construct as realignment of existing highway and reconstruction of existing bridges will be done under traffic.</p> <p>The construction of a local access road on the eastern side of the existing highway in the Class M configuration would be difficult.</p> | <p>The majority of the upgrade is to be constructed away from traffic.</p> <p>Overpass / underpass required for the crossing of Luthers Road in a Class A upgrade.</p> <p>Possible construction of a grade separated interchange in the vicinity of Luthers Road as part of a Class M upgrade or in the adjacent Wells Crossing to Iluka Road project.</p> | | |
| Staging | <p>Section E can be constructed independently from the other sections.</p> <p>Construction within Section E may be suitable for staging.</p> | | | |

| Section E | | | | |
|---|---|--|----------------------|----------------------|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| Community | | | | |
| Vehicular Access | Likely changed general access arrangements during construction and operation. Improved safety of access provided at all intersections with the upgraded highway. | | | |
| | Possible accessibility impacts to highway businesses including Benefield's Rose Farm and general store service station (Kungala Road), and Big Garden Furniture during construction and operation. | Potential accessibility impacts, mainly during construction, for those scattered rural properties that would be located to the east of these options. These options involve the construction of new carriageways and the reverting of the existing highway to local access road status. As a result existing access situation for many properties would be unaltered along the existing highway. Acquisition of a portion of Wells Crossing Flora Reserve may result in access issues for forestry management activities and emergency response operations. | | |
| Community Severance/Consolidation | No substantial community severance impacts are considered likely. | | | |
| | Access across the highway would be restricted and may make it more difficult for properties on the eastern side of the existing highway to access local facilities such as the community hall or service station and general store at Kungala Road. | Potential separation of scattered rural properties that would be located to the east of these options. Likely improved consolidation within Halfway Creek locality. Likely no significant change in environmental amenity for properties currently fronting the existing highway generally between Lemon Tree Road and Kungala Road, during operation, and minor impacts during construction. Likely improved environmental amenity for those residences fronting, and on the western side of, the existing highway generally between Halfway Creek and Wells Crossing. | | |

| Section E | | | | |
|---|---|---|----------------------|----------------------|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| | Likely no significant change in environmental amenity for all properties currently fronting the existing highway during operation, and minor impacts during construction. | Likely reduced environmental amenity for rural residences located to the east of the existing highway generally between Halfway Creek and Wells Crossing, and some of which were not previously exposed to the highway. | | |
| Noise Impact | The total number of potential receivers in this section within 500 metres of the existing highway is 41. | | | |
| | The total number of potential receivers in this section within 500 metres of the centreline of this option is 40. | The total number of potential receivers in this section within 500 metres of the centreline of these options are 35. | | |
| | Distances to potential receivers from the centreline of this option are <100 metres (5), 100 metres to 200 metres (10) and 200 metres to 500 metres (25). Relative to the existing highway this is very similar with a slight reduction in the number of potential receivers within 200 metres. | Distances to potential receivers from the centreline of these options are <100 metres (3), 100 metres to 200 metres (9) and 200 metres to 500 metres (23). Relative to the existing highway this represents a significant reduction in the number of potential receivers within 100 metres. | | |
| | All of the potential receivers are expected to be subject to the "Redeveloped Highway" criteria. | For these options 19 of the potential receivers are expected to be subject to the "Redeveloped Highway" criteria, and 16 of the potential receivers are expected to be subject to the "New Highway" criteria. | | |
| | The weighted noise impact (without mitigation) score for the existing highway in this section is 51. | | | |

| Section E | | | | |
|---|--|---|----------------------|----------------------|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| | The weighted noise impact (without mitigation) score for this option is 42, indicating a lower noise impact relative to the existing highway. | The weighted noise impact (without mitigation) score for these options is 38, indicating a lower noise impact relative to the existing highway. | | |
| Property Impact – Number of Properties Affected | 28 | 18 | 18 | 18 |
| Property Impact – Approximate Area Affected (ha) | 46.7 | 66.8 | 66.8 | 66.8 |
| Property Impact – Description of Properties Affected | <p>Land acquisition to varying degrees from a number of rural residential properties and rural properties. Possible acquisition of land from the travelling stock reserve (TSR 46942) approximately 400 metres north of Kungala Road.</p> <p>Strip acquisition from Wells Crossing Flora Reserve. The affected land is zoned by Forests NSW for conservation (Zone 1 Special Protection). Revocation of this land, irrespective of the area involved may require an Act of Parliament. Strip acquisition of land within Glenugie State Forest, including lands zoned by Forests NSW for production (Zone 3B) and further assessment (Zone 8). Depending on the presence of any other special values within Zone 8 that may qualify these areas for classification as a special management zone (Zone 1 or 2) and subject to refined design, it is likely that any area required by this option would be less than 20 ha, and that revocation could be effected by a notice in the Gazette.</p> <p>Strip acquisition from the service station and general store (Kungala Road) and Big Garden Furniture (Luthers Road). Substantial acquisition from Banana Coast Wreckers.</p> <p>Acquisition of land from behind (east side) Big Garden Furniture (Luthers Road).</p> | | | |

| Section E | | | | |
|---|--|--|----------------------|----------------------|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| Amenity – Bus Access | <p>Under a Class A scenario, the provision of bus stops and access arrangements for buses would generally remain the same as existing. However, the provision of improved clear zones and possibly designated bus bays should improve the current situation.</p> <p>Under a Class M scenario, no bus stops would be provided on the upgraded highway. Local bus routes and bus stops would be provided via local access roads.</p> | <p>These options would involve a new alignment, to the east of the existing highway, north of Kungala Road. Therefore the bus stops on the existing highway would remain with no bus stops provided on the new alignment.</p> | | |
| Amenity – Pedestrian and Cyclist Access | <p>For safety reasons, pedestrian access across the upgraded highway would be limited under a Class A scenario and banned under a Class M. Cyclists would be permitted to use the left hand shoulder on the upgraded highway. Pedestrian needs will be further assessed following selection of the preferred route.</p> | | | |
| Visual Amenity | <p>The existing cleared corridor through flat to undulating forested landscape would need to be widened for the majority of this section.</p> <p>The visual impact of cut and fill for this option would be negligible with the alignment closely following the existing flat to undulating topography.</p> | <p>With the exception of some small cleared areas, these options would pass through flat to undulating forested landscape. The southern part of these options (where it is located along the existing highway alignment) would require clearing of vegetation to the west. Parts of the eastern side of the existing highway in this area are already cleared, which would reduce the cleared corridor effect.</p> <p>Where these options deviate from the existing highway alignment a newly cleared corridor would be created. The proximity of the existing highway to the west may lead to a wider cleared corridor in some locations.</p> <p>The flat to undulating topography in this section would result in minimal cut and fill requirement and associated visual impact.</p> | | |
| | <p>Potential viewers in this section are limited to road users and a small number of rural residents.</p> | | | |

| Section E | | | | |
|--|--|---|---------------|---------------|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| Indigenous Heritage | There are no known listed indigenous heritage items within or in the immediate proximity of this option. | | | |
| | There is a high potential for stone artefacts to occur in a widespread distribution, particularly in undisturbed areas and around watercourses. | | | |
| | Within this section areas of cultural sensitivity to the local Aboriginal community include two travel routes (that traverse the study area) and associated campsites, and a ceremonial site. | | | |
| | All options would traverse the two travel routes. | | | |
| | | These options would pass in the vicinity of the ceremonial site in the vicinity of Halfway Creek. | | |
| | Within this section there are two parcels of land vested in Grafton-Ngerrie LALC under the <i>Aboriginal Land Rights Act 1983</i> , both of which are located adjacent to the eastern edge of the existing highway. | | | |
| | This option may involve acquisition of one parcel of land located immediately south of Luthers Road. | These options may involve acquisition of one parcel of land located approximately 200 metres north of Luthers Road. | | |
| Non-Indigenous Heritage | There are no known listed non-indigenous heritage items within or in the immediate proximity of this option. | | | |
| | Potential historical relics include those relating to the themes of timber cutting, farming and transport. | | | |
| Land Use – Statutory Planning | <p>Ulmarra LEP 1992: Pending clarification of the application of the new State planning reforms within this section these options pass through or immediately adjacent to land zoned 1(a) (General Rural Zone) and 1(f) (Rural (Forests) Zone).</p> <p>Summary of Statutory Position: Within this section these options would be potentially prohibited unless Clarence Valley Council decide that the project is consistent with one or more of the objectives of the affected zones.</p> | | | |
| Land Use – Residential | Residential land use in this section is limited to scattered rural residential properties that may be affected to varying degrees. | | | |

| Section E | | | | |
|--|---|---|---------------|---------------|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| Land Use – Productive Land | | These options would involve acquisition and severance of a number of rural properties. | | |
| | | This option would largely use the existing highway alignment and would mainly require strip acquisition of rural properties fronting the existing highway. | | |
| | | All options would involve varying degrees of acquisition of some of the higher quality agricultural land (in terms of unimproved value) within the Halfway Creek floodplain, although most of which is currently heavily vegetated. | | |
| | | All options would involve minor strip acquisition (to varying degrees) from Glenugie State Forest including lands zoned for production. | | |
| | This option may involve strip acquisition of land from the travelling stock reserve (TSR 46942) located on the western side of the existing highway approximately 400 metres north of Kungala Road. | | | |
| Environmental | | | | |
| Wetlands | There are no mapped SEPP 14 wetlands in the vicinity. | | | |
| | There are a number of freshwater wetlands generally associated with Halfway Creek, which may include endangered ecological communities (listed under the NSW <i>Threatened Species Conservation Act 1995</i>) and threatened aquatic species (listed under the NSW <i>Fisheries Management Act 1994</i> and Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i>). | | | |
| Water Quality | Waterway Crossings: Halfway Creek (numerous crossings) and Wells Crossing, both of which drain to the west. Freshwater wetland habitats are located downstream within the study area. | | | |
| | No adverse water quality impacts have been envisaged to occur, provided that RTA standard management measures are applied during both construction and operation. | | | |

| Section E | | | | |
|--|---|---|---------------|---------------|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| Native Flora | Key Vegetation Communities: These options do not impact on forest ecosystems (as mapped by the NPWS Comprehensive Regional Assessment CRA) project) with high conservation value. | | | |
| | Field observations identified that all options pass through a mature Scribbly Gum community that is quite distinct from those in the broader study area. Unlike the generally immature and regrowth vegetation that characterises most of the vegetation in the remainder of the study area, many of the trees in this community immediately adjacent to the existing highway are mature. | | | |
| | NPWS Reserves: None affected. | | | |
| | State Forests: This option passes along the boundaries of Wells Crossing Flora Reserve (managed by Forests NSW) and Glenugie State Forest. This option would require widening of the existing highway alignment along this section. | State Forests: These options pass through the edges of Wells Crossing Flora Reserve (managed by Forests NSW) and Glenugie State Forest for various lengths in a new alignment roughly parallel with and to the east of the existing highway alignment. | | |
| | Vegetation Clearing: Clearing is generally limited to widening of the existing corridor for the width of one new carriageway. | Vegetation Clearing: Clearing is required for the full width of two new carriageways, involving widening of the existing corridor until it deviates on a new easterly alignment south of Kungala Road, thereafter a new cleared corridor would be created. | | |
| Potential Endangered Ecological Communities: All options also pass through some riparian vegetation associated with Halfway Creek, which may contain endangered ecological communities listed under the NSW <i>Threatened Species Conservation Act 1995</i> . | | | | |
| Possible Threatened Species: The following threatened flora species have been recorded within close proximity of the existing highway and therefore have a high potential to occur; <i>Eucalyptus tetrapleura</i> , <i>Botrychium australe</i> , <i>Lindsaea incisa</i> and <i>Brasenia schreberi</i> . Other species may also occur. | | | | |

| Section E | | | | |
|--|---|---|---------------|---------------|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| | <p>Confirmed Threatened Species Sighted Within Option Corridor (250 metres wide): <i>Brasenia schreberi</i> (1), <i>Eucalyptus tetrapleura</i> (15) and <i>Lindsaea incisa</i> (1).</p> | <p>Confirmed Threatened Species Sighted Within Option Corridor (250 metres wide): Nil.</p> | | |
| | <p>Approximate total area of vegetation clearing is 28 ha.</p> <p>Approximate area of clearing of potential endangered ecological communities is nil.</p> <p>Approximate area of clearing of high conservation value vegetation community is nil.</p> | <p>Approximate total area of vegetation clearing is 47 ha.</p> <p>Approximate area of clearing of potential endangered ecological communities is nil.</p> <p>Approximate area of clearing of high conservation value vegetation community is nil.</p> | | |
| Native Fauna | <p>NPWS Designated Wildlife Corridors: All options pass through the “Halfway Creek Regional Corridor,” and along the western end of the “Snake Creek Subregional Corridor”. The existing highway alignment already passes through, or adjacent to these corridors.</p> | | | |
| | <p>This option would involve widening of the existing cleared corridor through the “Halfway Creek Regional Corridor”.</p> | <p>These options would involve creation of a new cleared corridor through the “Halfway Creek Regional Corridor”.</p> | | |
| | <p>The option may involve clearing along the edge of the “Snake Creek Subregional Corridor”.</p> | <p>It is not expected that any of these options would require clearing within the “Snake Creek Subregional Corridor”.</p> | | |

| Section E | | | | |
|--|--|--------------|---------------|---------------|
| Assessment Criteria / Performance Measures | Blue Option | Green Option | Purple Option | Orange Option |
| | <p>NPWS Designated Key Habitats: Areas of key habitat, some associated with designated wildlife corridors, are scattered generally throughout this section, a number of which would be affected by all options.</p> | | | |
| | <p>Other Habitats: The mature Scribbly Gum community contains many mature trees that contain good hollows for fauna.</p> | | | |
| | <p>Possible Threatened Species: Potential habitat may occur for the koala and other threatened fauna species, particularly in the areas with mature Scribbly Gums. Species previously recorded near the road easement of this section include the rufous bettong, yellow-bellied glider, brush-tailed phascogale, powerful owl and square-tailed kite. Other species recorded further from this section of the road easement that could occur are the glossy black cockatoo, bush stone-curlew, grey-crowned babbler and squirrel glider. Several other species may occur, including the common planigale, spotted-tailed quoll, grey-headed flying-fox, little bent-wing bat, greater broad-nosed bat, hoary wattled bat, yellow-bellied sheath-tail-bat, east-coast freetail-bat and masked owl. Listed aquatic species (Oxleyan Pygmy Perch and Eastern Freshwater Cod) may occur within Halfway Creek and associated tributaries.</p> | | | |
| | <p>Confirmed Threatened Species Sighted Within Option Corridor (250 metres wide): Nil.</p> | | | |