

# Cairns

BRUCE HIGHWAY UPGRADE URBAN CONGESTION PLANNING STUDY

Executive Summary



*In 2039 the Cairns Bruce Highway corridor will be;*

*“A sustainable, high-quality multi-modal transport network, planned in partnership with the community and supported by all levels of government, that meets the long-term needs for the southern gateway into the City of Cairns while enhancing the natural and built environment of the Tropical North.”*

*In September 2008 the Australian Government announced \$5m for planning to address urban congestion on the southern approach to Cairns – the Bruce Highway. A Study Area from Wrights Creek to Draper Street was selected by the Department of Transport and Main Roads (TMR) and endorsed by the federal government to be the subject of a planning study investigating the long term transport corridor requirements for a 30 year horizon. The broader study also informed the planning study undertaken for the \$150m Australian Government funded upgrading of the Bruce Highway between Sheehy Road and Kate Street announced in late 2007.*



*Figure 1- Bruce Highway- Approach to Ray Jones Drive*

# Scope of the Cairns Bruce Highway Upgrade Planning Study

## The study was commissioned to:

- / Determine the infrastructure requirements, for a 30 year planning horizon, to cater for the transport needs to support the development forecasts outlined in the Far North Queensland (FNQ) Regional Plan 2031. Transport infrastructure includes:
  - / Dedicated high speed busway
  - / Dedicated high speed cycleway
  - / Highway
  - / Rail
  - / Service roads.
- / Develop a costed Staging Plan to facilitate progressive upgrading of highway infrastructure within the Study Area
- / Meet the Urban Congestion Program Objectives, namely:
  - / Productivity – The economic benefits to the Australian community
  - / Sustainability – The project is sustainable from economic, social and environmental perspectives. There is certainty over the provision of the infrastructure in to the future
  - / Liveability – The infrastructure will improve the quality of life for constituents of Cairns.

## Purpose of this report

The planning process has culminated in a detailed transport corridor plan from Wrights Creek to Draper Street. This corridor plan is referred to as the Master Plan and it caters for forecast development in the southern Cairns region for the next 30 years i.e. to 2039. The Urban Congestion Planning Report documents the technical work that has been undertaken throughout the planning process to arrive at the Cairns Bruce Highway Upgrade – Master Plan. The Master Plan provides government with a blue print for managing urban congestion in the southern corridor over the next 30 years.

The Urban Congestion Planning Report is presented in three volumes:

- / Volume 1 – Consolidation Report (this report)
- / Volume 2 – Technical Reports (17 reports)
- / Volume 3 – Engineering Drawings

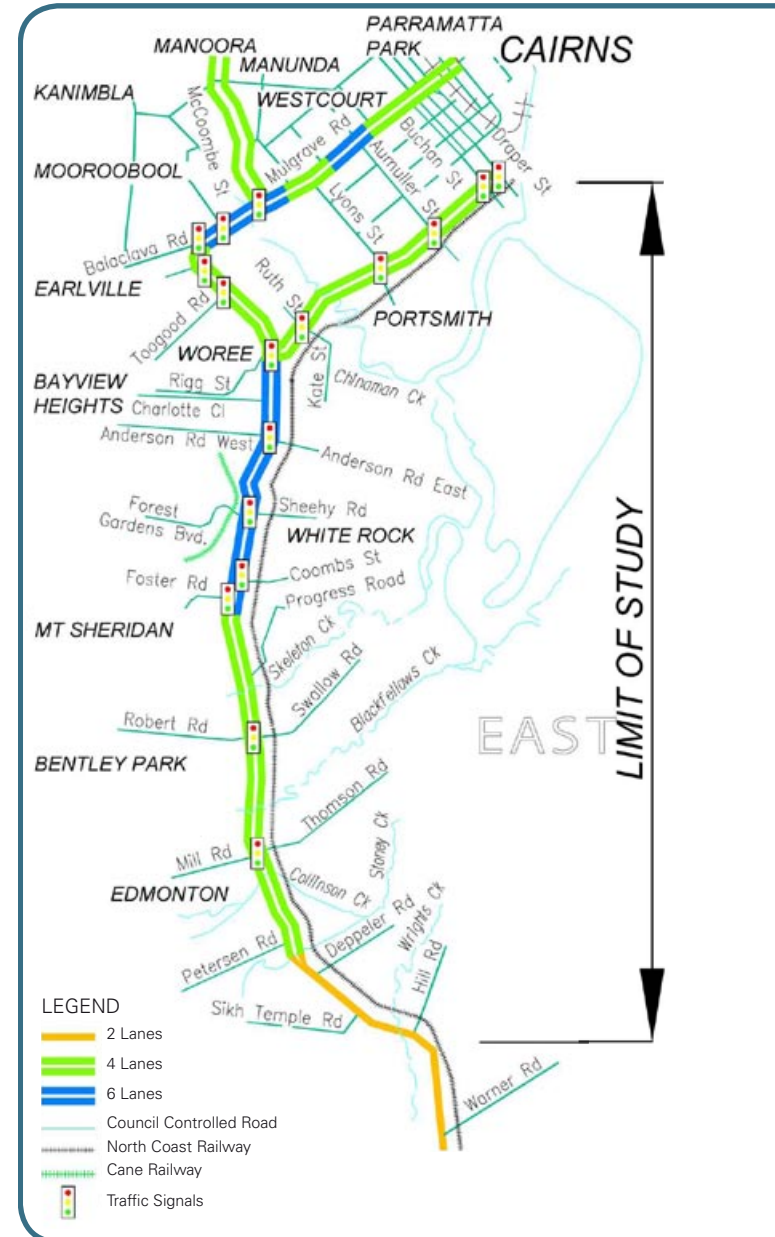


Figure 2 Study Area

This planning study has been funded primarily from the federal government's Urban Congestion Program (\$5.0m) with a contribution from the state government (\$350k). The study informed the broader state funded Cairns Network Transport plan which reviewed the entire Cairns transport needs to 2039.



## Project background and need

Cairns is a rapidly growing regional centre. A substantial amount of work in land use and transport planning has been undertaken over the past 10 to 15 years. The Cairns Bruce Highway Upgrade project has analysed this prior planning and incorporated the findings into the current planning study. Information from key documents that has been integrated into the planning study includes:

- / Southern Cairns Integrated Land Use and Transport Study (SCILUTS)
- / Preliminary State Agency Position Paper-Mount Peter Structure Plan
- / Far North Queensland Regional Plan 2009-2031.

### Key findings from the analysis include:

- / The need to upgrade the Cairns Bruce Highway is well documented and the significant amount of planning work that has already taken place within the Study Area has formed the basis for this planning study and proposed upgrade
- / The Far North Queensland Regional Plan (FNQRP) 2009-2031, established under the Integrated Planning Act 1997, has set the vision, directions and policies for the FNQ region to 2031. It identifies the Cairns southern corridor as being the key regional growth area in Cairns and proposes an ultimate population capacity of up to 50,000 residents in the Mt Peter area
- / The transport solution for the Cairns Bruce Highway Upgrade must be multi modal that supports and encourages all forms of transport activity (i.e. pedestrian, cyclists, motor vehicles and buses).
- / Planning ahead is essential so that infrastructure keeps pace with growth and is provided in the right place, at the right time and at the right price
- / There are many significant developments in the Cairns southern corridor including the Mount Peter Structure Plan (Mount Peter development), Edmonton Town Centre Development (Mann's Farm), and the Edmonton Business and Industry Park (Pregno).

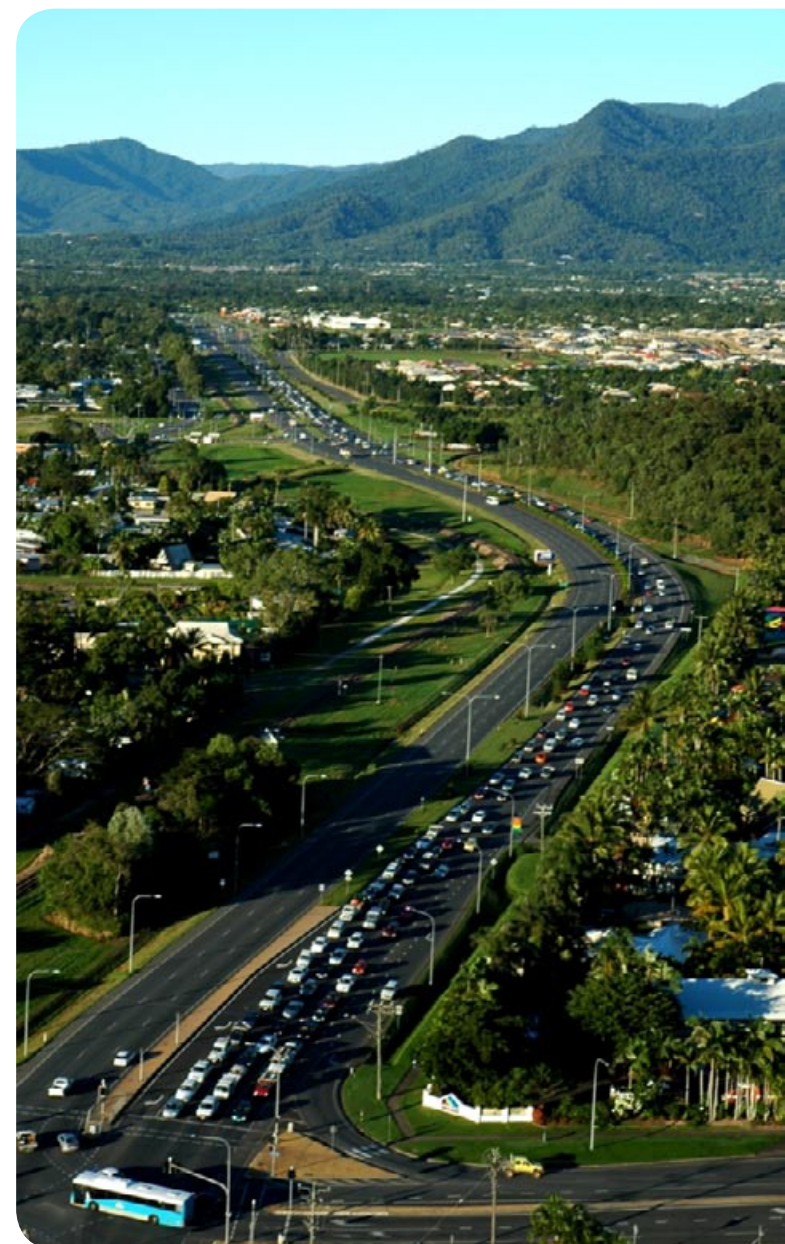


Figure 3- Aerial View of congestion along the Bruce Highway corridor

## Associated project – Cairns Transit Network

Cairns needs a balanced transport solution to effectively deal with its rapidly growing population. Planning for the Cairns Bruce Highway Upgrade has been undertaken in conjunction with the Cairns Transit Network project to ensure a balanced road and public transport solution for the Cairns southern corridor. Moving more people more efficiently will mean fewer car trips, less congestion and less pollution.

The Cairns Transit Network project is part of the Queensland Government's long-term plan to improve public transport in Cairns. It would connect the main communities in Cairns including the northern beaches, Smithfield, Redlynch, the Central Business District (CBD), Earlville, Edmonton, Gordonvale and the neighbourhoods in between. The key objective of the Cairns Transit Network project is to plan and protect three key priority public transport corridors across Cairns. These corridors aim to improve the speed and reliability of bus services operating within these corridors. The three key corridors are:

- / Northern corridor – Cairns City to Palm Cove (via Smithfield)
- / Southern corridor – Cairns City to Gordonvale (via Earlville and Edmonton)
- / Western corridor – Cairns Base Hospital to Skyrail (via Redlynch).

The Cairns Transit Network project corridors have been developed to cater for the future long-term growth of public transport usage across Cairns. A range of differing treatment options was considered within each corridor and the preferred treatment along the CBHU Study Area is a dedicated busway.



*moving more people more efficiently will mean fewer car trips, less congestion and less pollution*

Figure 4- A typical transit network station on the South East Busway, Brisbane QLD



## Existing corridor description

The Bruce Highway between Brisbane and Cairns is the principal corridor linking coastal Queensland cities and towns with Brisbane and interstate capitals. It represents a major component of the National Land Transport Network in Queensland. The Bruce Highway services the long distance transport movements between the port facilities and major industrial areas in Cairns, and the other major economic regions, both within and external to Queensland. The Bruce Highway provides the only direct road access into Cairns from the south.

The Bruce Highway Study Area lies in the coastal plain between Gordonvale and the Cairns CBD. This area is highly constrained by topography and has been selected as a major population growth area under the FNQ Regional Plan 2009-2031. The historic settlement pattern resulted in development that hugs the existing Bruce Highway corridor and has gradually expanded to the west until constrained by the hill slopes and to the east until constrained by the Trinity Inlet wetlands. The corridor is shared by the North Coast Railway, high voltage powerlines, telecommunications infrastructure and major water supply trunk mains. These features, together with the biodiversity, cultural and social attributes of the area, contribute to a highly constrained corridor.

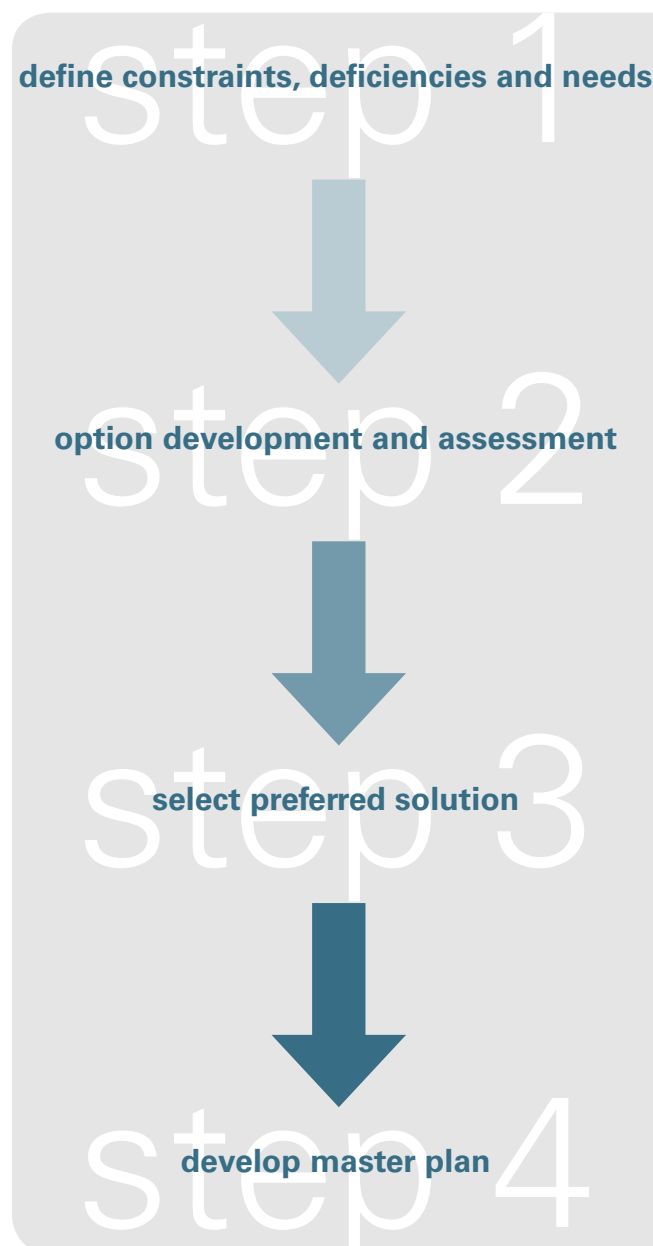
Average weekday traffic volumes (2009) are 18,300 vehicles per day at the Stoney Creek (southern end of Study Area) and 55,000 vehicles per day at Anderson Road (northern end of Study Area). Growth in traffic volumes over the past 12 years has been relatively constant, averaging 3.8% per annum (linear). The existing highway is comprised of two lanes south of Edmonton, four median divided lanes between Edmonton and Foster Road and six median divided lanes north of Foster Road. The intersections of Sheehy Road, Anderson Road, Ray Jones Drive and Kate Street have exceeded their capacity and are causing traffic congestion, delays and increased accident rates.

The growth in traffic volumes on the highway has resulted in progressive upgrading from two to four to six lanes as various sections have reached their capacity. The six lane section north of Foster Road has reached its traffic carrying capacity in the peak hours and the next step in the upgrading sequence is to construct a grade-separated facility.



**Figure 5 Cairns Congestion-** Demonstrating how traffic carrying capacity has been reached along Bruce Highway corridor.

## Study Process



The planning study was delivered using a four stage approach with each stage informing the next. The stages were:

### 1. Defining constraints, deficiencies and needs

AECOM was commissioned on 6 October 2008. The initial stage of the project focused on defining project objectives and performance standards for the corridor, data collection and analysis and identification of deficiencies of the existing highway and the existing planning. Phase 1 of community consultation commenced on 5 December 2008 and provided the community with an introduction to the project, and an opportunity to outline their concerns and ideas for improving the network.

### 2. Option development and assessment

Having collected and analysed the relevant information, the project moved into the development of options for interchanges and interchange locations. The interchanges formed the building blocks for the overall corridor planning layouts and a total of 14 possible interchange locations were explored. A high level assessment of the interchange locations and interchange form was undertaken and approximately 100 schemes for the full corridor length were developed. These schemes were then assessed, refined and re-assessed, ultimately arriving at a short list of five schemes. The five schemes underwent further refinement with three schemes presented to the public for comments.

Two more phases of community consultation occurred during this stage in the project:

- / Phase 2 – Project update. A newsletter providing a project update and general information about grade separation and interchanges was mailed to all Cairns residents on 16 September 2009. It was a joint newsletter with the Cairns Transit Network.

- / Phase 3 – Options release. On the 6 November 2009 three options were released to the public for comment and 1 on 1 meetings were held with potentially affected property owners. This stage was also undertaken jointly with the Cairns Transit Network project.

### 3. Selection of preferred solution

The three options released for public comment were subjected to a detailed multi criteria analysis (MCA) with input from study team members. The analysis measured and scored 29 attributes, grouping these into four overall criteria, namely; environment, transport, social and cost. In addition to the findings of the MCA, feedback from the community engagement activities and property owner meetings was utilised to refine all three options. The MCA was applied to four discrete sections of the Study Area at appropriate “match points” (i.e. places along the route where all options pass through a common point), and this allowed many more permutations and combinations of options than the initial three that were released to the public. The preferred solution arising from the MCA was a combination or “hybrid” of all three options.

### 4. Development of Master Plan

The hybrid preferred solution was then subjected to detailed design input from the study team to integrate transport, environmental, social and cost considerations and thereby improve the performance of the layout with respect to all project objectives. This enhanced option is referred to as the Master Plan.





*Figure 6- An artist's impression of what the future highway may look like in the long term*



## Study outcome – Master Plan

The Cairns Bruce Highway Upgrade Master Plan is detailed on the accompanying plans at the end of the Executive Summary and contains the following key features:

### Travel demand

- / Traffic volumes on the highway at 2039 are forecast to reach 95,000 vehicles per day north of Sheehy Road, while the service roads either side of the highway at this location carry a further 15,000 vehicles per day. These traffic volumes are based on 20% of peak hour trips on public transport<sup>1</sup>

### Highway

- / Fully grade separated roadway between Wrights Creek and Ray Jones Drive.
- / Four lane freeway standard from Wrights Creek to the Bentley Park interchange (at Blackfellow Creek), six lane freeway standard from Bentley Park interchange to Sheehy Road, six lane grade separated urban arterial standard from Sheehy Road to Rigg Street, with two auxiliary lanes provided to cater for weaving manoeuvres and at grade intersections north of Rigg Street.
- / New roadway from Rigg Street to McCoombe Street with a connection to Spence Street
- / Four grade separated interchanges and one grade separated “Y” junction:
  - / Deppeler Road – closed diamond interchange, full access
  - / Bentley Park (Blackfellow Creek) – single point interchange, full access
  - / Foster Road – closed diamond interchange, full access
  - / Sheehy Road – closed half diamond interchange, limited access (north facing ramps only)

- / Rigg Street – grade separated “Y” junction connecting Mulgrave Road and Ray Jones Drive
- / Posted speed of 100km/h from Wrights Creek to Sheehy Road, transitioning to 80km/h north of Sheehy Road, with the posted speed of 70km/h north of Aumuller Street.
- / Route continuity along the Bruce Highway (Ray Jones Drive).

### Dedicated high speed cycleway

- / Grade separated 5m wide cycle facility (7m corridor) from Wrights Creek to Spence Street.
- / Located within the rail corridor on the eastern boundary and providing direct connection for urban areas east of the highway and 11 connection points for urban areas to the west of the highway.

### Queensland Rail line

- / Posted speed of 100km/h from Wrights Creek to Robert Road, and 80km/h north of Robert Road<sup>2</sup>.
- / Grade separated road crossings south of Anderson Road and at grade road crossings north of Kate Street
- / Provision for duplication and electrification with 25m allowance for rail south of Robert Road , and 18m north of Robert Road.

### Service roads

- / The local road network is consistent with Cairns Regional Council’s Transport Network Plan.
- / Eastern and western service road networks running parallel to the highway from Deppeler Road to Kate Street / Rigg Street.

### Dedicated high speed busway

- / Grade separated high speed busway from Blackfellow Creek to Rigg Street and at grade north of Rigg Street.
- / Posted speed of 80km/h from Blackfellow Creek to Rigg Street with the design speed through bus stops being 60 km/h.

### Environment

- / A restoration strategy for enhancing biodiversity (and landscape) values of riparian and other vegetation.
- / Adoption of Water Sensitive Urban Design principles to achieve water quality objectives
- / Development of a Cultural Heritage Management Plan
- / Noise management including noise mounds and barriers.
- / Urban Architecture/Landscaping
- / Urban Architecture and Landscape Master Plan including recommendations for seven key nodes and a longitudinal / linear response to continuing the Great Green Way
- / Detailed recommendations for treatment of key design elements and integration of biodiversity, landscape, and urban architecture inputs.

<sup>1</sup> The application of 20% of peak hour trips on public transport has been restricted to those trips between the southern corridor and Cairns city.

<sup>2</sup> There is a short section of 18m corridor between Collinson Creek and Thomson Road



## Conclusions

The Cairns Bruce Highway Upgrade planning study has developed a Master Plan for the Bruce Highway between Wrights Creek and Draper Street to accommodate forecast traffic volumes over the next 30 years. The Master Plan supports the Q2 ambitions of a Strong<sup>3</sup> Queensland and a Green<sup>4</sup> Queensland. Population growth, land use patterns and demographics that are consistent with the FNQ Regional Plan, Cairns Regional Council's Planning Scheme and the Mount Peter, Draft Structure Plan.

The Master Plan provides a multi-modal transport solution incorporating:

- / grade separated roadway between Wrights Creek and Kate Street
- / high speed cycleway for full corridor length
- / dedicated high speed busway between Rigg Street and Blackfellow Creek
- / complementary system of service roads running parallel to the highway on both sides of the highway
- / provision for duplication and electrification of Queensland Rail line in the future.
- / The Master Plan delivers a total transport solution for the southern corridor of Cairns and benefits the community by providing:
  - / improved safety for road users, pedestrians and cyclists
  - / improved access for motorists entering and exiting the highway
  - / reduced travel times for motorists
  - / efficient and effective transport
  - / improved freight efficiency
  - / improved incident management through the use of 3m shoulders and service roads

- / new facilities for cyclists and pedestrians
- / better connections for business and industry
- / integrated public transport facilities
- / a project that can be delivered in the short term to significantly alleviate congestion between Sheehy Road and Kate Street
- / provides a 30 year transport solution

The Master Plan is capable of being progressively rolled out through a series of construction projects subject to need and as funding becomes available. It has been developed in consultation with the community and offers government and the community a blue print for the development of transport infrastructure in the southern corridor for the next 30 years.

<sup>3</sup> Q2 Strong Queensland, Target 1: Queensland is Australia's strongest economy, with infrastructure that anticipates growth

<sup>4</sup> Q2 Green Queensland, Target 1: Cut by one-third Queenslanders' carbon footprint with reduced car and electric use.

## Recommendations

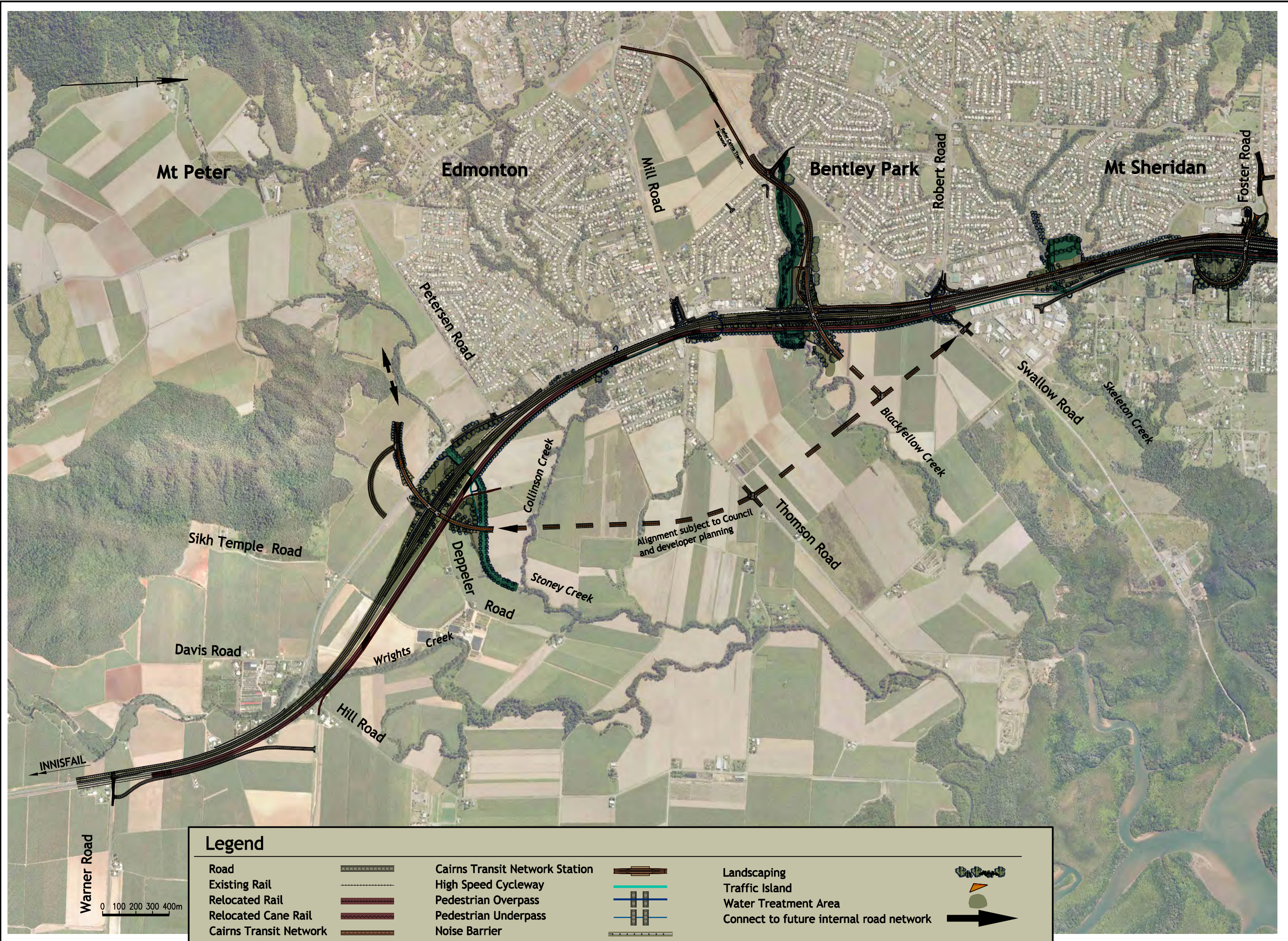
It is recommended that government endorse the overall findings of the Cairns Bruce Highway Upgrade planning study, i.e. the Master Plan and note the Implementation items summarised below:

- 1)** The Options Analysis and Business Case report should continue to be progressed to ensure that the construction of the first package of works, Bruce Highway – Sheehy Road to Kate Street, is completed and open to traffic by 2014. TMR should continue to monitor the performance of the network in the southern corridor and plan to undertake further design work to scope future packages of works and to help secure funding
- 2)** Release the Master Plan to the public at a time selected by the Australian and Queensland Governments
- 3)** TMR should ensure that the staging and implementation plan for the Cairns Transit Network is fully integrated with the staging plan developed as part of the CBHU project
- 4)** TMR should also ensure that other State Agencies and the Cairns Regional Council are made aware of the outcomes of this study and draw their attention to the actions required by other agencies.

Full details of these implementation items, including the seven key actions required by other agencies, are contained in Section 4.5 of this report.



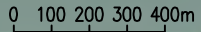
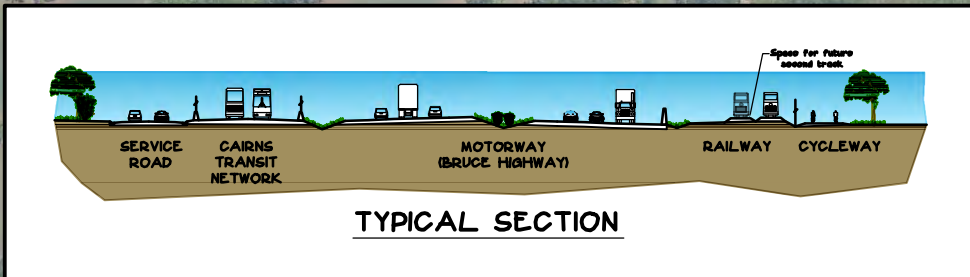
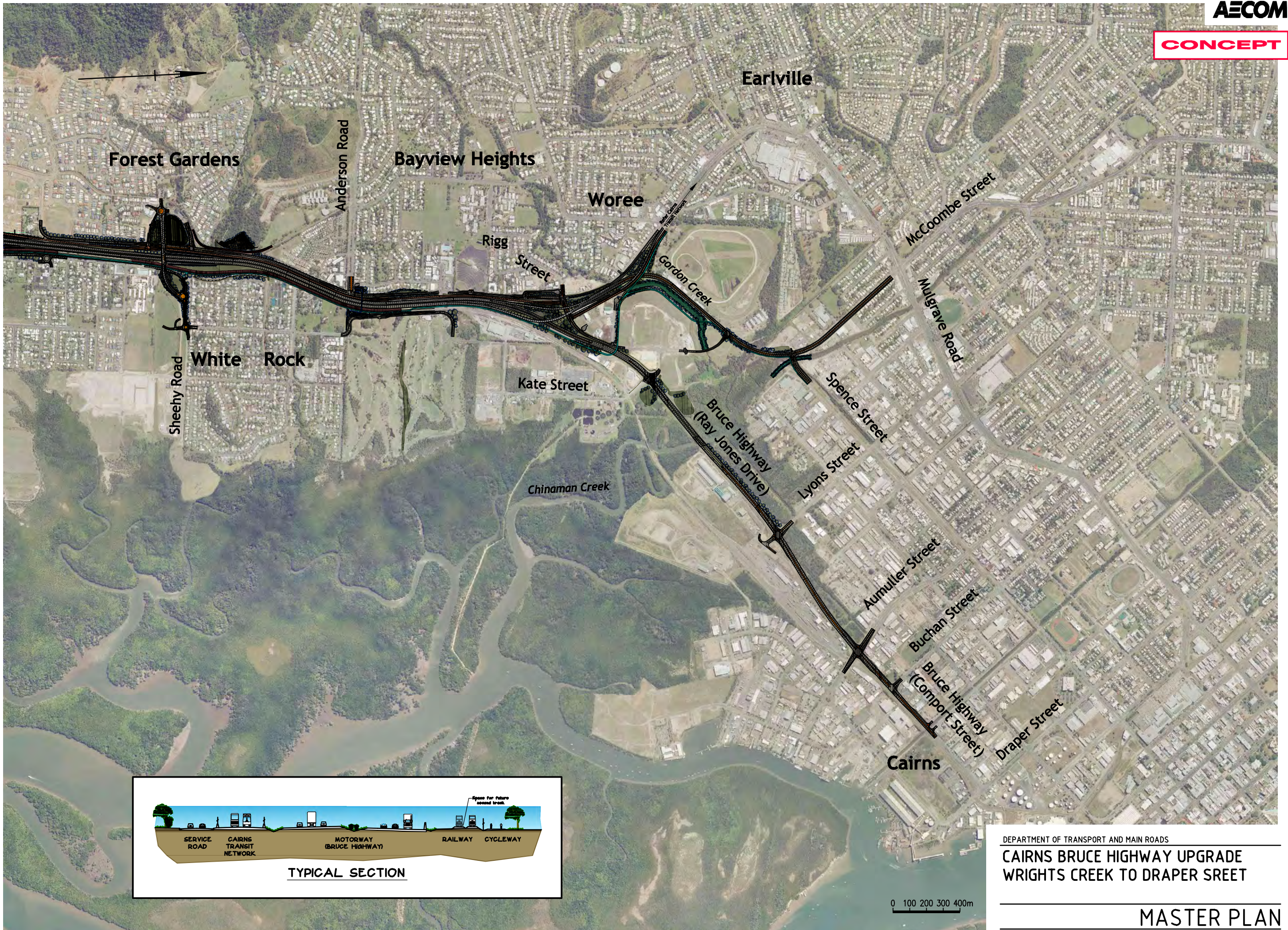




### Legend

Road		Cairns Transit Network Station		Landscaping	
Existing Rail		High Speed Cycleway		Traffic Island	
Relocated Rail		Pedestrian Overpass		Water Treatment Area	
Relocated Cane Rail		Pedestrian Underpass		Connect to future internal road network	
Cairns Transit Network		Noise Barrier			





DEPARTMENT OF TRANSPORT AND MAIN ROADS  
**CAIRNS BRUCE HIGHWAY UPGRADE**  
**WRIGHTS CREEK TO DRAPER STREET**

MASTER PLAN



