Executive Summary

Overview

Parsons Brinckerhoff (PB) has been appointed as consultants by Department of Transport and Main Roads to investigate and identify a preferred corridor alignment for the proposed Caboolture to Maroochydore Corridor Study rail line into Maroochydore City Centre.

Considered are the alignment proposed in the 2001 Caloundra to Maroochydore Corridor Study and a second alignment identified by the Department of Transport and Main Roads in conjunction with stakeholders and incorporated in the new Sunshine Coast Regional Council's Maroochydore Centre Position Paper (“Carnaby Street”). Refer Figure ES1.

Study Options

- **Current CAMCOS (Southern Drive)**
  - Option 1: At grade

- **Carnaby Street Alignment**
  - Option 2: Carnaby Street sub-grade
  - Option 3: Carnaby Street elevated
  - Option 4: Carnaby Street at-grade

Figure ES1: Study alignment options

The primary aim of the rail realignment is to provide better transport and land use integration and delivery of a transit-oriented development for the town centre of Maroochydore.

Included in this project is assessment of social, environmental, engineering and transport integration factors related to the proposed alignment, and recommendations of a preferred alignment, transport network and urban design integration.

The analysis concludes that the preferred option is elevated rail into Maroochydore to a terminal station short of the Maud Street canal near the intersection of Plaza Parade and Carnaby Street (option 3). This is supported by the Maroochydore Centre Position Paper adopted by the Sunshine Coast Regional Council. It is estimated that the construction cost of option 3 (including north and south connections) will be $201.9 million (2007 dollars).

Arising from this study are a number of key issues that should be investigated as a matter of priority. These include the integration with the CoastConnect bus corridor and local bus services, review of the
surrounding structure plan (including road network) and opportunities for development under the rail corridor to ensure maximum benefits are achieved by the project.

**Policy context**

Maroochydore is the designated Principal Activity Centre for the Sunshine Coast under the South East Queensland Regional Plan 2009-2031 (Regional Plan). According to the Regional Plan:

> “…principle activity centres serve as key focal points for regional employment and in-centre residential development. As major trip generators, these centres typically have existing or planned, dedicated public transport, including rail, bus or light rail, and comprise key nodes in the regional public transport system…”

The South East Queensland Infrastructure Plan and Program 2009-2026 has committed to delivery of public transport corridor from Beerwah to Maroochydore in the period from 2013/14 to 2025/26.

In 2005/2006 the Maroochy Shire Council commenced master planning for a new city centre in Maroochydore. To help consolidate the new city centre as a compact walking and public transport-oriented city, the draft master plan envisaged an alternative station location to that recommended by Caboolture to Maroochydore Corridor Study. The Maroochydore Station Corridor Study was commissioned in direct response to the Maroochy Shire Council central business district master planning process and has in turn influenced the ongoing planning for Maroochydore by the Sunshine Coast Regional Council.

Following the local government amalgamation in March 2008, the newly-formed Sunshine Coast Regional Council decided to review the Maroochydore City Centre Structure Plan. Under the Premier’s Housing Affordability Strategy, Maroochydore Centre has also been identified as one of the localities for which planning should be brought forward to facilitate early release of residential product. The revised Plan was adopted by Council on 26 May 2009 as the basis for amendment to the planning scheme to meet that commitment.

As part of the scheme amendment process, the Council has prepared and posted on its website a Maroochydore Centre Position Paper. The Position Paper illustrates the planning intent as the Maroochydore Centre Directions Map which shows the Carnaby Street option as Council’s preferred station location and corridor. The currently-protected and Carnaby Street station location options assessed by Department of Transport and Main Roads are not inconsistent with the Plan. Figure ES2 shows the Directions Map from the Maroochydore Centre Position Paper (May 2009).
Social and planning context

The alternative rail alignments into central Maroochydore proceed through and around what is currently the Horton Park Golf Course. Other key current land uses in the area include retail and low scale commercial, and some new high quality housing developments. Future land uses will include a range of retail, commercial and community facilities appropriate to a city centre, as well as low, medium and high density housing.

Sunshine Plaza shopping centre is located on the north side of Plaza Parade. It provides many of the facilities and services expected in a town centre, including shops, cafes and restaurants, banks and cinemas. Further expansions to the shopping centre are currently proposed. Sunshine Plaza is located in the potential walking catchment for the proposed Maroochydore railway station (Carnaby Street).

The land surrounding the proposed rail alignment is allocated as ‘urban footprint’ under the Regional Plan. ‘Urban footprint’ identifies land suitable to provide for the region’s urban development needs until 2031, and includes existing urban areas as well as new greenfield sites. Land contained within the urban footprint is intended to be well located with regard to existing and planned urban infrastructure, including public transport. Therefore it is considered that the development of the proposed corridor supports the overall intent for SEQ’s ‘urban footprint’. This part of the urban footprint, including a major portion of the Horton Park Golf Course, is the focus of the Sunshine Coast Regional Council’s Maroochydore City Centre planning.

A principle of the Regional Plan is to integrate development with transport infrastructure, community services and employment. This can be achieved through Transit Oriented Development (TOD):
“A transit orientated development precinct has a walking and cycle-friendly core with a rail or bus station and is surrounded by relatively high-density residential development, employment or mixed uses.”

Under the Maroochydore Centre Position Paper,

“The Direction Plan reflects a strongly integrated approach to land-use and transport planning for Maroochydore. The intended land use structure is focussed on a walkable heart for the Centre, built around the transit centre, a major public plaza (interconnected with a significant open space network) and key community facilities. The economic, social and environmental success of the Centre is closely tied to its walkability and the effective provision of public transport.”

“The structure of the Centre needs to facilitate a core of commercial (office and retail) space integrated with the proposed CCAMCOS transit station (in the vicinity of Carnaby Street), and linked to Sunshine Plaza by footpaths and cycle ways.”

The Council’s planning for Maroochydore centre is based on the assumption that the Horton Park Golf Course will become available for redevelopment. Indeed, it is a critical factor in delivering the Council’s vision for Maroochydore centre. To the west of the golf course is the ‘Sunshine Cove’ development featuring significant residential and commercial development. A major regional ‘health hub’ has been committed for the southern end of the Maroochydore central business district by Queensland Health.

Environmental context

The land affected by this study can be divided into three areas.

The first area is highly disturbed land associated with urban subdivision currently underway. Although the Queensland Herbarium lists remnant vegetation, there was little evidence of this during field studies.

The second area is that currently occupied by the Horton Park Golf Course. From an environmental point of view, this consists of mostly degraded land featuring introduced and exotic shrubbery and grasslands (as appropriate for a functioning golf course). No remnant vegetation is mapped by the Queensland Herbarium in this area. Field studies indicate the vegetation in the golf course provides habitat for local fauna. In particular, the Maud Street canal runs through the golf course, and stands of mangroves along this creek may provide breeding ground for fish and other aquatic life.

The third area is a pocket of remnant vegetation alongside the Sunshine Motorway to the west of Maroochy Boulevard. This area was determined to be of high ecological integrity with a diversity of native species of flora and potential for a range of rare and threatened fauna.

A geotechnical review of the area shows it to be formed from ancient tidal delta and estuarine deposits of sand and clays. Existing data indicates the area is likely to contain both actual and potential acid sulfate soils. The management of these soils will be an important part of the design and construction of the rail alignment.

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1 South East Queensland Regional Plan (2009). Page 101
2 Maroochydore Centre Position Paper, May 2009. Page 1
Alignment options

The following station locations and associated rail alignments into central Maroochydore were investigated:

- the currently approved Caboolture to Maroochydore Corridor Study alignment to a station on Southern Drive adjacent to Plaza Parade

- the alignment identified by the Maroochydore draft Concept Plan (2006), with a line through the centre of the Horton Park Golf Course to a station facing Horton Parade opposite First Avenue. The Council’s Maroochydore Centre Position Paper no longer accommodates this option and it has not been included in this report. However, it is included in the Maroochydore Station Corridor Study report included in websites [www.pb.com.au/maroochyscsc](http://www.pb.com.au/maroochyscsc) and [www.transport.qld.gov.au/maroochystation](http://www.transport.qld.gov.au/maroochystation).

- a third alignment identified by the Maroochy Town Centre Enquiry by Design Workshop (June 2007) which passes through a corner of the Horton Park Golf Course to a station near Carnaby Street and the Maud Street canal. This option is supported by the Council’s Maroochydore Centre Position Paper.

The original Caboolture to Maroochydore Corridor Study (Southern Drive) station location is at-grade. The Carnaby Street alignment is considered under three construction options – at-grade (conventional rail on ballast), elevated on structure, or sub-grade (in a cutting suitable for future covering). Each alternative has been designed to comply with current QR Ltd standards for urban passenger rail.
The Carnaby Street alignment also features a fully integrated bus/rail interchange at the terminal station.

The currently-protected alignment and station location at Southern Drive does not comply with all QR standards, and further negotiation would be required with QR for construction. In particular, the corridor is not wide enough for standard batter, provision for maintenance access is by way of an easement rather than by a dedicated right of way within the corridor, and there is insufficient space at the station location for a third rail layover space, nor for a fully integrated bus/rail interchange.

Minor variations in alignment exist between the elevated and at-grade options for the Carnaby Street alignment. This was done originally to allow for full integration of the surrounding road network.

In order to preserve the future option of extending the rail northwards beyond Maroochy Boulevard (with the corridor currently protected as far as the Sunshine Coast Airport at Pacific Paradise), each of the at-grade options would require reconstruction of Maroochy Boulevard for a distance and to a height necessary for the north-west leg of the rail line to pass under the roadway. The elevated options would pass over the Boulevard without interference, while the sub-grade options would pass below.

Figure ES4: Overview of alignments
Social impacts

The Carnaby Street options are reliant on the acquisition of land from the Horton Park Golf Course as part of its redevelopment.

The currently-protected Southern Drive option has lower overall land take requirements as an existing transport corridor is in place. However, this corridor is very narrow and ongoing impacts on adjacent land owners can be expected. This includes use of shared easements for maintenance access, and use of local streets for bus stops and associated circulation. At such time as the line might be extended northwards beyond Maroochy Boulevard, the north-west link would also impinge onto the “Sunshine Cove” (formerly ‘Wises Farm’) development.

The need to maintain appropriate rail standards for curvature and transitions on a short length of track, together with a desire to provide an east-west road link between Maroochy Boulevard and Dalton Drive for local connectivity and permeability has meant there is a slight difference in alignment between the at-grade and elevated variations of the Carnaby Street option.

The elevated option remains clear of the ‘Brencorp’ development to the east of Maroochy Boulevard, but impinges slightly on land (designated as green space) in the ‘Sunshine Cove’ development to the west. As the rail would be on an elevated structure at this point, the interference will be minimal.

The at-grade option avoids ‘Sunshine Cove’, but in order to allow for the road connection, is located further to the east. This will require land acquisition from Brencorp as the alignment cannot be contained within the current corridor and buffer zones.

A detailed noise and vibration assessment has been carried out on each of the options. These show that each of the options complies with Department of Environment and Resource Management (DERM) standards for noise and vibration, but may not comply with Sunshine Coast Regional Council standards, particularly with regards to sleep disturbance. The Carnaby Street sub-grade option performs best, followed by at-grade options (with standard noise abatement facilities in place) with elevated solutions performing the worst (unless noise tube design is included). The Southern Drive option performs poorly as it is located much closer to existing and potential development.

The rail corridor design will have a significant influence on the quality of the urban environment. A rear laneway/’back-of-lot’ approach would have contributed towards a negative outcome. The Council’s Maroochydore Centre Position Paper incorporates active frontage facing the rail station which helps improve local amenity.

Environmental impact

A comparative analysis of the options identified for the rail and station alignment was conducted based on a set of pre-determined environmental criteria and environmental values identified by site investigations.

In terms of level of impact on the identified environmental criteria, the existing Southern Drive alignment is considered to be the most benign option, as this alignment does not traverse the Horton Park Golf Course but is located within an existing significantly and recently disturbed environment with little ecological value.

There is expected to be little difference in potential impacts between grade options (2, 3 and 4) for the ‘Carnaby Street’ alignment.
The ecological values identified within the study area as a result of this preliminary investigation reinforces the need for further targeted flora and fauna surveys in order to ascertain the presence/absence of species listed under the Nature Conservation (Wildlife) Regulation (NCWR) and the Environment Protection and Biodiversity Conservation Act 1999 and whether the alignment options will have any implications for those species. Further targeted studies as part of the subsequent detail design phase will allow the ecological values of the area to be managed through an integrated strategic transport planning solution.

**Transport integration**

As a key transport node for the Sunshine Coast, integration between transport modes at Maroochydore station is essential.

The Carnaby Street options have been designed to ensure permeability for both vehicular and pedestrian movements. The at-grade option does not provide as much permeability as crossing points will be limited to formally constructed over- or under-bridges. For this reason, the elevated or sub-grade solutions are preferred.

Bus-rail integration is also critical, and Maroochydore Station will serve as a rail head for a wide area of the Sunshine Coast. Local buses will serve areas such as Buderim, Marcoola and Kuluin and distribute arrivals at Maroochydore Station to the Maroochydore foreshore and Cotton Tree precincts. The CoastConnect: Caloundra to Maroochydore project will also likely deliver express buses from other areas on the Sunshine Coast.

An elevated structure in particular provides the opportunity for an integrated bus/rail station with bus platforms located at ground level beneath overhead rail platforms. This would take the place of a separate bus station at Sunshine Plaza as the main bus terminus for Maroochydore. For the Carnaby Street options, a Sunshine Plaza east bus facility on Horton Parade would remain as a premium quality through stop.

The local road network within the Maroochydore Structure Plan has been redesigned with bus movements in mind, and the Public Transport map in the Council’s Maroochydore Centre Position Paper provides for continuation of priority bus corridors interfacing with the station as well as introducing a further shuttle loop linking various parts of the City Centre. This provides an appropriate framework for a review of local bus routes to serve the station.

**Construction costs**

Indicative construction costs have been developed for each of the Carnaby Street options. These have been developed using standard unit rates, with no allowance for special conditions or land acquisitions, and are subject to review following detailed design. Table ES1 summarises these costs, which include a 50% contingency.
Table ES1: Construction costs

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Construction cost (millions, 2007 dollars)*</th>
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<tbody>
<tr>
<td>2</td>
<td>Carnaby Street alignment, sub-grade</td>
<td>$275.8</td>
</tr>
<tr>
<td>3</td>
<td>Carnaby Street alignment, elevated</td>
<td>$201.9</td>
</tr>
<tr>
<td>4</td>
<td>Carnaby Street alignment, at-grade</td>
<td>$126.5</td>
</tr>
</tbody>
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*Note: Excludes land acquisition costs. Includes 50% contingency allowance

Preferred option selection

A weighted multi-criteria analysis (MCA) of the options was conducted in order to determine the preferred solution. Twenty-two MCA criteria in 6 broad categories were agreed in advance with stakeholders. The categories were:

- Transport integration (including network efficiency)
- Engineering (including construction cost)
- Economics (including development yields and stageability)
- Urban placemaking (including quality of built form)
- Natural environment
- Social environment (including noise, amenity and property impact)

The weighted MCA showed that the preferred alignment overall was the Carnaby Street elevated option (option 3).

To confirm the robustness of this conclusion, a range of sensitivity tests were undertaken. These tests showed that:

- Carnaby Street elevated is the preferred option from an economic and natural environment point of view, as well as under the balanced approach
- Carnaby at-grade becomes the preferred solution if engineering costs become the main criterion, to the exclusion of nearly all other criteria
- Carnaby below-grade becomes the preferred solution if socio-economic criteria become dominant. A moderate increase in the importance of the social environment is necessary to make the change
- At no stage is the Southern Drive alignment (currently-protected Caboolture to Maroochydore Corridor Study at-grade alignment) the preferred option.

Conclusion

It has been established from an engineering perspective that all options are feasible. While the nature of the ground (low lying) means that sub-grade work is challenging, the sub-grade options are not physically impossible.

The weighted MCA indicates that option 4, the “Carnaby Street” alignment, when constructed as an elevated structure is the preferred option.
This option is consistent with the planning intent of the Council’s Maroochydore Centre Position Paper in terms of best serving the land use distribution and pedestrian network of the Directions Plan and integrating with local connectivity as illustrated in the Public Transport Map of that Position Paper.

This option also provides a positive opportunity for integration with complementary public transport and supports the work undertaken in the CoastConnect: Caloundra to Maroochydore project.