Route Identification Report Executive Summary

Appendix D

Executive Summary

Introduction

The *South East Queensland Regional Plan 2005-2026* (SEQ Regional Plan) identifies an integrated regional transport system throughout South East Queensland as a desired regional outcome, with rail playing a key role in achieving this strategic outcome. Subsequently, the need to investigate upgrading of the North Coast Rail Line between Landsborough and Nambour is identified in the SEQ Regional Plan and the *South East Queensland Infrastructure Plan and Program 2007-2026* (SEQIPP 07). This Route Identification Report (the report) documents the process undertaken to investigate route options for this proposed upgrading. This report is a precursor to the Environmental Impact Statement (EIS), and will form part of the supporting documentation for the EIS.

The section of corridor between Landsborough and Nambour is a component of the North Coast Rail Line running between Brisbane and Cairns. It currently caters for a range of rail services including inter-city, inter-urban and freight services. The rail corridor was established in the late 19th century and various upgrades to stations, track and rolling stock have been made over the past 100 years but the corridor remains characterised by poor horizontal and vertical alignment, which reduces speeds in some parts to less than 50 km/hr. It is further constrained from an operational and capacity perspective due to it being a single track, with passing loops only at stations. In contrast, trains travel between Beenleigh and Robina at speeds of up to 140 km/hr. It is clear that in order to achieve a modern railway, improvements to the alignment are essential.

The Project

The upgrade of the North Coast Rail Line (NCL) between Landsborough to Nambour is defined as the "Landsborough to Nambour Rail Project' (the project).

The project will include construction of a double track railway along a predominantly new route, which will have provision to accommodate up to two additional tracks if required in the future. The project will improve the efficiency, service frequency, operating speeds and reliability of trains, and cater for the increasing demand for rail services in the corridor arising from population and freight transport growth.

The project has been declared a 'significant project for which an Environmental Impact Statement (EIS) is required' pursuant to Section 26(1)(a) of the *State Development and Public Works Organisation Act 1971* (SDPWO Act). This is as a result of the following considerations:

- *s. 27(c) the project's potential effect on relevant infrastructure*
- *s. 27(e) the potential environmental effects of the project*
- *s. 27(h) the strategic significance of the project to the locality, region or the State.*

Only the most important or complex projects are generally declared to be significant projects, signalling that a robust assessment process is warranted involving whole-of-government coordination.

The Coordinator-General's decision to declare a project to be a 'significant project' does not infer Queensland Government backing of the project, rather it signals that the project warrants a robust environmental impact statement.

http://www.infrastructure.qld.gov.au/major_projects/index.shtm

The initial advice statement is available via the Department of Infrastructure and Planning website: www.infrastructure.qld.gov.au/major_projects/nambour_rail.shtm

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The Study

The Landsborough to Nambour Rail Corridor Study (the study) is an early phase of the Landsborough to Nambour Rail Project. The study will provide for a greater level of certainty around future development and land use of the area surrounding the North Coast Rail Line. By identifying the corridor requirements for the future upgrade now, Queensland Transport is providing for the future needs of both rail users and the surrounding communities.

Three key elements are required to deliver this objective. These are:

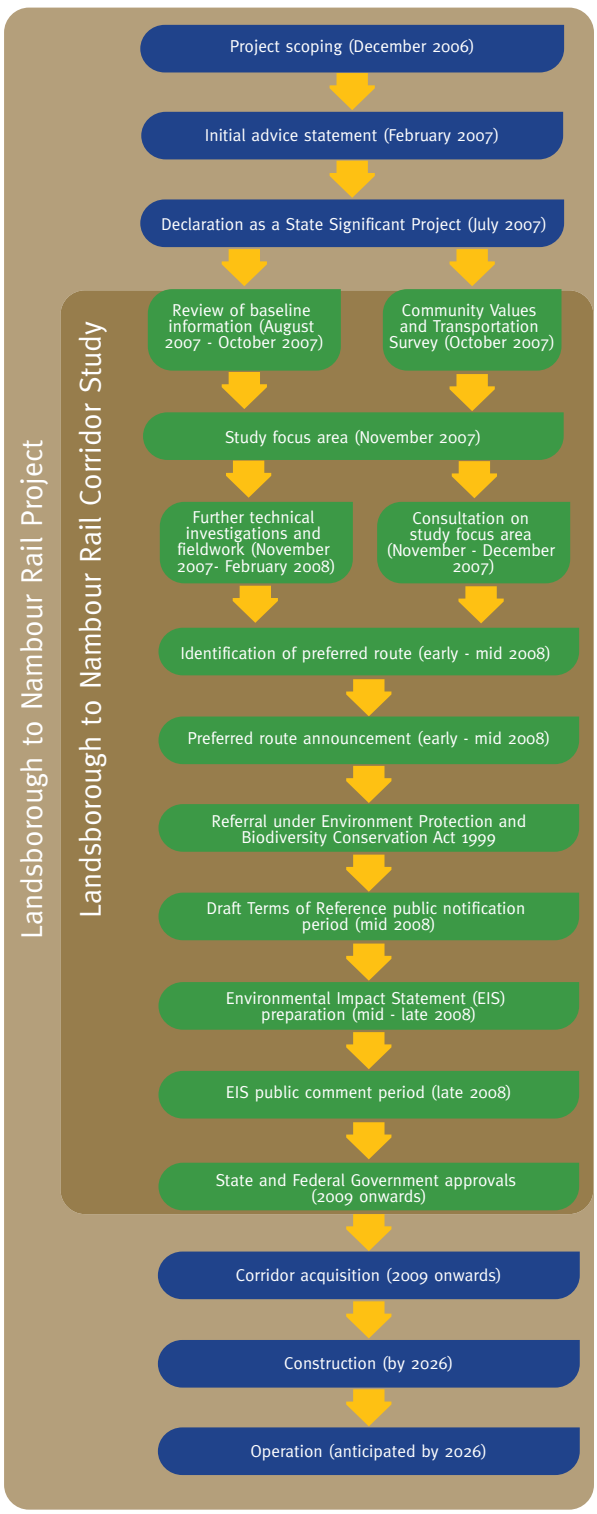
- **Route Identification.** This report documents the outcome of this process, which is the identification of a preferred route for the upgrade corridor.
- Preparation of an **Environmental Impact Statement** (EIS) for the preferred route under the provisions of the *State Development and Public Works Organisation Act 1971* (SDPWO Act). This process will be managed by the Department of Infrastructure and Planning.
- **Design** the corridor to a sufficient level of detail to allow corridor acquisition to occur at the completion of the study phase of the project (preliminary design).

Consultation with stakeholders including government agencies, the local community and other interested parties provides important information that is of value to the study, and will be considered as part of all three elements that make up the study.

Figure 1 shows the staging and timeframes for both the project and the study, which are subject to:

- Future infrastructure delivery priorities and funding decisions of the Queensland Government
- Outcomes of community consultation and technical issues identified during the study.

Figure 1: Indicative Project and Study Timeline



Background

Policy Framework

South East Queensland (SEQ) is recognised as one of Australia's fastest growing regions with a high demand for sustainable growth management measures to be implemented. The SEQ Regional Plan provides a framework for managing rapid growth, associated change, land use, and development through a series of strategic directions and regional policies over the next 20 years. The development of an integrated transport system throughout SEQ is identified as a 'desired regional outcome' in the plan, and rail is identified as playing a key role in achieving this outcome.

In support of the SEQ Regional Plan, SEQIPP 07 was released by the Queensland Government to outline infrastructure priorities and provide support for longer-term planning of the SEQ Regional Plan. SEQIPP 07 identifies the Landsborough to Nambour section of the North Coast Rail Line in the Infrastructure Priorities and Projects (Part B).

The Existing North Coast Line

The North Coast Rail Line connects Brisbane and Cairns, stretching for a distance of approximately 1,661 km. It faces operational pressures between Landsborough and Nambour due to:

- The various types of rail traffic it carries, including CityTrain, TravelTrain, TiltTrain and freight services
- The wide variation in operating characteristics of the rolling stock involved
- The capacity constraints of the existing single track line
- The substandard horizontal and vertical alignment of the existing line.

The track capacity and horizontal and vertical alignment issues significantly impact upon achievable operating speeds between Landsborough and Nambour, with some services travelling at less than 50 km/hr for many sections of the track.

Strategic Transport Context

The strategic purpose of the North Coast Rail Line is:

- To support and enhance the regional and state economies through efficient freight movement
- To support and enhance the transport needs of the region and State
- To provide a reliable alternative for longer distance intrastate travel.

The following strategic objectives are defined in the *Rail Network Strategy for Queensland*:

- The rail network in Queensland must be safe for operators, users, and the public
- The rail network will support and promote initiatives introduced by the State that provide net benefits to the environment.

The development of rail transport infrastructure that can compete with road-based private vehicle and freight transport will aid in achieving these objectives.

Regional Transport Context

The Landsborough to Nambour rail corridor provides a strategically important function in offering choice and travel options not only for residents within the corridor, but the wider Sunshine Coast area through a combination of park and ride facilities at Nambour, Woombye and Mooloolah (the later two recently delivered under TransLink's *Network Plan*) and co-ordination of bus services to Nambour and Landsborough. Bus services to Landsborough provide connectivity to Caloundra as well as Maroochydore via the University of the Sunshine Coast, while bus services from Cooroy, Eumundi and Noosa connect with trains at Nambour.

This corridor forms part of the wider South East Queensland rail network which offers options of travel to many locations in South East Queensland including Brisbane, the Gold Coast, and Ipswich.

Corridor Objectives

It was determined that this study should identify a high quality railway corridor with capacity for up to four rail tracks and associated infrastructure and earthworks. However only two tracks will be constructed as part of the initial project. This strategy provides opportunity for additional tracks to be developed within the corridor in the future without the need to acquire additional land. This planning decision offers a greater level of certainty in the longer term development of land use surrounding the corridor. Generally a 60 m wide corridor will accommodate these route option requirements. However, in some places due to terrain or other infrastructure issues, a wider corridor may be needed, particularly where steeper cuttings or embankments, road overpasses, landscaping, or noise protection treatments are required.

Design standards relevant to the development of route options include the Queensland Rail *Civil Engineering Track Standards – Module 8 for New Construction.*

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The following design standards have been established for the upgrade:

- A high speed alignment (i.e. 160 km/hr desirable, 80 km/hr absolute minimum in constrained areas)
- Design for two track, allow corridor for four tracks plus access roads for maintenance and emergency services at formation level
- Maximum grade 1 in 100 in both directions
- Grade separated road crossings
- Stations on straights
- Minimise property impacts
- Minimise environmental and social impacts
- Identify staging opportunities
- Identify potential sites for stabling and freight refuge/s
- Flood immunity for new railway construction suitable for a 100 year Average Recurrence Interval (ARI)
- Queensland Rail *Standard Track Formation Corridor Widths*
- Queensland Rail *Standard Clearances for Proposed Structures*.

The following design objectives have been established for stations:

- Extend station platforms to 150 m, with provision for further extension in the future if required
- Upgrade pedestrian and disabled access to comply with current standards and the *Disability Discrimination Act 1992* (including lifts and pedestrian overbridges)
- New station buildings
- Car park and access upgrades
- Station and car park lighting
- CCTV for stations and car parks
- Emergency phone and communications
- Provision for interchange connectivity with other public transport modes.

The Scoping Study

Queensland Transport completed a technical feasibility study (the 'scoping study') in December 2006 that examined the potential for upgrading the Landsborough to Nambour section of the NCL. The purpose of this internal scoping study exercise was to provide decision makers with a fundamental understanding of the issues associated with the existing corridor between Landsborough and Nambour as well as the potential constraints and implications of upgrading the corridor. Essentially the scoping study was conducted to confirm whether it would it be physically possible and broadly economically feasible to upgrade the corridor, and therefore reasonable to progress to the next stages of the project.

The outcome of the scoping study phase was confirmation that it would be possible to further consider the upgrade of the North Coast Rail Line between Landsborough and Nambour. 'Bands of interest' (preliminary to the study focus area) were defined on the basis of preliminary corridor objectives and constraints information gathered through desk-based assessments. The bands of interest encompassed areas where it was considered suitable routes for the upgrade could possibly be located. The bands of interest provided flexibility for future refinement of the study focus area and allowed for the development of route options in response to new constraints information, and provided varying opportunities for maintaining rail access at most stations for the towns along the corridor.

No community consultation was undertaken during the scoping study phase. It was recognised that without community input, the outcomes of the scoping study could have no status. Therefore it was recommended that the bands of interest be refined through community consultation in future stages of the project to ensure all relevant information could be considered prior to the recommendation of the preferred route.

Consideration of Upgrading the Existing Corridor

The scoping study also reviewed options to upgrade the existing corridor, or at least maximise the re-use of this corridor. The following constraints were identified to achieving the project objectives if the existing corridor were to be upgraded:

- The existing corridor has too many bends (i.e. constrained horizontal geometry) to achieve desired speeds without substantial curve easings
- The existing corridor is too steep (substandard vertical alignment) to achieve the desired speeds and this can not be rectified within an operational corridor
- The existing corridor could accommodate two tracks in some but not all sections, and is too narrow to accommodate additional tracks in future. Therefore it can not provide the longer term planning certainty
- The curve easings and corridor widening requirements to meet the current design standards and corridor objectives would mean that the land requirements of this upgrade alternative are comparable to those of an offline upgrade.

A number of construction constraints were also identified, including:

- Track occupations or closures would be a long term construction implication, generating service impacts, potentially extending the construction period, and necessitating more night work than construction of offline sections of corridor
- Achieving safe and secure construction access to the works could have substantial impacts on adjoining properties, equivalent to an off-line option
- The electrification of the existing operational track complicates the construction process, particularly in areas where new track is in close proximity to the existing operational track
- The existing tunnels only have sufficient width for a single track, and do not meet current rail design standards. The safe working distance for construction of a second tunnel is two tunnel widths from the existing tunnel, meaning that the corridor would need to be widened in the vicinity of tunnel structures and the approach to the new tunnel portal. Construction in close proximity to an existing operational rail tunnel is not desirable or practical.

An offline solution will need to use some areas of existing track, but the route options that have been investigated during the route identification and evaluation process have matching vertical alignments (i.e. at the same level) to make it possible to use new sections of track mixed with old sections of track.

Route Identification Process

Scope and Aims

The study was commissioned to identify a preferred route, undertake preliminary design and conduct an Environmental Impact Statement (EIS) for the upgrade of the North Coast Rail Line between Landsborough and Nambour. The study was required to take the following matters into consideration:

- Environmental constraints (e.g. significant vegetation or fauna habitat, protected areas)
- The need to provide a faster and more efficient rail service
- Future flexibility of the corridor (i.e. the ability to provide additional tracks)
- The potential capacity of the corridor to cater for the mix of services using it
- Local and regional transport needs
- Physical constraints (topography, geology, and hydrology)
- Property issues/impacts
- Existing land uses (urban, rural, open space/environmental)
- Social constraints (social/economic impacts, cultural heritage).

The following aims have been identified for this study:

- Minimise environmental effects
- Minimise property and social impacts
- Seek to identify opportunities where the rail upgrade can bring land use or transport network benefits
- Consider government agency and community input in the decision making process
- Identify a realistic upgrade solution that is affordable and able to be constructed while maintaining an operational rail line.

Community Engagement

Community input is recognised as an important element of this study. Therefore a comprehensive community engagement strategy has been implemented. This strategy has the following aims:

- To undertake engagement activities to reach a wide audience of identified stakeholders and encourage those affected by the study to take an active interest in engagement activities
- To provide opportunities for the community to input into the options identification and analysis process
- To support the preparation of the EIS for the study
- To increase knowledge within the community about the study and its EIS process.
- To build a knowledge base within the community to assist people and groups in assessing the EIS
- To advise stakeholders of the outcome of the EIS process on completion.

The following activities events and processes have been completed or are proposed:

- Development and maintenance of a stakeholder database
- Information line, website and enquiry email
- Study updates and newsletters (October 2007, November 2007, and planned for April 2008)
- Community Values and Transportation Survey (delivered in October 2007)
- Print advertising to notify the community of milestones and events
- Information sessions, community displays and events

- Fact sheets to provide supporting information at the community information sessions
- Stakeholder database to record contact and feedback on the issues, concerns and suggestions received by the study team.

Methodology

The following section describes the various activities and investigations undertaken to identify the preferred route.

The route identification process adopted for this study provided the study team with the scope to identify, refine and adjust route options in response to issues raised through community feedback and other technical investigations during the initial phase of the study.

This approach was specifically developed to allow the study team to progress quickly and with certainty from the initial investigation area to a preferred route, whilst providing fair and equitable opportunities for community input to be considered throughout the process.

Review of Baseline Conditions

The first step of the study process was a review of the existing conditions (the 'baseline conditions') within the original (22 km x 3 km) study area. This process included the following:

- Review of previous work
- Site visits and field survey work
- Consultation with local government, state government and service providers to gather updated relevant spatial information and mapping.

This step of the study examined the characteristics, issues and constraints identified within the original study area. In some cases the broader region surrounding the original study area was also reviewed, particularly from the land use, social and economic perspectives.

Constraints and issues that were considered likely to have some bearing on the identification of the study focus area were then broadly classified. This process involved ranking key constraints into categories of low, medium and high, based on evaluations of their significance to future decision making.

Areas of high constraints were considered to have a significant bearing in alignment location and assessment of route options, whereas medium and low constraint areas would be considered to have a lesser bearing on the identification and assessment of routes.

Study Focus Area Refinement

The refinement of the study focus area was a two step process. An initial study focus area was identified on the basis of:

- Review of the 'bands of interest' developed during the scoping study
- Definition of project objectives
- Review of baseline constraints and issues in the original study area (22 km x 3 km).

This information was then re-evaluated after the delivery of the Community Values and Transportation Survey and further technical investigations, discussed below.

Study Focus Area Consultation and Investigations

Consultation with the community during the community information sessions in November and December 2007 also helped the study team to further understand the constraints and issues within the study focus area. This also included consultation with local government officers and the Environmental Protection Agency.

The investigations undertaken during the review of the baseline conditions also identified some key areas where further detailed review would be required, in particular, ecological aspects. Additional ecological fieldwork has been undertaken in some areas to confirm assessments and assumptions based on existing available ecological information.

Route Option Identification

Indicative routes that had been identified as feasible during the scoping study work were reviewed and refined against:

- Technical design objectives
- Updated topographical information, cadastre and aerial photography.

Refinements were undertaken to respond to new constraints identified through community feedback and technical investigations, provide straights for stations, adjust to updated topographical data, and identify constructability and vertical alignment issues.

A number of new routes were also identified in response to these objectives and constraints. A route option submitted through the community consultation process outlined above was also taken through the design process, to allow for comparison with other route options.

Route Option Evaluation

The study focus area was divided into five segments, to assist in the route evaluation process. These were:

- Landsborough: Segment A
- Mooloolah: Segment B
- Eudlo: Segment C
- Palmwoods to Woombye: Segment D
- Nambour: Segment E

The segments were defined at points where it was considered possible to interchange between route options, and therefore allow the study team to assess each individual route segment and identify a preference for each segment.

Constraints and issues within each segment were reviewed and documented, which provided the basis for the evaluation of route options within each segment.

The relative performance of the route options were then compared on a segment by segment basis. That is, all route options within segment A were compared against each other on the basis of environmental, social, transport, land use and planning, economic and engineering criteria to identify the best performing route for segment A. This process was then repeated for segments B through E.

Identification of the Preferred Route

The best performing route segments from segments A through E were then combined to provide a continuous route from Landsborough to Nambour. Some refinement and adjustment was necessary at points where different route segments were joined to make up the preferred route.

Community Feedback

To date, the following community feedback has been received:

- Community Values and Transportation Survey – 1006 responses
- Written submissions during consultation on the study focus area - 453 submissions.

In addition to this, the study team spoke to hundreds of people at community information sessions during November and December 2007.

Key issues and themes from submissions included:

- Concerns about social and property impacts of a new corridor
- Significance of the local environment, National Parks and habitat areas
- Preferences for eastern or western route alignments (particularly through Mooloolah and Eudlo)
- Flooding concerns
- Existing road network issues (i.e. level crossing at Mooloolah, low height rail bridges, and concerns about road overpasses).

Issues and Constraints

The following key issues and constraints have both shaped the study focus area, and influenced the route identification process.

Ecology

The study area is located in the South East Queensland Bioregion, one of the most species-rich bioregions in Australia, containing centres of endemism (i.e. species that are geographically or behaviourally unique, and a wide range of habitat types). All remnant vegetation in the bioregion is considered to be of high ecological value, at a minimum, on a local scale. It is generally of good quality with minimal disturbance and high habitat diversity. There are many areas that have state significance and are protected by the *Nature Conservation Act 1992* or *Vegetation Management Act 1999*. Furthermore, some of these areas support species of State importance (under the *Nature Conservation (Wildlife) Regulation 2006)* and National importance (under the *Environment Protection and Biodiversity Conservation Act 1999*). Consequently, there are many significant ecological features within the landscape between Landsborough and Nambour.

Planning and Land Use

The study area includes six townships which all have a strong identity based on their history as railway towns. The towns are: Landsborough, Mooloolah, Eudlo, Palmwoods, Woombye and Nambour. With the exception of Eudlo, the towns are all identified for future urban growth in the SEQ Regional Plan. Nambour is identified as a major activity centre. It is intended that development around these town centres will become denser, taking advantage of the rail services and commercial activities within the town centres. However the smaller towns are secondary growth areas with the majority of urban development planned for Nambour, Beerwah and the coastal areas.

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Much of the land between the town centres is protected from urban development through its inclusion in the Regional Landscape and Rural Production Area in the SEQ Regional Plan; this zoning is reflected in the local government planning schemes. This land primarily comprises smaller rural holdings and rural residential uses. Dominant rural activities include fruit farming, dairy and horse studs.

There are also two National Parks, several nature reserves and numerous recreational reserves in the study focus area.

Topography

The Blackall Range runs parallel to the study area to the west. At a number of points, east-west running ridges dissect the study area, most noticeably between Landsborough and Mooloolah and between Mooloolah and Eudlo. The highest elevation within the study area is approximately 160 m on the western border of the study area between Landsborough and Mooloolah. There is a high level of undulation below this height within the study area with the Department of Natural Resources and Water (DNRW) describing the area as hilly to low hilly with moderate to steep slopes[1]. As a result of the topography, the existing rail line has sharp curves and steep gradients which limits rail speeds to 50 km/hr in some areas (Queensland Rail Metropolitan System Information Pack). The study area does not have any significant peaks which dominate the terrain but rather undulates with many areas of slope greater than 20%.

The predominantly sandstone bedrock is likely to be a relatively high yield aquifer, and consideration will need to be given for the potential to cut off regional groundwater flow and the effect of groundwater on rail formation and on significant earthworks.

Much of the area between Landsborough and Mooloolah and Mooloolah and Eudlo is steep, and minor changes in rail alignment could lead to significant changes in earthworks requirements. The rail alignment should consider both the cut to fill balance, but also seek to balance earthworks on adjacent sections, so that material does not need to be hauled for long distances along the alignment, or on local roads.

New tunnels cannot be constructed in close proximity to existing operational tunnels. Therefore this will be a significant constraint to the location of possible routes in two locations.

The study focus area spreads over four major floodplains: Mooloolah River, Eudlo Creek, Paynter Creek and Petrie Creek. As a result, any proposed routes would cross significant lengths of floodplain with the potential to affect existing flow regimes depending on the chosen infrastructure and civil design.

[1] *http://www.webgis.nrm.qld.gov.au/webgis/webmin/Run.htm*

The following named watercourses pass through the study area (listed south to north):

- Mellum Creek (Pumicestone Passage Catchment)
- Addlington Creek (flows into Ewen Maddock Dam – tributary of Mooloolah River)
- South Mooloolah River (tributary of Mooloolah River)
- Mooloolah River
- Acrobat Creek (tributary of Eudlo Creek)
- Eudlo Creek (tributary of the Maroochy River)
- Paynter Creek (tributary of the Maroochy River)
- Petrie Creek (tributary of the Maroochy River).

Many of these waterways are significant from an ecological, recreational and visual perspective. Pumicestone Passage, which Mellum Creek flows into, is one of four passage-type estuaries in Queensland. Its mangrove fringed wetland contains extensive seagrass meadows and is a valuable nursery area for commercial and recreational fisheries. Of international significance, the Pumicestone Passage is listed under the RAMSAR Convention as an important feeding and roosting site for migratory birds.

Route Options

Segment A - Landsborough

Five route options were identified within segment A, shown in Figure 2. These routes all pass through Dularcha National Park, and require a new tunnel at the northern end of segment A. All routes also cross Addlington Creek close to the existing rail corridor crossing, and affect the western edge of the Landsborough Recreational Reserve.

Route A2 follows the existing rail corridor closely through Dularcha National Park. Routes A1, A3, A4 and A5 all require a new alignment through this National Park, fragmenting previously undisturbed areas of the National Park. Routes A1, A3, A4 and A5 also impact the edge of residential areas adjoining the existing rail corridor on the western side. Routes A1, A3, A4 and A5 have minimum curve speeds ranging between 120 and 160 km/hr (for non-tilt trains), whereas Route A2 has a minimum curve speed of 100 km/hr, due to its constrained geometry through the National Park.

Routes A1, A3 and A4 require a new tunnel on the eastern side of the existing rail tunnel, and routes A2 and A5 require a new tunnel on the western side.

Routes A1, A3, A4 and A5 have been discounted for the following reasons:

- They all were considered to generate significantly greater impacts to Dularcha National Park
- They all have comparatively higher property impacts than route A2.

Feedback from the community highlighted concerns about the upgrade impacting on existing residential areas adjoining the existing rail corridor on the western side, the environmental significance of Dularcha National Park, and concerns about impacts to the Landsborough Recreational Reserve.

Route A2 is the preferred route for segment A, as it was considered to have a comparatively lower impact to Dularcha National Park, and involves widening of the existing rail corridor, rather than the creation of a new alignment through the National Park.

Route A2 impacts on a total of 17 properties, which is comparatively lower than other routes considered in this segment.

In summary, route A2 has been selected as the preferred route within segment A as it is considered to have a lesser impact on Dularcha National Park and its ecological values than other routes considered in this segment. It also has fewer direct property impacts than other routes in this segment, as it takes a slightly more eastern alignment travelling north from Landsborough station. It is also considered to have an acceptable design speed, given the surrounding significant environmental and topographical constraints.

Segment B – Mooloolah

Five route options were identified in segment B, shown on Figure 2.

Route options B1, B3 and B4 pass through the eastern side of the study focus area, with routes B2 and B5 passing to the west.

Routes to the east require greater clearing of riparian vegetation around the southern branch of the Mooloolah River. In particular, routes B1 and B3 run adjacent to the south branch of the Mooloolah River, requiring either significant earthworks or longer bridges. Route B1 impacts on an area towards the northern end of segment B recognised as a *Nature Refuge under the Nature Conservation (Protected Areas) Regulation 1994*, traversing a large tract of intact vegetation as well as an adjoining reserve. Route B4 impacts the edge of the Marie Higgs (Mooloolah) Conservation Park, protected under the *Nature Conservation (Protected Areas) Regulation 1994*, and South River Park.

Routes B1, B3 and B4 to the east of Mooloolah were discounted due to the following reasons:

- Impacts on town centre resulting from relocating the station approximately 600 m to the east
- Conflicts with the Northern Pipeline Interconnector corridor (B1 and B3) with the potential implication of relocation of this significant infrastructure in the future
- Poor pedestrian access (particularly for schools and elderly)
- Property impacts and difficulties in providing access to adjoining properties.

Community feedback generally indicated that the loss or relocation of the station from the Mooloolah town centre would have impacts on the local community and businesses. Concerns about the impacts of retaining the rail corridor through the town centre were also raised in community feedback.

Routes B2 and B5 take a similar alignment through the western side of segment B, passing in close proximity to the existing rail corridor through Mooloolah. However, route B2 crosses the existing track four times, and has a section running parallel for approximately 1.3km. Route B5 crosses the existing track twice, and has a shorter parallel running section than route B2. Both routes B2 and B5 require grade separation of the Brays Road/ Mooloolah Connection Road, and cross the Mooloolah River at a sharp bend, which has been identified as ecologically significant.

The preferred route through segment B is therefore route B5.

Route B5 has a minimum curve speed of 140 km/hr (for non-tilt trains) and directly impacts on 36 properties, which is marginally lower than other routes considered in this segment.

In summary, route B5 was selected as the preferred route as it maintains a station close to the existing station location and town centre, and was considered to present comparatively lesser environmental impacts than routes to the east. However, this route will impact on the town centre, requiring grade separation of Brays Road/Mooloolah Connection Road. It will also require environmentally sensitive bridge design at the crossing of the Mooloolah River.

Segment C – Eudlo

Five route options were identified in segment C, shown in Figure 2. Routes to the west include C1, C3, C6. Routes to the east include route C5, with variants C4 and C2 at the southern end.

Significant feedback was received during the study focus area consultations, supporting the retention of a station at Eudlo, and providing information about flooding and environmental issues in the local area.

This feedback also included the submission of a further option to the study team. This has been identified as route C7, and has been described as 'the central alignment option'. It was presented to the study team as a consistent 60 m wide corridor. In order to allow a fair comparison of the performance of this option against other options, it was developed to the same level, using the rail design standards established for this project.

All western routes (C1, C3 and C6) impact on a small portion of the western fringe area of Eudlo Creek National Park. Routes to the east include route C5, with variants C4 and C2 at the southern end, and avoid impacting on Eudlo Creek National Park, but have been discounted for the following reasons:

- Flood plain considerations (longer bridges would be required)
- Local road network impacts
- Relocation of station away from township
- Community preference to retain station close to township/for a more westerly route
- Extent of visual impact
- Impacts to rural industries.

Route C1 is the westernmost route through this segment. It was not selected as the preferred as it was considered to have greater flooding implications where it traverses the confluence of Eudlo Creek and several natural drainage lines. It also provided for the relocation of Eudlo Station, however at a distance of 175 m to the west of its current location.

Route C7 (the central alignment option) had a comparable number of direct property impacts as other options. It also fragments Eudlo Creek National Park to a greater extent than the western routes, also affecting an area containing several drainage lines (natural waterways) that are known to be utilised by the federally listed (Endangered, EPBC Act 1999) Giant Barred Frog (*Mixophyes iteratus*). It severs a portion of the Tania Ave Park, adjacent to Eudlo Creek National Park. Route C7 was also considered to have significant constructability issues due to the multiple crossings of the existing rail corridor. It would also require more significant road network realignments, compared to other western options.

Route C3 and C6 are similar in their alignments, environmental and property impacts. However route C6 has a higher minimum curve speed than C3, and was therefore considered the preferred route.

Route C6 directly impacts on 39 properties. It crosses the existing rail corridor once, and also has a short section where construction would encroach on the existing rail corridor, in the vicinity of Paskins Road. Route C6 has a minimum curve speed of 160 km/hr (based on curve radii, for non-tilt trains).

In summary, route C6 was selected as the preferred route through this segment as it provides the opportunity to provide a relocated station close to the Eudlo town centre and avoids traversing large areas of flood-prone land, which would require costly and visually intrusive structures. It also avoids impacting on areas identified as important for federally listed species within the eastern portion of Eudlo Creek National Park.

Segment D – Palmwoods to Woombye

Route options through Palmwoods are extremely constrained due to the urban nature and topography of the area. Four routes were identified in segment D, shown in Figure 2. Route D1 has lower design standards than other routes in this segment. It also crosses the existing rail corridor five times, and runs adjacent to it for approximately 1.6 km. Other routes considered in this segment have fewer crossings of the existing rail corridor. Routes D3 and D2 have shorter sections of parallel running, and D4 passes to the west of the existing rail corridor.

All routes considered in this segment require numerous or complex crossings of Paynter Creek and tributaries. Whilst all routes have some degree of impact to a natural wetland area to the north of Palmwoods, route D1 has a greater impact than other routes considered in this segment. Routes D1, D3 and D4 all have higher number of directly affected properties than route D2.

Therefore route D1 has been discounted due to its lower design standards, constructability issues, property impacts and environmental impacts.

Routes D3 and D4 have been discounted as they generate broader property impacts through Palmwoods by taking a more easterly alignment through the town. This results in impacts to a greater area of the Palmwoods Bowls Club and Kolora Park than route D2. Routes D3 and D4 also have greater impacts on the Woombye Recreational Grounds than route D2, by taking a more western alignment through this area.

Feedback from the community during the study focus area consultation highlighted concerns over impacting on local heritage precincts, and concerns about impacts to community and recreational facilities including Kolora Park and the Palmwoods Bowls Club.

On the basis of property impacts and design standards, route D2 has been identified as the preferred route.

Route D2 would potentially site a new station at Palmwoods approximately 40 m to the north-east of the current station, and

a new station at Woombye approximately 50 m to the west of the current Woombye station.

Route D2 impacts on a total of 26 properties, which is comparatively lower than other options considered in this segment. Route D2 impacts on both Kolora Park and the western portion of the Palmwoods Bowls Club, though to a lesser extent than routes D3 and D4. Through this area, the route is likely to be on structure.

As route D2 passes north out of the Palmwoods township, it crosses a major tributary of Paynter Creek, which could require realignment of the waterway or major earthworks.

Route D2 has four rail crossings, and runs approximately 200 m in the existing rail corridor which would be a constructability issue, but to a lesser extent than D1 or D4. In addition there are four rail crossings. It has a minimum curve speed of 140 km/hr (based on curve radii, for non-tilt trains).

In summary, route D2 was selected as the preferred route in segment D, as it achieves better design standards than D1, it has fewer impacts on a wetland area to the north of the town, and is considered to have less impact to properties, including community and recreational facilities, than route D3 or D4.

Segment E – Nambour

Five routes were identified in segment E, with all generally following the existing rail alignment into Nambour Station. These are shown in Figure 2. Route E1 follows the existing rail corridor closely between Woombye and Nambour, generally to the west of the existing rail corridor. Routes E2 and E3 impact on existing and emerging residential areas to the east of the existing rail corridor, whereas E5, the most western alignment, has the greatest impact on rural and horticultural property to the west. Route E5 also had a greater impact on sections of Petrie Creek, which is recognised for its ecological and open space values. Constructability issues have been identified at Blackall Range Road for all routes considered, however route E1 has been determined to have the greatest opportunity for management of this issue.

All routes in this segment are considered to have complex constructability issues due to their proximity to the existing rail corridor, or requirement for multiple crossings of Petrie Creek.

Issues raised in feedback through the study focus area consultation included the environmental significance of Petrie Creek, concerns about Blackall Range Road, and concerns about impacts to residential and commercial properties.

As a result of these property and environmental considerations, route E1 has been identified as the preferred route in this segment.

North of Woombye Station, route E1 runs close to the existing rail corridor. At Blackall Range Road, it then passes to the west of the existing rail corridor, and continues on this side into Nambour Station. Nambour Station would remain in its current location, however station upgrade works would need to be considered. Route E1 has a minimum curve speed of 130 km/hr (based on curve radii, for non-tilt trains) with the exception of the curve approaching Nambour Station, which is restricted to 80 km/hr due to urban constraints.

Route E1 directly impacts upon 28 properties, which include a number of properties that may be affected through land requirements as a result of possible station upgrading. This total is comparatively less than routes E2, E3 and E4.

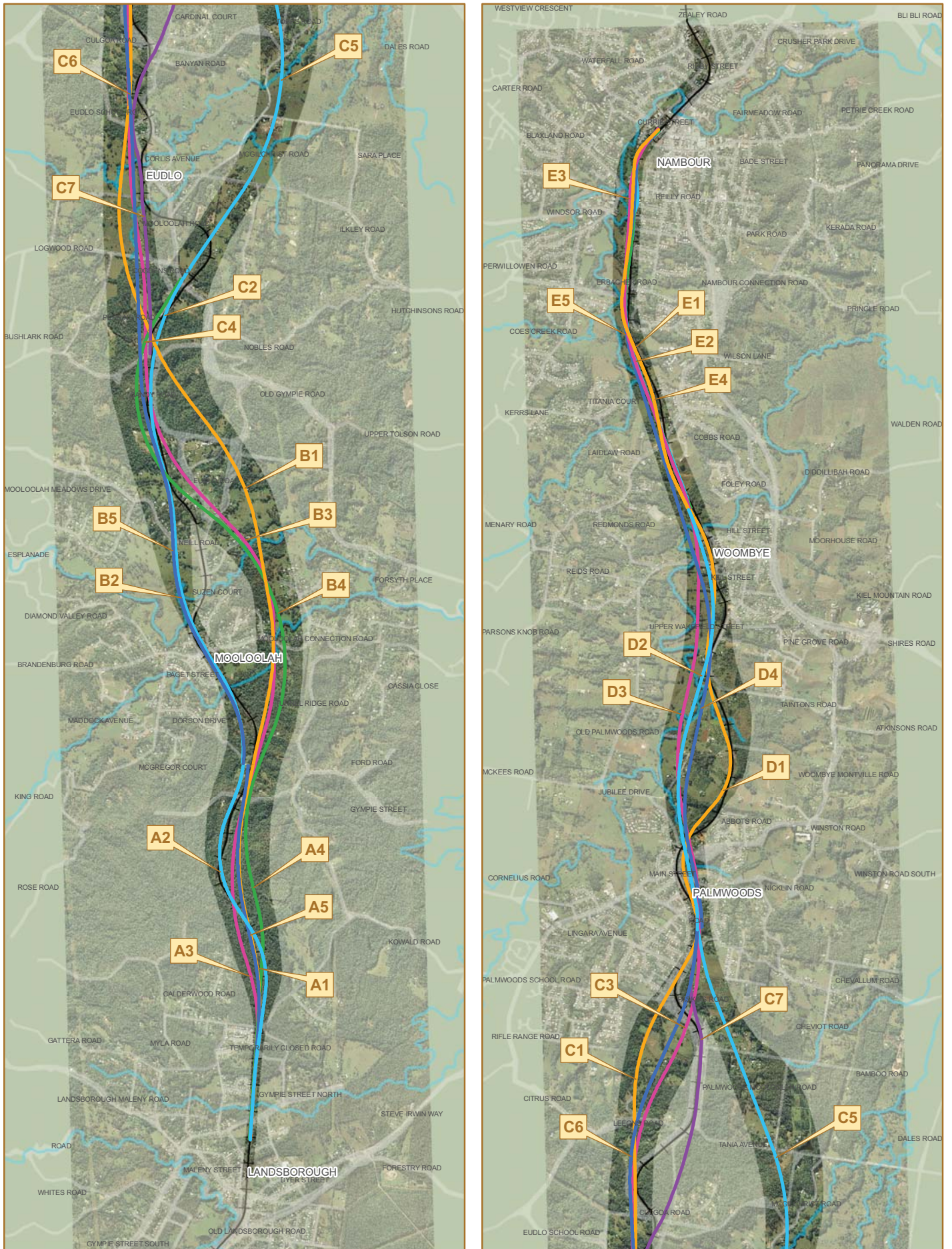
In summary, route E1 was selected as the preferred route within segment E, as it has fewer direct property impacts to residential areas to the south and east of the existing rail corridor on the approach to Nambour, than the majority of route options considered in this segment. It also was considered to have a lesser impact to Petrie Creek than the westernmost route.

Nambour Stabling

During the route identification process, it was determined that a rail stabling yard would be required to support planned passenger service improvements on the North Coast Line. The purpose of the stabling is to house trains overnight and conduct cleaning. The following criteria have been used to identify possible options for the stabling yard:

- The stabling yard is to be located within 1 km of the station to minimise dead running time and fuel costs
- The stabling yard should be located on a straight alignment of the track
- Location and track configuration to minimise complex moves between the stabling and the platform
- Site must be accessible for maintenance and operating crews.

Three possible options have been identified for stabling locations during the route identification process. A preferred option for stabling will be identified as part of the EIS and preliminary design process.



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0 250 500 750 1,000 Meters

Legend

A1 B1 C1 C4 D1 E1 — Existing Rail Line
A2 B2 C2 C5 D2 E2 — Creeks
A3 B3 C3 C6 D3 E3 — Roads
A4 B4 C7 D4 E4
A5 B5 E5

Note: All routes shown are centrelines, detailed corridor widths will be provided within the report.

Landsborough to Nambour Rail Corridor Study

Figure 2

Route Options

The Preferred Route

The overall preferred route is shown on Figure 3. It consists of the following route segments: A2, B5, C6, D2 and E1.

The land requirements for the preferred route will directly affect 146 properties. This total does not include properties that are considered to already form part of the existing rail corridor or support existing rail infrastructure. This total also includes properties potentially affected by land requirements for possible upgrade works at Nambour Station.

Further refinement of the preferred route and associated corridor requirements will occur during the EIS and preliminary design phase. This will also include the determination of noise, landscaping, and other environmental management requirements. The focus of the study to this point has been to identify a preferred route and end the period of uncertainty for those within the study focus area not directly affected by land requirements for the preferred route.

The preferred route complies with the design standards established for this study. The preferred route will help to deliver improved efficiencies, service frequency, operating speeds and reliability of services. It will also cater for the increasing demand for rail services caused by population and freight growth. It has been selected on the basis of social, environmental, transport, technical and economic considerations, and is considered to present the best possible route through the study focus area.

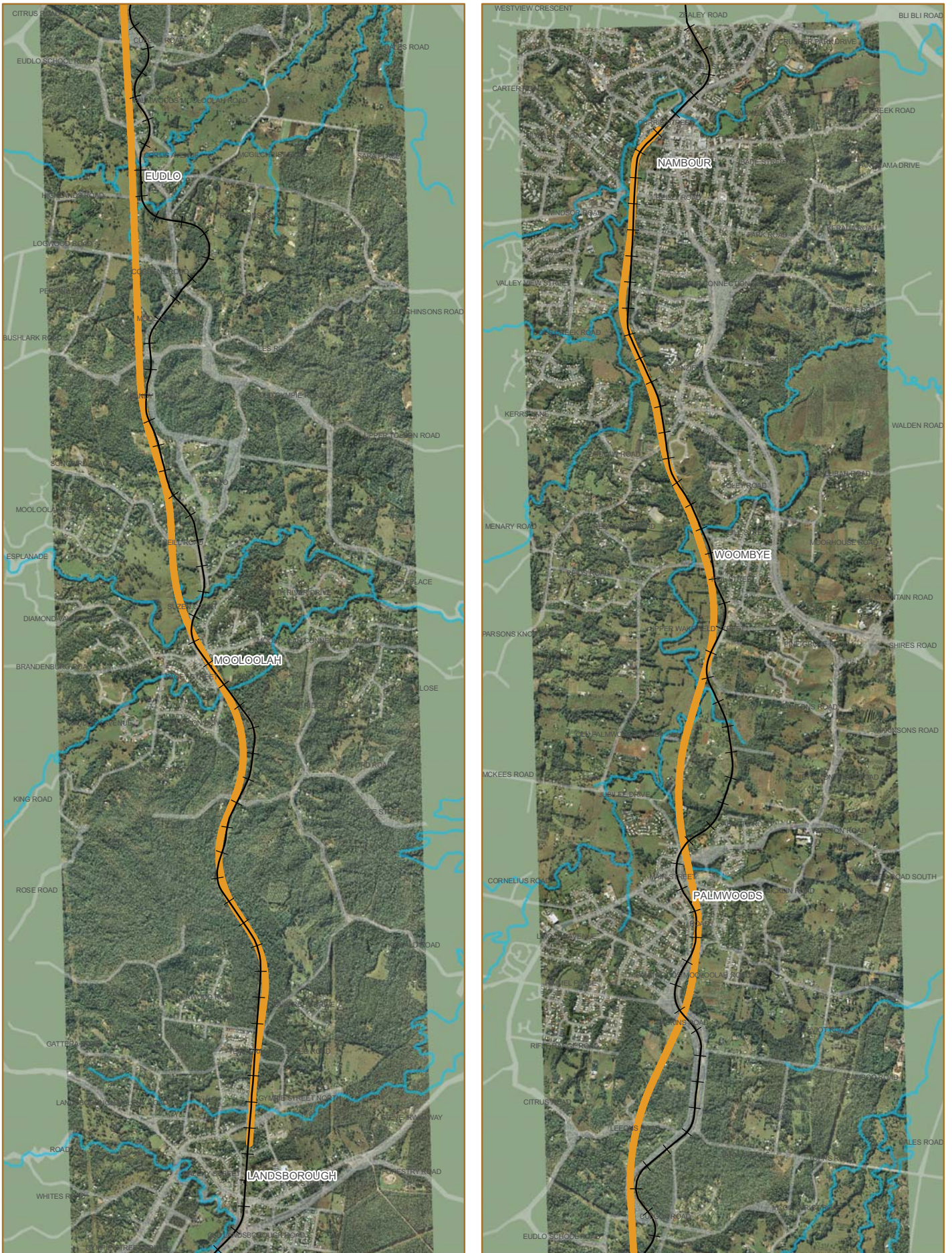
The preferred route:

- Requires grade separation at Gympie Street North. Currently this is proposed to be further developed as a road over rail bridge. Further assessment, planning, design and consultation will be required to address this issue.
- Traverses Dularcha National Park, close to the existing rail corridor. This will require further consultation with the EPA and sensitive design and construction planning.
- Passes under the Rose Road ridge in a tunnel, located on the western side of the existing operational tunnel. Further design and investigation is required to confirm the extent of the construction footprint in this area.
- Passes through the Mooloolah town centre, close to the existing rail corridor. Further assessment, planning, design and consultation will be required to address the issues associated with future grade separation of Brays Road/ Mooloolah Connection Road.
- Crosses the Mooloolah River at a sharp bend, which has been identified during recent field work as an ecologically sensitive area. Further assessment, planning, design and consultation is required to refine this river crossing, and address road network impacts in the area.
- Passes under the ridge line south of Eudlo in a tunnel, to the west of the existing operational tunnel. Further design and investigation will be required to confirm the extent of the construction footprint in this area.
- Passes the township of Eudlo approximately 85 m to the west of the existing station location. This allows the reinstatement of Eudlo Station relatively close to the township.
- Traverses the western fringe of Eudlo Creek National Park. This will require further consultation with the EPA and sensitive design and construction planning. There are opportunities in close proximity to this National Park for reconnecting wildlife corridors through areas where significant cuts have been identified.
- Passes through Palmwoods town centre, to the east of the existing rail corridor. Further assessment, planning, design and consultation will be required to address issues including station location, management and mitigation of impacts to community and recreational facilities, and opportunities to resolve local road network issues.
- Passes Woombye slightly to the west of the existing rail corridor, and allows for the siting of Woombye Station approximately 50 m west of its current location. It also encroaches on the eastern side of the Woombye recreational grounds. Further assessment, planning, design and consultation will be required to develop the best outcome for this area.
- Is located within a widening of the existing rail corridor, and minimises residential property impacts in this area. Further design will be required to minimise impacts on sections of Petrie Creek.

Based on the comparative review of route options on a segment by segment basis, the preferred route is considered to have a lower environmental impact than other route options considered. It also has lower property impacts, and has been selected with consideration to social, economic, transport and land use considerations.

In summary, the key issues to be addressed through the EIS and preliminary design would include:

- Property, social and community impacts
- Realignment of the local road network and reprovision of property accesses



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March 2008

Legend

- Existing Rail Line
- Preferred Route
- Creeks
- Roads

Note: All routes shown are centrelines, detailed corridor widths will be provided within the report.

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0 250 500 750 1,000 Meters

Landsborough to Nambour Rail Corridor Study

Figure 3

The Preferred Route

- Clearance of mapped regional ecosystems (protected under the *Vegetation Management Act 1999*)
- Constructability issues where the preferred route crosses or runs within the existing rail corridor
- Sensitive environmental design of creek crossings with a view to minimising the clearing of riparian vegetation and impact on aquatic habitats
- Landscaping and noise mitigation requirements
- Effects of grade separation at Gympie Street North
- Management of impacts to the Landsborough Primary School oval and Landsborough Recreational Reserve
- Management and mitigation of impacts to Dularcha National Park
- Effects of grade separation of Brays Road/Mooloolah Connection Road on the Mooloolah town centre
- Sensitive environmental design for the crossing of the Mooloolah River, north of the town centre
- Management and mitigation of impacts to Eudlo Creek National Park, including investigations for wildlife corridor provisions in adjacent areas
- Identification of the best station location at Palmwoods
- Road network issues in Palmwoods
- Minimisation and management of impacts to community and recreational facilities in Palmwoods and Woombye
- Constructability issues in the vicinity of Blackall Range Road
- Identification of a preferred stabling option in Nambour.

Next Steps

Community Engagement

Community engagement has and will continue to play a valuable role in the study as the project moves into the EIS phase. Future activities include:

- Maintaining the existing 1800 number and project website to provide the public with ongoing access to current and accurate information about the project
- Meeting with directly affected landowners to provide information about the project and acquisition processes, to assess the impacts on individual landowners, and determine ways that impacts can be minimised or managed
- Maintaining regular contact with directly affected landowners to keep them informed of activities and timeframes
- Ongoing information sessions during the EIS process as required.

EPBC Referral

Several matters of National Environmental Significance (NES) under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC) have been identified as present in the study focus area.

Prior to the issue of the draft Terms of Reference for public and agency comment, the project will be referred to the Commonwealth Department of the Environment, Water, Heritage and the Arts for a decision to be made as to whether the activity (the project) is a controlled action under the EPBC Act, and the level of environmental assessment required. The matters of National Environmental Significance (NES) identified relate to species or communities protected by this Act.

Executive Summary

The EIS Process

The Project has been declared a 'significant project for which an EIS is required' pursuant to Section 26(1)(a) of the *State Development and Public Works Organisation Act 1971* (SDPWO Act) due to its potential impact on significant infrastructure, potential environmental effects and the strategic significance of the project.

The SDPWO Act sets out a process requiring the proponent to prepare an Environmental Impact Statement (EIS) under the SDPWO Act for a 'significant project'. The Department of Infrastructure and Planning will oversee this process. This process includes:

- Preparation and public notification of draft Terms of Reference
- Public notification of the EIS, which must address the finalised Terms of Reference
- Review of public submissions
- Reporting on the evaluation of the EIS, public submissions and additional information by the Coordinator-General.

The EIS process will formally begin after the release of the preferred route. The EIS is expected to address the impacts and mitigation opportunities for environmental, social and economic effects that may be generated by the project. This will include the determination of noise, landscaping, and other environmental management requirements.

Preliminary Design

The preferred route will be further refined throughout the preliminary design phase. This process will refine the corridor requirements, including the areas required for the rail corridor, and areas required for road realignments, property accesses, and other environmental management requirements.

Additional land requirements for rail power supply and other supporting infrastructure will be identified during the preliminary design process. Generally, consideration for reuse of sections of the existing rail corridor would be a priority. Requirements for construction access, sites and compounds will also be broadly determined during the preliminary design phase, and assessed during the EIS process.

Limitations of this document

This report has been prepared solely for Queensland Transport to provide a record of the process for the identification of a preferred route for the upgrade of the North Coast Line between Landsborough and Nambour.

Whilst Arup and its consultants have taken care in the preparation of this report, it does not accept any liability or responsibility whatsoever in respect of:

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