CHAPTER 02

Project Rationale

CALVERT TO KAGARU ENVIRONMENTAL IMPACT STATEMENT

INLAND RAIL

ARTC

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2. Project rationale

2.1 Introduction

This chapter describes the rationale for the Calvert to Kagaru Project (the Project) and the broader Inland Rail Program (Inland Rail). This chapter provides details on:

- The justification for Inland Rail, including:
  - Description of the existing freight network between Melbourne and Brisbane and the future demands that are forecast to be placed on this network
  - History of Inland Rail
  - Comparison of freight movement alternatives as a solution to the projected freight network capacity constraints
- The benefits of proceeding with Inland Rail and the Project
- The consequences of not proceeding with Inland Rail and the Project
- Alternative locations and route options for Inland Rail and the Project
- Relationship to other projects.

2.2 Terms of Reference

This chapter addresses the Terms of Reference (ToR) for the Project as summarised in Table 2.1.

Appendix B: Terms of Reference Compliance Table provides a cross-reference for each ToR against relevant sections in this EIS.

TABLE 2.1: TERMS OF REFERENCE COMPLIANCE TABLE—PROJECT RATIONALE

Terms of Reference requirement		Where addressed
6.7	Present feasible alternatives of the project's configuration (including individual elements) that may improve environmental outcomes. Discuss the consequences of not proceeding with the project.	Sections 2.5 and 2.7
7.6	An EIS should also describe the expected benefits and opportunities associated with the project	Section 2.4
10.1	The EIS must describe and illustrate at least the following specific information about the proposed project: (e) Rationale for the project	Chapter 2: Project Rationale
11.18	In accordance with Schedule 4 of the EPBC Regulations, feasible project alternatives must be discussed, including: (a) If relevant, the alternative of taking no action (b) A comparative description of the impacts of each alternative on the triggered MNES protected by the controlling provision (c) Sufficient detail to make clear why any alternative or option is preferred to another.	Sections 2.6 and 2.7 Appendix K: Matters of National Environmental Significance Technical Report, Section 1.7
11.19	Short, medium and long-term advantages and disadvantages of the alternatives or options must be discussed.	Sections 2.6 and 2.7 Appendix K: Matters of National Environmental Significance Technical Report, Section 1.7

2.3 Justification for Inland Rail

2.3.1 Existing rail network and capacity

At present, there is no continuous inland rail link between Melbourne and Brisbane. Currently, interstate rail freight travels between Melbourne and Sydney via Albury, and then between Sydney and Brisbane, generally along the coast. Transit times are long, and the existing network cannot accommodate highly efficient, long double-stacked trains.

The existing North–South rail corridor between Melbourne and Brisbane does not provide a service offering that is competitive with road transport. This is largely the result of 19th century alignments leading to low travel speeds, poor reliability and major bottlenecks, most notably in the Sydney metropolitan area.

Infrastructure Australia (2016a) notes that *'...the demand for urban transport infrastructure is projected to increase significantly. Without action, the cost to the wider community of congestion on urban roads could rise to more than $50 billion each year by 2031. The demand on many key urban road and rail corridors is projected to significantly exceed the current capacity by 2031'*. This projection is supported by findings published in the 2019 edition of *The Household, Income and Labour Dynamics in Australia Survey* (Wilkins et al., 2019), which found that the mean daily commute times of employed persons in mainland capital cities increased by 19.5 per cent between 2002 and 2017. This trend would continue, and potentially worsen, with increased trucking movements on metropolitan roads.

The *National Land Freight Strategy* (Standing Council on Transport and Infrastructure, 2013) identified a number of existing challenges facing road and rail freight in general, including:

- Congestion from increasing numbers of passenger vehicles and the priority given to passenger vehicles over freight vehicles in urban settings can adversely impact on the efficiency of freight vehicle movement. This is particularly the case on routes such as the Pacific and Ipswich motorways, and the Hume, Newell and Warrego highways.
- Urban development encroaching on freight routes and precincts as cities grow in size and density leads to an increased potential for amenity, environmental and interface issues.

The *Melbourne–Brisbane Inland Rail Alignment Study* (ARTC, 2010) indicated that:

- There are likely to be capacity constraints on the existing coastal railway unless significant capital works are undertaken.
- The coastal railway between Sydney and Brisbane would reach capacity around 2052.

The issues associated with the existing regional rail systems also include that much of the infrastructure is old and has maintenance and renewal issues. Poor maintenance of rail lines leads to more freight being transported by road, imposing additional maintenance burdens on the affected local governments (Infrastructure Australia, 2015).

2.3.2 Future east coast freight demand

In 2011, the Australian domestic rail freight task totalled 261.4 billion tonne kilometres, accounting for approximately 46 per cent of total domestic freight. This represents an increase of 91 per cent since 2000–2001 (Infrastructure Australia, 2015).

The *Australian Infrastructure Audit* (Infrastructure Australia, 2015) notes that:

- The national land freight task is expected to grow by 80 per cent between 2011 and 2031
- Demand for freight rail infrastructure is expected to grow, particularly for resource bulk commodity haulage in Western Australia (WA), Queensland (QLD) and New South Wales (NSW)
- Freight rail will need to play a growing role in the movement of goods between ports and inland rail freight terminals, and in the movement of containerised and general freight over longer distances.

The Melbourne to Brisbane corridor is one of the most important general freight routes in Australia, supporting key population and employment precincts along the east coast and inland NSW. The current volume of non-bulk and complementary freight moving within this corridor is approximately 21 million tonnes per annum. This is expected to increase to 40 million tonnes per annum by 2050, consisting of manufactured (non-bulk) products, bulk steel, paper, agricultural and mining products (Infrastructure Australia, 2016). Inland Rail would help to ease the burden placed on roads by this additional volume of freight by providing an alternative means for transporting the equivalent of more than 200,000 truck movements annually (ARTC, 2015b).

The eastern states of Australia comprise 18 million residents (79 per cent of Australia's population), nine million jobs (78 per cent of Australia's national employment) and contributes $1.1 trillion in gross state product (75 per cent of the share freight contributes to gross domestic product). Interstate freight transport is projected to increase by 70 per cent between 2015 and 2030, to 140 billion tonne kilometres. The Melbourne to Brisbane corridor already supports 17 per cent of these interstate movements (ARTC, 2015b).

With the population of the eastern states forecast to increase by 60 per cent over the next 40 years, the need for efficient and effective freight transport will continue to increase. Strong forecast population growth, accompanied by comparable employment growth, is likely to place significant pressure on existing infrastructure and services (ARTC, 2015b). Without the increased use of rail, the growth in freight demand is likely to increase pressure on the road network, resulting in increased freight costs and lost economic opportunities.

Inland Rail will intersect the East–West rail corridor at Parkes, better connecting all state mainland capitals and will serve a variety of freight markets, not just Melbourne to Brisbane with significant demand from regional commodities and interstate freight. Inland Rail will also be a catalyst for other complementary investments in the supply chain including new multimodal terminals, processing facilities and distribution centres along the supply chain (ARTC, 2015b).

2.3.3 History of Inland Rail

The development of an inland railway between Melbourne and Brisbane has been considered for more than a hundred years, first being formally considered in 1902 (ARTC, 2015b). The current Inland Rail Program was initiated in 2006, as a safe, sustainable solution to the freight challenge that will transform the way freight is moved around the country. The Inland Rail Program has been the subject of significant analysis for the following reasons:

- The existing North–South coastal railway will reach capacity in the next three decades. Additional capacity is required to accommodate increasing demand for interstate and regional rail freight in the future.
- The quality of service provided by the existing coastal route is adversely impacting on freight productivity and transport costs.
- The existing North–South coastal railway is trafficked by passenger and freight trains. This is impacting on the reliability of rail freight and is constraining opportunities for the expansion of passenger services.
- In the absence of a continuous inland rail link between Melbourne and Brisbane, transporting freight by road has a competitive advantage over rail. This makes it difficult for rail freight to increase its market share.
- Transporting freight by road has associated safety, congestion and environmental risks (ARTC, 2015b).

Since 2006, two major studies have been commissioned in relation to the development of an inland rail route between Melbourne and Brisbane. The first study, the *North–South Rail Corridor Study* (Ernst & Young, 2006) examined the adequacy of the existing Melbourne to Sydney to Brisbane rail corridor to meet future freight demand. The study also examined different options for an enhanced, existing coastal route or alternative inland routes. Key issues identified in the study included infrastructure links, engineering, environmental, urban and regional planning issues. A financial and economic analysis was also undertaken on each of the route options. The study identified the 'Far Western Sub-corridor' through Parkes as the preferred corridor.

In 2008, the then Australian Government Minister for Infrastructure, Transport, Regional Development and Local Government announced a second study, the *Melbourne–Brisbane Inland Rail Alignment Study* (ARTC, 2010). The purpose of this study was to optimise the Far Western Sub-corridor route, and to analyse the likely economic and commercial benefits of an inland rail route between Melbourne and Brisbane. The outcome was the determination of a preferred alignment, based on consideration of the economic benefits and key commercial considerations.

It provided the government and private sector with information that would help guide future investment decisions, including likely demand, estimated construction costs, and a range of possible private financing options. The report recommended the Inland Rail should be considered again in the future as new details became available of the cost of coastal railway upgrade proposals, the capacity and reliability improvements they provide, and/or demand achieved.

In November 2013, the Australian Government Minister for Infrastructure and Regional Development announced $300 million in funding for the Inland Rail Program to be used for pre-construction activities such as detailed corridor planning, environmental assessments and community consultation. The Minister also announced that a high-level Implementation Group would be formed to drive Inland Rail.

In 2014, ARTC developed *a Concept Business Case* (ARTC, 2015c) as a precursor to a more detailed Program business case. The *Concept Business Case* outlined key scope and scheduling assumptions, identified key risks and environmental and planning considerations, and preliminary updates to demand, economic and financial analyses.

The *Concept Business Case* identified key areas for further consideration and/or analysis. These areas included demand, costs, risks, technical and operational requirements, and refined financial and economic analysis, which were subsequently addressed within the *Inland Rail Program Business Case* (ARTC, 2015b).

The *Inland Rail Program Business Case* was developed in 2015 to provide a detailed assessment of why Inland Rail is needed and how it could be delivered. The viability, benefits, costs and risks associated with the Program were all assessed (ARTC, 2015b).

2.3.4 Freight movement alternatives

Alternative freight transport solutions with the potential to address Australia's current and future freight challenges were considered by the *Inland Rail Program Business Case* (ARTC, 2015b) and the *Melbourne–Brisbane Inland Rail Report* by the Inland Rail Implementation Group (IRIG) (Inland Rail Implementation Group, 2015).

Three capital investment options were assessed by the *Inland Rail Program Business Case* (ARTC, 2015b):

1. Progressive road upgrades
2. Upgrading the existing east coast railway
3. An inland railway.

These capital investment options were subjected to a rigorous assessment against seven equally weighted criteria consistent with Infrastructure Australia's *Reform and Investment Framework Guidelines* (ARTC, 2015b):

1. Capacity to serve future inter-capital and regional/bulk freight market needs on the east coast
2. Foster economic growth through improved freight productivity and service quality (including improved reliability and resilience)
3. Optimise environmental outcomes
4. Alleviate urban constraints
5. Enable regional development
6. Ease of implementation
7. Cost-effectiveness.

Overall, constructing an inland railway was found to be the preferred option with an average 'high likelihood' of improving outcomes across all criteria. Progressive road upgrades and upgrading the existing east coast railway both had an average 'medium likelihood' of improving outcomes across all criteria.

In relation to individual criteria, progressive road upgrades outranked the inland railway option only in relation to ease of implementation and ranked equally with an inland railway in relation to enabling regional development outcomes. The inland railway option was found to be the best option across all other criteria.

The following alternatives were reviewed by the IRIG:

- Maritime shipping
- Air freight
- Road freight
- Rail solutions.

The results of the review of alternatives undertaken by the IRIG are summarised below.

2.3.4.1 Maritime shipping

Maritime freight was examined as a potential alternative to Inland Rail based on two types of services including:

- A dedicated service between Melbourne and Brisbane (coastal shipping)
- Using spare capacity on vessels calling at Melbourne and Brisbane as part of an international voyage.

The *Melbourne–Brisbane Inland Rail Report* (IRIG, 2015) concluded that:

- Shipping is unlikely to be a strong alternative to Inland Rail because it does not provide the level of service (transit time and service availability) required by the majority of the Melbourne to Brisbane interstate market
- Shipping still has a role to play, especially due to its strength in transporting high-volume and long-distance cargo around the coast. Shipping can be used in conjunction with other modes such as an inland railway to meet Australia's future transport needs.

Additionally, a maritime freight solution would not provide the same potential economic benefits and opportunities to inland communities that can be provided by Inland Rail.

2.3.4.2 Air freight

Domestic air freight accounts for less than 0.01 per cent of total domestic freight movements in Australia by weight (IRIG, 2015). Most of these movements are comprised of newspapers and parcels between major cities, on either dedicated freight flights or on existing passenger flights. Air freight is highly specialised due to the inherent constraints on aircraft size and the nature of the goods that can be carried. The report concluded that:

- Air freight has a limited role to play in the transport of bulky or heavy goods on the Melbourne to Brisbane corridor, but will continue to play a crucial role for small, high-value and time-dependent goods.
- Air freight is not a viable alternative for addressing Australia's freight requirements on the Melbourne to Brisbane corridor into the future.

2.3.4.3 Road freight

The role of road transport was considered as a potential alternative to an inland rail. Road transport is the main mode of transport for the majority of commodities produced or consumed in Australia. Along the north–south corridor, the main routes for road freight are on the Hume Highway (between Sydney and Melbourne), the Pacific Highway (for coastal transport between Sydney and Brisbane) and the Newell Highway (between Melbourne and Brisbane) (IRIG, 2015).

The identified issues and considerations relevant to road freight on these corridors include:

- The north–south road corridor will face significant local and regional capacity constraints for road freight in the medium to longer term
- The mix of local traffic, private vehicles, freight vehicles on road transport corridors reduces reliability as a result of the different average travel speeds between cars and heavy vehicles, and increased accident rates
- Conflicts between local traffic, private vehicles and freight vehicles on these corridors will increase in line with significant forecast growth in population, employment and demands for freight transport
- Compared with rail, road freight results in additional environmental costs, including from air pollution, greenhouse gas emissions and water pollution
- The cost to freight operators of congestion in urban areas due to reduced travel speeds and reliability for freight transport is estimated to be around $60 million per year for Melbourne to Brisbane inter-capital freight alone
- The Australian Government and state governments are investing in road infrastructure along the north–south corridor. However, this investment will be insufficient to remove all the existing and predicted future issues along the full length of the corridor, leaving trucking productivity exposed to the cumulative effects of the remaining deficiencies
- The *Melbourne–Brisbane Inland Rail Report* (IRIG, 2015) concluded that:
  - While road transport will continue to contribute to Australia's freight task, unless substantial additional investment is made in road infrastructure, it will be unlikely by itself to meet the longer-term needs for Australia's freight task due to significant local and regional capacity constraints
  - Should the Australian Government decide not to proceed with a rail solution, further investigation of road transport is required to determine its capacity to manage the future north–south freight task.

2.3.4.4 Rail solutions

The two main rail solutions considered by the IRIG were enhancement of the existing east coast railway and construction of a new inland railway.

The *Melbourne–Brisbane Inland Rail Report* (IRIG, 2015) noted that there are capacity, reliability and performance issues associated with the existing east coast railway. The performance issues mainly relate to constraints associated with moving freight trains through the Sydney metropolitan rail network. The service offering constraints of the existing coastal rail route compared to Inland Rail are summarised in Table 2.2.

TABLE 2.2: COMPARISON OF EXISTING MELBOURNE TO BRISBANE COASTAL ROUTE TO INLAND RAIL SERVICE OFFERING

Service offering	Coastal Rail (2014–15)	Inland Rail	Improvement with Inland Rail
Transit time	32–34 hours	Up to 24 hours	10 hours
Reliability[1]	83%	98%	15%
Availability[2]	61%	95%	34%
Relative price (to road)[3]	85%	57–65%	20–28%

Source: *Inland Rail Program Business Case (ARTC, 2015a)*

Table notes:

1 Reliability is defined as the percentage of goods delivered on time by road freight, or available to be picked up at the rail terminal or port when promised.

2 Availability refers to the percentage of available departure and arrival services that are convenient for customers, which depends on cut-off and transit times.

3 Relative price is presented for non-bulk, inter-capital freight (door-to-door) indicating the range over the period 2024–25 to 2049–50.

As a sub-option of enhancing the existing east coast railway, the report noted that the proposed new Outer Sydney Orbital corridor would provide opportunities for a rail route that could ease freight congestion on Sydney freight networks. However, the main role of this corridor would be to address freight capacity constraints on other routes, such as those for intrastate and export freight. In addition, this option would not provide significant transit time savings for Melbourne to Brisbane freight, as the missing link between north–west NSW and southern QLD would still be required, or the existing coastal line would need to be upgraded (IRIG, 2015).

The report concluded that:

- For Melbourne to Brisbane freight, the existing east coast railway would not be competitive with road in terms of cost or time, even with significant further investment. It is not a viable alternative to Inland Rail.
- Inland Rail would meet Australia's future freight challenge and bring significant and positive national benefits by boosting national productivity and economic growth, while promoting better safety and environmental outcomes.

2.3.4.5 Summary of findings

Overall, in relation to the various alternatives to Inland Rail, the IRIG (2015) concluded that:

- While shipping and air will continue to play a role in the interstate freight market, they are not viable alternatives to rail.
- Without Inland Rail, road is the only mode capable of addressing the majority of the future freight task, with associated direct and indirect costs.

2.3.5 Service offering

The Inland Rail Program, and this Project, provides a significant opportunity to change the fundamentals of the freight logistics supply chain in Australia and deliver economic and social benefits long into the future.

The service offering is central to the delivery and competitiveness of Inland Rail and reflects the priorities of freight customers. It was developed in consultation with key market participants and stakeholders and represents the key elements to be addressed by Inland Rail to enable a competitive and complementary service offering compared to other modes, including road transport.

The key characteristics of the Inland Rail service offering are:

- **Reliability:** 98 per cent, defined as the percentage of goods delivered on time by road freight, or available to be picked up at the rail terminal or port when promised
- **Price:** cheaper relative to road transportation, as a combined cost of access to the rail network, rail haulage and pick-up and delivery
- **Transit time:** 24 hours or less from Melbourne to Brisbane
- **Availability:** services available with departure and arrival times that are convenient for customers, which depends on cut-off and transit times.

These key characteristics are underpinned by the key technical characteristics that are particularly relevant to rail operators as these characteristics directly influence operating cost structures and the rail operators' own service offerings to the market. The key technical characteristics of Inland Rail and the Project are discussed in Chapter 6: Project Description.

While the service offering is specific to the rail network, terminals are a critical element and ARTC will work with terminal operators and proponents as the Inland Rail Program progresses to enable connection opportunities.

2.4 Benefits of proceeding with Inland Rail

Inland Rail presents a unique opportunity to establish a competitive freight system through the provision of trunk rail infrastructure supporting a network of intermodal terminals and local sidings for the distribution of commodities at the national, regional and local level.

As a component of the larger Inland Rail Program, the potential benefits of the Project cannot be separated from the benefits that are attributed to the full Melbourne to Brisbane alignment. Therefore, the potential benefits of Inland Rail and of this Project, as documented in the *Inland Rail Program Business Case* (ARTC, 2015b), are presented together in this section.

2.4.1 Direct benefits

Foreseeable benefits directly attributed to the Inland Rail Program, as identified by the *Inland Rail Program Business Case* (ARTC, 2015b), are summarised below.

2.4.1.1 Improved access to and from regional markets

Inland Rail will improve access to and from regional markets through:

- Improved linkages to regional areas for inter-capital freight
- Improved mine to port accessibility between coal mines in the Surat and Clarence–Moreton Basins and the Port of Brisbane, which reduces operating costs and results in additional coal exports that would not have otherwise occurred
- Improved access in agricultural areas to key local, regional and international markets, which will improve market drought resilience and the ability to move greater volumes of grain via rail.

2.4.1.2 Reduced costs for the market

Inland Rail will reduce costs to market through the efficiencies gained by the development of a dedicated freight rail system. Anticipated benefits include, but are not necessarily limited to:

- Reduced inter-capital freight transport costs for the market are likely to result in lower prices for consumers (predominantly manufactured goods). This also presents an opportunity for flow-through of cost savings to reduce the cost of living for consumer households.
- Reduced lifecycle costs for infrastructure owners/operators on traditional road freight routes due to lower freight volumes on these assets. This would reduce maintenance costs and enable investments in capacity to be avoided or deferred.
- Reduced transport costs may improve competitiveness of key markets and economic activity, particularly in the agricultural and coal sectors.

- Reduced operating costs may improve the viability of some mines resulting in induced coal freight volumes that would not otherwise have occurred. There will be additional profits to mines, which Australian owners will retain, and additional taxes (company, royalties and payroll tax) for profits accruing to overseas owners.
- Coal freight in the Surat and Clarence–Moreton Basins is likely to benefit from reduced above rail operating costs as a result of:
    - Higher axle loads east of Oakey (20-tonne axle loads compared to the current 15.75-tonne axle loads)
    - Longer trains (1,010 m compared to the current 650 m)
    - A more direct alignment via a tunnel across the Toowoomba Range that avoids the current crossing where operating speeds are constrained by high gradients and tight curves on a winding track.
- Inter-capital and agricultural freight currently travelling by road is likely to benefit from reduced operating costs due to economies of scale in rail relative to road transport.

2.4.1.3 Improved reliability and certainty of transit time

The dedicated Inland Rail freight system will deliver greater efficiencies in terms of reliability and certainty through the following measures:

- Improved reliability and certainty of transit time results in productivity and economic efficiency due to operating cost savings, shorter transit times, improved availability and avoided incidents on the coastal route
- Benefits associated with higher axle loads, longer trains, lower gradients and longer curves, resulting in shorter transit times and avoided incidents and flooding
- Linkages between existing rail networks, such as the existing Queensland Rail (QR) West Moreton System rail corridor and the Brisbane to Sydney Interstate Line. Additionally, railway infrastructure within existing corridors used by Inland Rail would be subject to replacement and upgrade. New linkages and upgraded infrastructure would combine to enable faster transit time on existing journeys.

Freight customers have indicated they may be willing to pay for improved reliability and availability with Inland Rail. These benefits would induce additional freight volumes that would not have occurred in the absence of Inland Rail.

2.4.1.4 Increased capacity of the transport network

The capacity of the overall transport network will be enhanced by the development of Inland Rail via:

- Increased capacity enabling the opportunity to return unused freight paths to passengers in Sydney and Brisbane during off peak periods (noting that passengers are already given absolute priority in peak periods)
- Improved customer outcomes for rail passengers between Sydney and Brisbane with unused freight paths on the coastal route able to be returned to passenger services. The benefit of increased frequency of passenger services reduces average wait time and provides greater reliability and certainty for passengers
- Increased capacity enabling the opportunity to return unused freight routes to passengers in Sydney and Brisbane during off peak periods (noting that passengers are already given absolute priority during peak periods on metropolitan networks)
- Improved customer outcomes for rail passengers between Sydney and Brisbane with unused freight schedule timeslots on the coastal route able to be returned to passenger services. The benefit of increased frequency of passenger services would reduce average wait time and provide greater reliability and certainty for passengers
- Increased freight capacity enabling greater volumes of inter-capital freight to be moved via rail with a reduced reliance on existing state-controlled and local road networks
- By providing new linkages between existing rail networks, such as those operated by QR, Inland Rail would provide an option for alleviating future short- or long-term capacity constraints on these railways
- Road traffic through Sydney will be relieved by allowing greater capacity for public transport, avoiding the need for capacity augmentation on existing routes
- Greater volumes of inter-capital freight to be moved via rail with a reduced reliance on road
- Coal trains to use longer/heavier trains with better port access
- Agricultural freight, including grain to use rail in accessing key local and international markets.

2.4.1.5 Reduced distances travelled

Inland Rail will provide a shorter option for the transportation of freight, resulting in a reduced time between the point of source and the market for goods and produce. Through the provision of new linkages between existing rail networks, such as those operated by QR, Inland Rail will also provide a shorter route option for undertaking existing journeys.

2.4.1.6 Improved safety

Benefits relating to road safety through the development of Inland Rail are expected to:

- Remove 200,000 long-haul truck movements from roads each year. It is expected that road transport will still be required for distribution from intermodal terminals
- Reduce congestion and creates capacity on existing road and rail networks in metropolitan Sydney
- Reduce the burden on roads and improves safety
- Reduce truck volumes in over 20 regional towns
- Relocate mainline freight traffic from existing railways out of some town centres such as Inglewood, Pittsworth and Southbrook, providing for a safer environment with enhanced liveability.

Inland Rail will adopt the Advanced Train Management System (ATMS), which is a global positioning system for the control of train movements on the network. Each train 'knows' where it is on the network and can be automatically braked if it exceeds speed or does not have permission to be on a section of track.

2.4.1.7 Improved sustainability and amenity for the community

Inland Rail will provide a long-haul freight solution that is time and cost competitive when compared to road freight. Consequently, Inland Rail will replace some of the long-haul road freight task, resulting in reduced road congestion, fewer vehicular carbon emissions and reduced noise. It is estimated that transportation of freight on Inland Rail will use up to two-thirds less fuel than that would be required to transport the same volume of freight via the existing road route.

2.4.2 Indirect benefits

Foreseeable indirect benefits that cannot be directly attributed to the Program but rather arise through intervening factors or influences were also identified by the *Inland Rail Concept Business Case* (ARTC, 2015a). These indirect benefits are summarised below.

2.4.2.1 Create a step-change in the Australian freight network

Inland Rail offers significant performance advantages over the existing coastal route, including:

- Faster and more reliable transit times
- Shorter alignments
- More optimal grades
- The potential for double stacking and longer and heavier axle load trains.

It will improve the reliability and resilience of the freight network and improve access to export ports and urban freight destinations. These operational efficiencies will increase the role rail plays in the broader freight network and will allow rail to compete in the market as a viable alternative to road, increasing the overall network capacity and freight mode options available to the market.

2.4.2.2 Be a catalyst for growth

Inland Rail will future-proof Australia's rail freight task against population growth and the projected increase in freight demand, allowing for increased productivity in major capital cities.

Inland Rail is expected to deliver 16,000 new jobs at the peak of construction, and an average of 700 additional jobs per year over the entire period. It is expected to increase Australia's gross domestic product (GDP) by $16 billion during its construction and first 50 years of operation.

Inland Rail will improve the safety of the network with a better mix and separation of modes in urban and regional environments, providing options for movement of goods that do not require larger vehicles than is currently used throughout the passenger vehicle network. This separation will result in improved network efficiency by shorter journeys, lower fuel and maintenance costs, leading to supply chain efficiencies and reduced costs which will ultimately benefit consumers.

At a local level, the Project has the potential to catalyse development through:

- **Employment:** The construction workforce is expected to be drawn primarily from communities within the Project region and nearby local government areas (LGAs) and, therefore, employment and training benefits would extend to construction industry workers across the region. The availability of long periods of employment in project construction is likely to be a strong positive opportunity for those personnel and their families.

  Employment opportunities in the Project region during the construction stage will have positive mental health benefits for the individuals employed, particularly if they are exiting a period of unemployment or commencing their career. This would be particularly important in communities with high levels of unemployment such as Rosewood, Ebenezer and Willowbank, and for particular population groups where unemployment rates are high.

- **Business opportunities:** Local and regional businesses will benefit from the construction phase. Opportunities to supply the Project may include supply of fuels, equipment, borrow and quarried material, and services including fencing, electrical installation, rehabilitation, landscaping, maintenance and trades services.

  Local transport or logistics businesses may also have significant opportunities to service the construction phase.

  The Project's local supply arrangements will provide an opportunity to develop and grow local businesses.

  The expansion in construction activity in the vicinity of the Project will support additional flow-on demand and additional spending by the construction workforce, and therefore business trading levels in the region.

  The Project will improve the connection between local produce such as bulk grain, containerised cotton and other agricultural products, and markets; through to both domestic markets in cities and international markets via the Port of Brisbane.

Further details on local community benefits are discussed in Chapter 16: Social and Chapter 17: Economics.

2.4.2.3 Facilitate training and skills development

ARTC has a strong commitment to training local and Indigenous people and has consulted with Indigenous community members with respect to employment and training opportunities. Training pathways and creation of opportunities for the development of skilled local and Indigenous workers through the Project's construction and operation will be achieved by:

- Providing information about the nature of skills required with sufficient lead-time to enable local training programs to be customised
- Cooperating with high schools in the region and training providers to provide appropriate training and skill development, and identify available employment pathways
- Encouraging applicants from Indigenous community networks to increase the number of Indigenous people applying for jobs
- Linking training and development programs with other projects, key partnerships and local industries to provide the greatest regional benefit
- Working with state governments and the Australian Government to provide long-term outcomes through training, mentoring and other support programs.

ARTC has launched the Inland Rail Skills Academy, which is a collection of projects and partnerships with the aim to:

- Facilitate local employment and procurement opportunities regionally by 'priming the market' in each region in which Inland Rail would be constructed
- Make it easy for Inland Rail contractors to employ and procure trained and competent people locally
- Build ARTC's social licence to operate for Inland Rail projects.

The Inland Rail Skills Academy comprises four pillars, including:

- Education: science, technology, engineering and maths (STEM) and trades education in schools and university scholarships into Inland Rail-related professions (e.g. engineering, project management)
- Skills and training: apprenticeships and traineeships, and gaining industry accreditation to support employment into Inland Rail projects as well as other major regional industries
- Business capacity building: for small-to-medium enterprises to understand and meet major projects' supply chain requirements and enhance the value proposition of local business chambers and business groups
- Inland Rail staff training and inductions: opportunities for individuals to increase skills in a range of areas, including safety and sustainability.

The partnerships and projects that make up the Inland Rail Skills Academy are in progress, with a comprehensive program to be delivered from 2020.

ARTC's workforce development project, training partnerships and the Inland Rail Skills Academy will help to ensure that young people and Indigenous people in the region have the opportunity for skills training that will equip them for the construction industry and will be transferrable to future projects. It will also result in an increase in the skilled labour force in the Project region.

2.4.2.4 Provide benefits for metropolitan and regional areas

The diversion of Melbourne to Brisbane and regional rail freight from the Sydney and Brisbane metropolitan rail networks, and transferring road freight (which currently transits through the Newell Highway or regional towns in Victoria (VIC), NSW and QLD), onto Inland Rail will reduce the competition for scarce capacity on the rail and road networks of these major cities.

It is predicted that the construction of the Inland Rail Program will remove a significant number of trucks from roads on the east coast, resulting in improved environmental sustainability through reduced road congestion, fewer emissions and less noise. The 10-year delivery program will support economic activity in the regions and create regional jobs in QLD, NSW and VIC during construction and longer-term economic opportunities for the regional areas through access to the new infrastructure and associated services.

2.4.2.5 Enable complementary market driven investments

The ultimate benefits of Inland Rail require interdependent and complementary investment in several other development opportunities and initiatives, and these will be coordinated throughout the Program, including:

- Intermodal terminals, loading facilities and sidings for regional, agricultural and coal freight
- Rollingstock investment in longer, heavier trains along with supporting train operations to take advantage of the improved rail offering (e.g. determination of arrival, departure and transit times) by train operators
- Double-stack terminal capacity in Melbourne and Brisbane and the ability to accommodate 1,800 m trains
- Investment in connecting coal and agricultural rail lines and rail sidings from the Surat and Clarence–Moreton Basins in south-west Queensland to the Port of Brisbane (the Western Line and in metropolitan Brisbane).

2.4.2.6 Consistency with the Queensland Freight Strategy

The *Queensland Freight Strategy* (Department of Transport and Main Roads (DTMR), 2019a) establishes a vision for the State's freight system, outlining a series of commitments that guide policy, planning and investment decision making for QLD's freight system. The strategy includes five commitments, shared by industry, customers and government, as follows:

- **Build effective partnerships:** We will work collaboratively to deliver a freight system that advances customer, industry and government interests, now and into the future
- **Unlock economic opportunity:** We will optimise the use of existing freight infrastructure and target investment towards creating economic opportunities
- **Smarter connectivity and access:** We will plan a freight system that provides QLD businesses with smarter access to local, national and overseas markets
- **A resilient freight system:** We will support the adoption of sustainable freight practices and resilient infrastructure
- **Safer freight movements:** We will support safe freight movements across QLD through technology and system planning.

The direct and indirect benefits presented in Section 2.4.1 and Section 2.4.2 provide demonstration that the Project is consistent with the intent of the *Queensland Freight Strategy* (DTMR, 2019a).

2.5 Consequences of not proceeding with Inland Rail and the Project

Not progressing with Inland Rail will potentially constrain the future growth of the national economy. The continuing growth in freight demand described in Section 2.3.2 calls for urgent attention. Without a decision to make a step-change in rail efficiency and performance, pressure on the road networks will continue to increase, freight costs will continue to rise, consumers will pay more for products, and productivity in important industrial sectors could decline.

Without Inland Rail, road will increasingly become the dominant freight transport mode, with rail becoming less relevant. A continued over-reliance on road transport to meet the future east coast freight task will increase the vulnerabilities to demographic changes that are, even today, driving shortages of long-distance truck drivers and increasing costs.

More specifically, if investment in the east coast/Inland Rail freight corridor is not undertaken to increase capacity and minimise supply chain costs, the following risks are highly likely to eventuate:

- National productivity and economic growth will be constrained
- Freight companies and the consumers of products transported along the corridor are expected to experience excessive freight costs
- An increase in congestion on both rail and road networks, given the reliance on shared freight/passenger corridors
- An increase in the number of trucks on urban and regional roads required to move the rising freight volumes
- Larger trucks (i.e. B-doubles, B-triples) will be mixing with smaller passenger vehicles on major highways
- Governments will be required to make significant investments in major arterial and regional roads to ensure they can support the increase in the number and size of heavy vehicles
- There will be a deterioration of safety on the road network with existing infrastructure not supportive of changes in vehicle mix
- Ongoing fuel use and emissions discharged from an increased number and size of heavy vehicles will have environmental impacts
- An increase in freight road traffic will have major impacts on urban and regional communities on the freight route such as congestion, amenity and noise, resulting in safety and environmental issues
- Significant economic impacts associated with the inability of the freight network to meet the demand for goods and services.

2.6 Alternative locations and route options for Inland Rail

After it was determined that Inland Rail would meet Australia's future freight challenge, alternative routes for Inland Rail were considered through the following three studies:

1. *North–South Rail Corridor Study* (Ernst & Young, 2006)
2. *Melbourne–Brisbane Inland Rail Alignment Study* (ARTC, 2010)
3. *Melbourne–Brisbane Inland Rail Report* (IRIG, 2015).

The results of the studies are summarised below.

2.6.1 North–South Rail Corridor Study

The *North–South Rail Corridor Study* (Ernst & Young, 2006) considered potential routes for Inland Rail. The purpose was to identify a route that would deliver the best overall economic outcome.

2.6.1.1 Options identified

Potential route options were identified within a 'north–south rail corridor', an elliptically shaped area defined by the standard gauge rail line along the NSW coast, and a broad arc west of Shepparton, Jerilderie, Coonamble, Burren Junction, Goondiwindi and Toowoomba (refer Figure 2.1). This area covers all sections of the existing rail network in VIC, NSW and QLD that currently form, or could potentially form, part of an inland freight route between Melbourne and Brisbane.

Within this corridor, four sub-corridors were identified, each of which could be combined with alternative routes between Melbourne and Junee, via Shepparton or via Albury. The four sub-corridors comprised:

1. Far Western Sub-corridor—linking Junee to Brisbane via Parkes, Dubbo and/or Narromine, Coonamble, Burren Junction, Narrabri and/or Moree, North Star, Goondiwindi, Warwick and/or Toowoomba
2. Central Inland Sub-corridor—linking Junee to Brisbane via any inland route that includes the Werris Creek to Armidale to Tenterfield rail links
3. Coastal Sub-corridor—following the existing coastal route between Junee and Brisbane (via Goulburn), through Sydney
4. Hybrid Sub-corridor—combining elements of an inland and coastal route, linking Junee to Brisbane via Muswellbrook and Maitland.

Within each of these sub-corridors, the feasibility of 136 possible route options was investigated. These options involved different combinations of new track and the upgrading of existing track.

2.6.1.2 Analysis of options

The route options were compared using an optimisation model specifically developed for the study, based on the following criteria:

- Operating efficiency
- Infrastructure requirements
- Market demand
- Environmental constraints
- Financial and economic viability.

Figure 2.1 shows the study area from the *North–South Rail Corridor Study* (Ernst & Young, 2006). Potential route options were identified within a 'north–south rail corridor', which was an elliptically shaped area defined by the standard gauge rail line along the NSW coast, and a broad arc west of Shepparton, Jerilderie, Coonamble, Burren Junction, Goondiwindi and Toowoomba.

FIGURE 2.1: STUDY AREA FOR THE *NORTH—SOUTH RAIL CORRIDOR STUDY*

The study identified potential demand, financial issues, environmental issues and infrastructure costs relevant to the four sub-corridors. The analysis undertaken for the study concluded that the Far Western Sub-corridor was the best performing sub-corridor option based on the following:

- Shortest and fastest transit journey from north to south, while avoiding the impact of Sydney rail traffic congestion
- Projected to require the lowest level of capital expenditure of the four sub-corridors
- Had the potential to derive additional revenue from southern QLD freight travelling to the western states and from Perth to the east coast, in addition to carrying Melbourne–Brisbane freight. This additional revenue opportunity is specific to this sub-corridor
- Expected to divert some of the freight that moves between regional areas and ports.

2.6.2 Melbourne–Brisbane Inland Rail Alignment Study

In 2008, the Inland Rail study was announced by the Australian Government, to be led by ARTC. This resulted in the *Melbourne–Brisbane Inland Rail Alignment Study* (ARTC, 2010), which identified the preferred corridor through central-west NSW and established the business case for the Inland Rail Program.

The purpose of the *Melbourne–Brisbane Inland Rail Alignment Study* (ARTC, 2010) was to determine the optimum alignment, as well as the economic benefits and likely commercial success, of a new standard gauge inland railway between Melbourne and Brisbane. The terms of reference for the study required the development of a detailed route alignment, generally following the Far Western Sub-corridor identified by the *North–South Rail Corridor Study* (Ernst & Young 2006).

2.6.2.1 Options identified

The *Melbourne–Brisbane Inland Rail Alignment Study* (ARTC 2010) short-listed and analysed a number of route options. The route analysis involved:

- Identification of the route—evaluation of the route options and preliminary analysis for the three main areas: Melbourne to Parkes, Parkes to Moree, and Moree to Brisbane
- Analysis of the route—the route was analysed in terms of capital cost, environmental impacts, journey time, as well as its preliminary economic and financial viability
- Development of the preferred alignment—the alignment was developed considering environmental and engineering factors.

The study noted that with the combination of numerous route options and sections, there were over 50,000 possible options for the route between Melbourne and Brisbane. As it was not feasible to analyse each option, two key criteria—capital cost and journey time—were used to establish a shortlist of route options in each of the three main areas. The shortlist included:

- Melbourne to Parkes—two shortlisted options:
    1. Via Albury, using existing track from Melbourne to Parkes (with a possible new direct line from Junee or Illabo to Stockinbingal by-passing Cootamundra)
    2. Via Shepparton, using the existing broad-gauge Mangalore–Tocumwal line via Shepparton, the disused standard gauge line to Narrandera and a new direct connection through to near Caragabal, before re-joining the existing line to Parkes.
- Parkes to Moree—four shortlisted options:
    1. Parkes to Moree via Werris Creek, using existing track (with a new section of track at Binnaway and Werris Creek to avoid reversals)
    2. Parkes to Moree via Binnaway and Narrabri, using existing track to Binnaway and then a new section connecting to the existing track near Emerald Hill or Baan Baa
    3. Parkes to Moree via Curban, Gwabegar and Narrabri, using existing track to Narromine, predominately new track between Narromine and Narrabri, and existing track from Narrabri to Moree
    4. Parkes to Moree via Burren Junction, using existing track to Narromine, and predominately new track via Coonamble and Burren Junction to Moree.
- Moree to Brisbane—two shortlisted options:
    1. The Warwick route—a new 'greenfield' route via Warwick to the existing standard gauge Sydney–Brisbane line
    2. The Toowoomba route—a new corridor direct from Inglewood to Millmerran and Oakey, near Toowoomba, and then a new alignment down the Toowoomba Range. It was then proposed to use the Southern Freight Rail Corridor (SFRC) from Rosewood to Kagaru.

2.6.2.2 Analysis of options

The shortlist of route options was subjected to more detailed assessment. Refining the proposed alignment involved an iterative process, with evaluation of the following:

- Environmental and land use issues
- Railway operations considerations
- Engineering assessments
- Capital cost estimates.

Assessment of the shortlisted options generally identified a negative correlation between capital cost and journey time. Therefore, the final preferred alignment was selected to achieve the intended maximum journey time while minimising potential capital cost. On this basis, the final preferred alignment, shown in Figure 2.2, consisted of:

- Melbourne to Parkes—670 km of existing track and 37 km of new track on a greenfield alignment from Illabo to Stockinbingal, bypassing Cootamundra and the Bethungra spiral
- Parkes to North Star—307 km of upgraded track, and 291 km of new track on a greenfield alignment from Narromine to Narrabri
- North Star to Acacia Ridge—271 km of new track on a greenfield alignment, 119 km of existing track upgraded from narrow gauge to dual gauge, and 36 km of the existing coastal route.

2.6.3 Inland Rail Implementation Group Report

The *Melbourne–Brisbane Inland Rail Report* (Inland Rail Implementation Group, 2015) was delivered to the Australian Government in August of 2015. The report recommended the adoption of the *Melbourne–Brisbane Inland Rail Alignment Study* (ARTC, 2010) alignment, with some detailed further consideration of three sections:

- Albury vs Shepparton. The report endorsed the route via Albury on the basis that potential freight values through Shepparton did not justify the significant additional capital cost.
- North Star to Toowoomba. The report noted that further engineering assessments were required between North Star and Toowoomba, which may result in a deviation of the alignment in this section.
- Toowoomba Range. The report endorsed the adoption of the Queensland Transport Gowrie to Grandchester corridor that was protected in 2003.

The 2015 base case alignment identified in the report is shown in Figure 2.2.

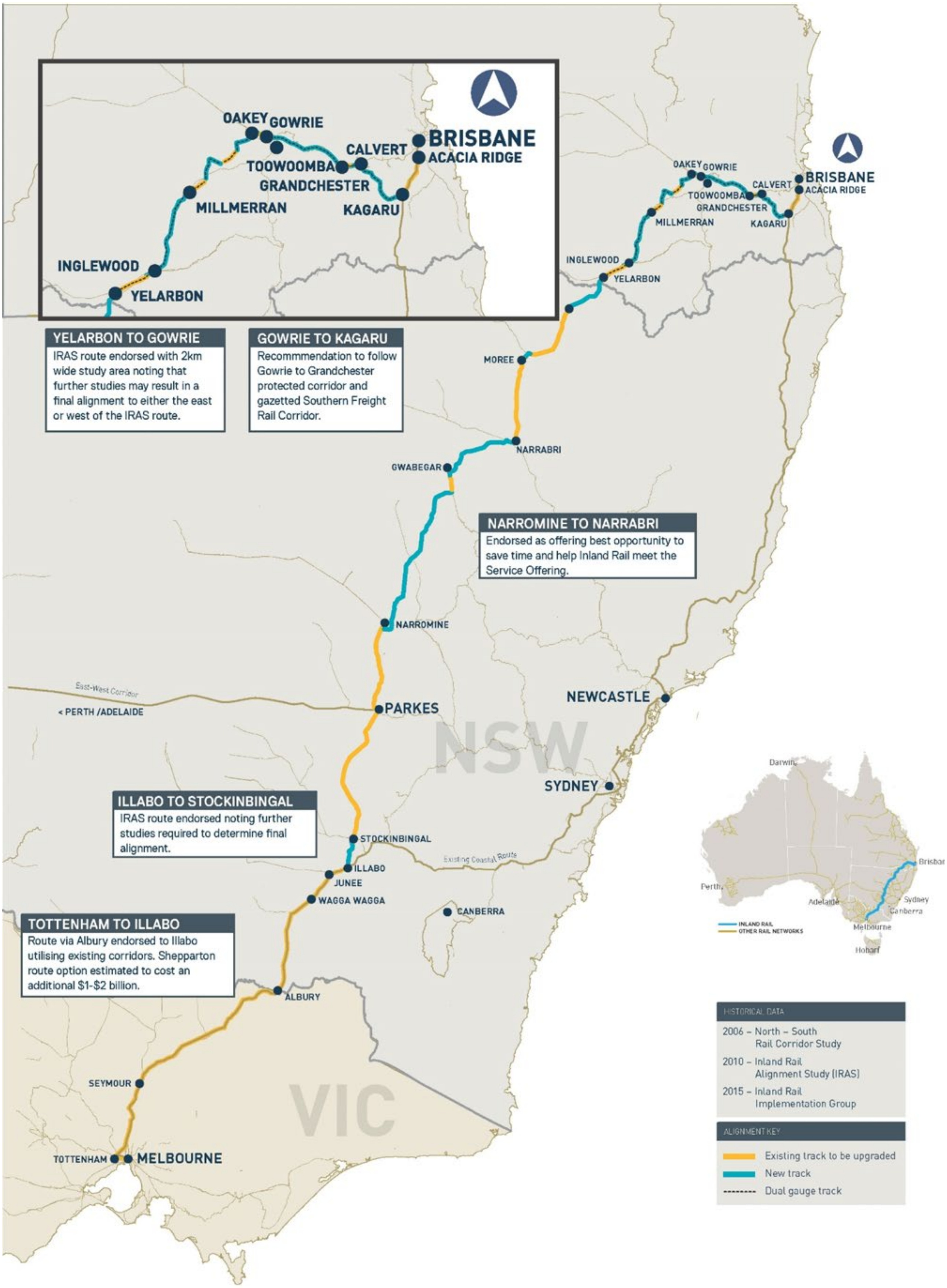

FIGURE 2.2: 2015 BASE CASE ALIGNMENT FOR INLAND RAIL

2.7 Alternative locations and route options for the Project

The1,700 km long Inland Rail Program has been divided into 13 separate projects to assist with the delivery of the Inland Rail Program of works. In 2016, ARTC commissioned multiple Phase 1 concept level, technical engineering and environmental services contracts, each looking at separate projects within the Program. This section provides background on the alternative routes considered during the design development of the Calvert to Kagaru Project.

Feasibility and preliminary planning studies that investigated potential alignments for the corridor during the course of project development are described in Section 2.7.1 and Section 2.7.2. Multi-criteria analysis (MCA) and comparative cost estimates analysis of alternative options that were considered while refining the alignment are discussed in Section 2.7.3.1 to Section 2.7.3.5.

2.7.1 Southern Infrastructure Corridor Study

In 2005, Maunsell Australia undertook the *Southern Infrastructure Corridor Study* for the Office of Urban Management (Maunsell, 2008). This study investigated, at a broad level, potential routes for the Southern Infrastructure Corridor Study. The study focused on the feasibility of routes for a freight railway, as this infrastructure is more highly constrained by terrain (horizontal and vertical geometry) when compared to road and other utilities such as pipelines and powerlines (AECOM, 2010b).

The study investigated eight route options in total (three northern, four central and one southern) for connecting the West Moreton Rail Line to the Interstate Line. All options included allowance for a potential intermodal freight terminal within the Purga area and connected to the existing Western Railway via the Ebenezer rail loop. The presence of the Teviot Range was a major challenge for all options (AECOM, 2010b).

2.7.2 Southern Freight Rail Corridor

DTMR completed a preliminary planning and impact assessment for the SFRC study to reserve a corridor of land for future railway development (AECOM, 2010a). The aim of the study was to identify a future route for a freight rail corridor connecting the western rail line near Calvert to the interstate railway north of Beaudesert.

A 55 km long and 2 km wide corridor of interest was further investigated in 2010 based on previous preliminary studies undertaken in 2005. Due to constraints in some areas, these investigations were extended beyond the original corridor of interest, most notably in Ebenezer and at the eastern end of the corridor near Kagaru.

The preliminary planning and impact assessment included extensive public consultation over the course of the study. The 12 studies listed below were completed as part of the SFRC study:

1. Topography, geology, soils and groundwater
2. Nature conservation
3. Surface water
4. Hydraulic study
5. Land use and planning
6. Air quality, climate and climatic trends
7. Visual impact assessment
8. Noise and vibration
9. Aboriginal cultural heritage
10. European cultural heritage
11. Social impact assessment
12. Economic analysis (AECOM, 2010a).

The findings of the studies provided an understanding of the onsite constraints within the corridor of interest that ultimately influence the alignment development process and final location (AECOM, 2010a). Of particular note is that measures were taken to minimise clearing of koala bushland habitat by realigning the SFRC corridor for 12 km through Ebenezer and Willowbank.

Based on design criteria and the studies referenced above, a preferred alignment for the SFRC was gazetted as Future Rail Corridor in 2010. The SFRC is 80 m to 100 m wide and extends about 53 km from Calvert at its northern extent to Kagaru at its south-eastern extent. Technical, environmental and cultural heritage studies undertaken as part of the assessment of the SFRC highlighted the need for further assessments, when more detailed designs were progressed closer to construction (AECOM, 2010a).

The SFRC was adopted as the base case alignment for the Calvert to Kagaru Project.

2.7.3 Calvert to Kagaru Project design development and refinement

MCA and comparative cost estimates were undertaken as part of the EIS and design development processes. Through these processes, ARTC considered options to refine the alignment within the EIS investigation corridor (and potentially outside the SFRC) to identify where there was a potential for significant efficiencies in constructability and reductions in potential environmental impacts.

To ensure a like-for-like assessment between route options, each alignment was refined to conform to ARTC's design criteria, which underpins the ARTC Service Offering. These key characteristics are:

- 98 per cent reliability
- A transit time from Melbourne to Brisbane in less than 24 hours
- Flexibility for faster and slower services
- Freight that is available when the market wants.

After each alignment was refined to comply with ARTC's design criteria, the alignments were assessed by a multi-disciplinary team to determine key metrics and values that would provide design, impact and cost estimate differentiators. The specific metrics assessed were chosen to align with ARTC's established MCA criteria:

- Technical viability
- Safety assessment of the proposed alignment
- Operation approach
- Constructability
- Schedule
- Environmental and heritage impacts
- Community and property impacts
- Approvals and stakeholder risk.

Once each alignment was assessed, MCA workshops were held, involving technical representatives from each discipline who were familiar with the key drivers (differentiators) for the assessment criteria in the MCA.

The alignment options considered as part of this process are summarised below.

2.7.3.1 Teviot Range

The Teviot Range, the mountainous region between Chainage (Ch) 36 km and Ch 47 km, was the focus of an MCA owing to several project delivery challenges that were identified during the course of consultation, design development and impact assessment studies, including:

- Management of stormwater flows into the tunnel at its eastern portal
- Direct impact on a culturally sensitive site (known as Rocky Pool)
- Potential impacts on environmentally sensitive sites (i.e. high value flora species and communities)
- Access constraints owing to remoteness of the site, affecting efficient construction and ongoing maintenance, as well as timely emergency response during tunnel operation.

Two alternative alignments were developed and assessed as part of the MCA against the base case alignment (the SFRC) (refer Figure 2.3). The two alternative alignments are located to the north of the base case alignment to avoid further topographic constraints and operational challenges. The MCA identified that both alternative options were preferred over the base case alignment with Option B being marginally preferred owing to fewer waterway impacts and affected land parcels.

2.7.3.2 Washpool Road

The base case alignment located near and along Washpool Road (between Ch 33 and Ch 38 km) was the focus of an MCA following findings of an initial floodplain assessment of Purga Creek and discussions with local government representatives and landholders on property access and local road design expectations. Option B was located to the east of the base case alignment (the SFRC) to avoid the requirement for a watercourse diversion and construction of multiple bridge structures across Washpool Road. Option C is located slightly east of the base case alignment to avoid the Purga Creek floodplain and also involves the realignment of Washpool Road to maintain local access (refer Figure 2.4). The MCA identified Option C as preferred owing to fewer property impacts than the comparative options.

2.7.3.3 Sandy Creek/Mount Flinders Road

An alternative alignment was selected for the crossing of Sandy Creek. This involved slight changes to a curve radius between Ch 26 km and Ch 30 km.

Figure 2.5 shows the five options investigated to achieve the optimum outcome. Option D (current alignment) was determined to be the favoured option as it achieved the desired improved environmental and structural outcomes, while remaining within the extents of the SFRC as much as possible. Option D was also selected as it created the least change in impact on surrounding landholders. The key benefits of this change in alignment were:

- Flexibility for future loop extension by making a straight available for the future turnout connection within the 483 m straight section
- Reduced bridge length at Sandy Creek crossing
- Avoiding revegetation growth area near Sandy Creek crossing.

Options B and E moved outside the SFRC. Option C was similar to Option D; however, it had a marginally greater impact on property and a higher cost estimate.

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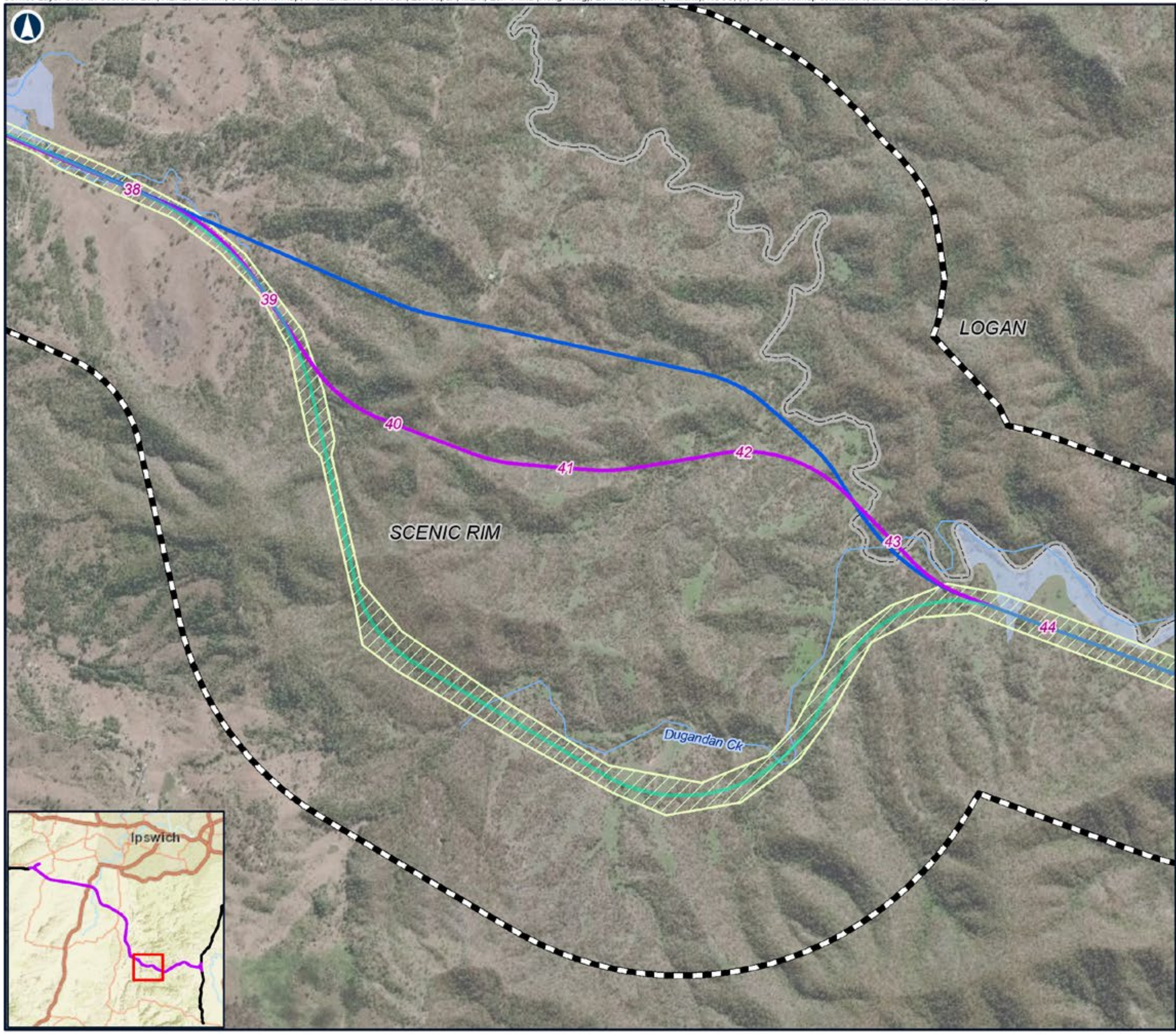

INLAND RAIL ARTC

The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.

CALVERT TO KAGARU

Figure 2.3: Teviot Range crossing options included in the multi-criteria analysis study

LEGEND

- 5 Chainage (km)
- Localities
- Option A (SFRC
- Option B (current alignment)
- Option C
- Southern Freight rail corridor
- Watercourses
- EIS investigation corridor
- Local Government
- Floodplain Assessment

0 0.75 1.5 km

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Scale: 1:30,000

Map by: CW Z:\GIS\GIS_3400_C2K\Tasks\340-EAP-201812061029_Project_Rationale_Figures\340-EAP-201812061029_ARTC_Fig2.3_TeviotRange_v5.mxd Date: 27/03/2020 12:06

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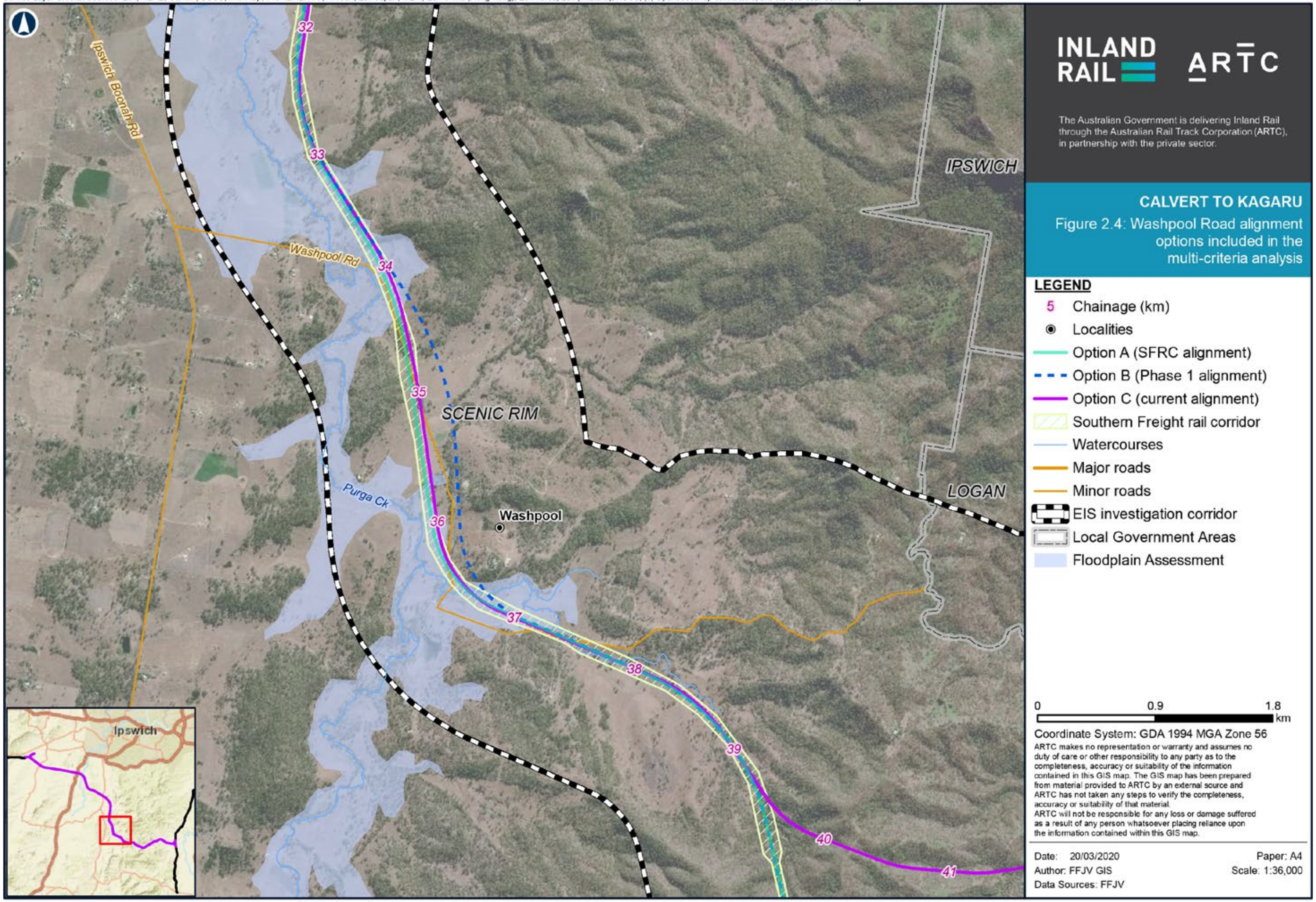

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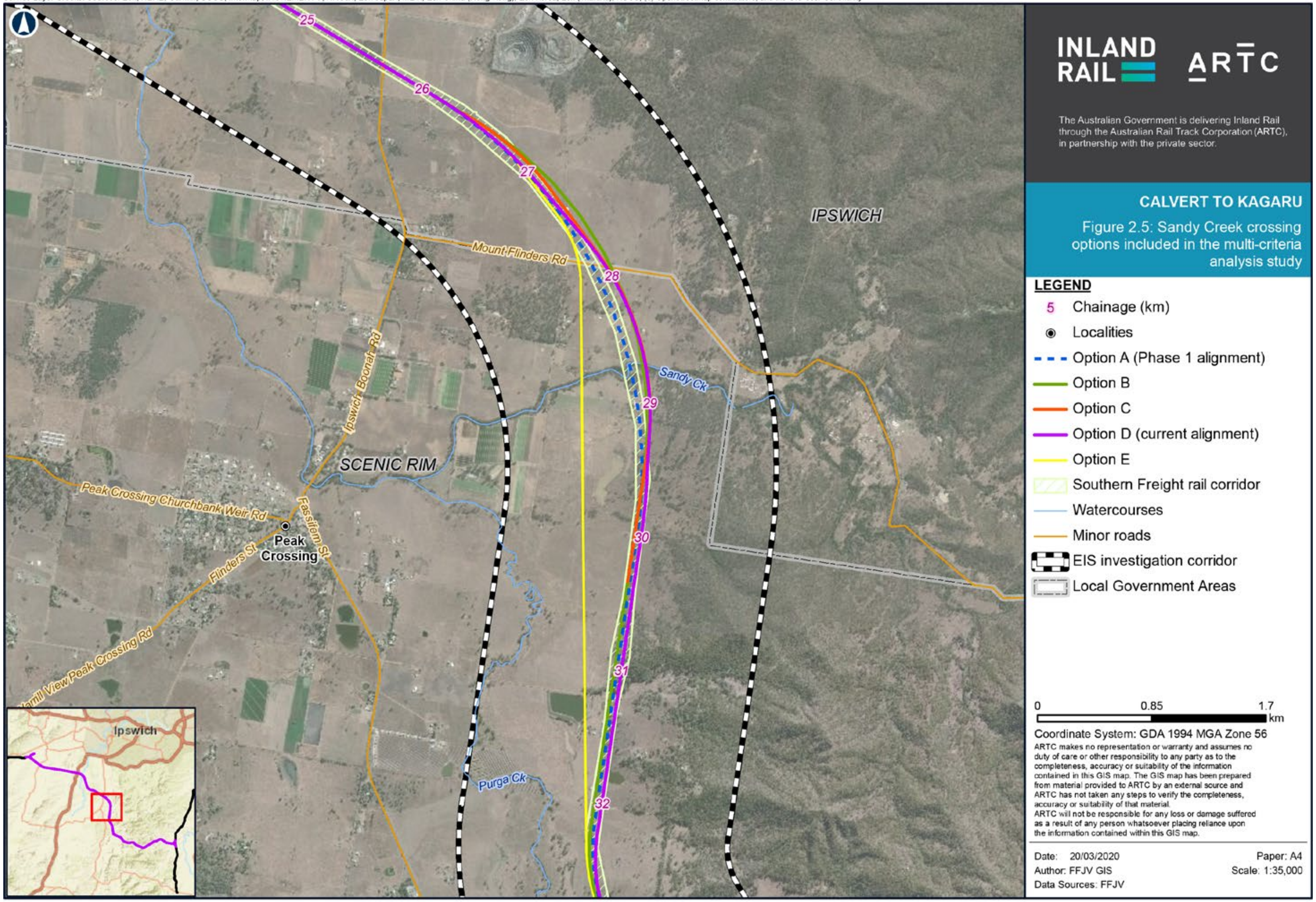

Figure 2.5: Sandy Creek crossing options included in the multi-criteria analysis study

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2.7.3.4 Connection at Helidon to Calvert and the Queensland Rail West Moreton System at Calvert

The Project joins the adjacent ARTC project alignment, Helidon to Calvert (H2C), running parallel to the QR West Moreton System, starting at Ch 2.2 km. The location of the alignment and minor deviation from the SFRC was determined by the requirement to maintain vertical clearance for formation and structures over the Western Creek floodplain and Waters Road, and to achieve the required design speeds.

2.7.3.5 Connection to interstate line at Kagaru

Connections at the Sydney to Brisbane Interstate Line, will be provided at Kagaru (adjoining to the Kagaru to Acacia Ridge and Bromelton (K2ARB) project), where the Calvert to Kagaru alignment diverges to provide:

- A connection with the ARTC Interstate Line heading north towards Acacia Ridge and Brisbane via a dual gauge track connection
- A connection heading south, via the Bromelton Connection Fork, towards Bromelton via a standard gauge track fork connection.

The updated track geometry proposed for these turnouts will limit the speed of vehicles travelling through this section to 50 km/h for safety reasons resulting in a minor deviation from the SFRC.

2.8 Relationship to other Inland Rail projects

The Inland Rail Program has been divided into 13 projects. Inland Rail will be operational once all 13 sections are complete, which is estimated to be in 2026. However, each of the sections of Inland Rail can be delivered independently with tie-in points to the existing national rail network.

The Project is one of the missing links across the Program. At the southern limit, the Project will connect into the H2C project, which has been declared a coordinated project for which an EIS is required under the *State Development and Public Works Organisation Act 1974* (Qld) (SDPWO Act). An EIS is currently being prepared for this Project.

At its northern limit, the Project will connect to the K2ARB project.

The Project does not have a direct relationship with any other coordinated projects, major projects and/or developments. However, the Project will provide more direct connectivity opportunities between the existing QR West Moreton System and ARTC Interstate lines, as well as being a potential catalyst for the development and growth of regional intermodal hubs, such as those associated with InterLinkSQ, Willowbank Industrial Area and Bromelton Intermodal Hub.

The full suite of potential benefits associated with the Inland Rail Program, as discussed in Section 2.5, can only be realised once the Project is complete and operational, as well as the other 12 Inland Rail sections.

The potential for cumulative impacts due to the Project in combination with other coordinated projects, major projects and/or developments has been assessed as part of this EIS and is presented in Chapter 22: Cumulative Impacts.