CHAPTER 19

Traffic, Transport and Access

CALVERT TO KAGARU ENVIRONMENTAL IMPACT STATEMENT

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

Contents

Figures

Tables

19. Traffic, Transport and Access

19.1 Scope of chapter

This traffic, transport and access assessment for the Calvert to Kagaru Project (the Project) includes the following:

- Provides an overview of existing transport network conditions, including existing road, active transport and rail traffic
- Describes the proposed works
- Provides an overview of baseline operations associated with intersections, road links, pavements, existing road–rail interface locations and road safety
- Provides a summary of construction tasks, routes and resultant traffic
- Summary of rail operational traffic and maintenance processes, as an input to the impact assessments
- Summary of traffic impact assessments associated with intersections, road links, road–rail interface locations, pavements, road safety, access and frontage
- Identification of the potential impacts arising from the Project on road, rail, active transport and airports/ports during its construction and operation
- Provision of mitigation measures to address the identified traffic impacts.

During the construction and operational phases, the expected impact from the Project on ports and airports is not considered to be significant as the transport of materials, workforce and equipment is expected to primarily use the road and rail transport networks. Impacts from the Project on the operation and throughputs at ports (containers) have not been assessed as they are considered not to be impacted by the Project.

19.2 Terms of Reference

This chapter addresses the relevant traffic, transport and access Terms of Reference (ToR) for the Project, as summarised in Table 19.1. Compliance of the Environmental Impact Statement (EIS) against the full ToR is documented in Appendix B: Term of Reference Compliance Table.

TABLE 19.1: TERMS OF REFERENCE COMPLIANCE TABLE—TRAFFIC, TRANSPORT AND ACCESS

Terms of Reference requirements		Where addressed
Existing Environment		
11.109	Describe and map the existing transport infrastructure and corridors. Provide data on existing road, active transport and rail traffic in the project area.	Section 19.5, Figure 19.1 and Figure 19.4 Appendix U: Traffic Impact Assessment, Sections 2.2, 2.3, 2.4 and 4, and Figures 1.2 and 1.3.
11.110	Describe and map where the project's preferred alignment differs from the State's strategic rail corridor and the reasons for any such deviation.	Section 19.4.1 Chapter 2: Project Rationale, Section 2.7, Figures 2.3, 2.4 and 2.5
11.111	Describe how the project complies with the Queensland Level Crossing Safety Strategy 2012–2021 on new road/rail interfaces and the impacts on existing road/rail interfaces.	Section 19.4.3 Appendix U: Traffic Impact Assessment, Sections 1.3, 3.2 and 9.5
Impact Assessment		
11.112	Assess the impacts of the project on individual road/rail crossings and any cumulative impacts on the wider transport network in the context of the Queensland level crossing safety strategy.	Sections 19.4.1, 19.5.1.1, 19.6, 19.8 and 19.9 Chapter 22: Cumulative Impacts, Section 22.5.12 Appendix U: Traffic Impact Assessment, Sections 4.4, 6.4.3 and 11
11.113	The EIS should include a clear summary of the total transport task for the project, including workforce, haulage routes, inputs and outputs during the construction and operational phases.	Sections 19.4.1 and 19.6 and Figure 19.4 Appendix U: Traffic Impact Assessment, Sections 5 and 6, Figure 1.3, Table 5.1 and Appendix A to H

Terms of Reference requirements		Where addressed
11.114	Present the transport assessment in separate sections for each project-affected mode (road, active transport and rail) as appropriate for each phase of the project.	Sections 19.6 and 19.8 Appendix U: Traffic Impact Assessment, Section 6
11.115	Provide sufficient information to allow an independent assessment of how existing and proposed transport infrastructure will be affected by project transport at the local and regional level (for example, local roads and State-controlled roads). Discussion should also refer to emergency service access.	Sections 19.6, 19.6.2.4, 19.8.2 and 19.8.3, Appendix U: Traffic Impact Assessment, Sections 6 and 6.6.1
11.116	Include details of the adopted assessment methodology for impacts on roads within the road impact assessment report in accordance with the Department of Transport and Main Roads Guide to Traffic Impact Assessment (refer to Appendix 1)	Section 19.4 Appendix U: Traffic Impact Assessment, Section 1.6
Mitigation Measures		
11.117	Discuss and recommend how identified impacts will be mitigated. Mitigation strategies and are to be prepared in close consultation with relevant transport authorities (including local government).	Section 19.7 Chapter 5: Stakeholder Engagement, Section 5.6 and Table 5.8 Appendix U: Traffic Impact Assessment, Section 9

19.3 Legislation, policies, standards and guidelines

This section identifies the relevance of any legislative or policy level objectives and standards that exist to protect or manage the transport infrastructures in the context of the Project in Queensland (QLD). A summary of the applicable legislation, policies and guidelines are shown in Table 19.2.

TABLE 19.2: SUMMARY OF LEGISLATION, POLICIES AND GUIDELINES

Legislation, policy/ strategy or guideline	Relevance to the Project
Legislation	
Transport Planning and Coordination Act 1994 (Qld)	The overall objective of the *Transport Planning and Coordination Act 1994* is to encourage effective integrated planning and efficient management of transport infrastructure. This is achieved through the Department of Transport and Main Road's (DTMR's) Transport Coordination Plan for Queensland 2017–2027. The objectives of the Transport Coordination Plan focus on five key areas: ▸ Customer experience and affordability ▸ Community connectivity ▸ Efficiency and productivity ▸ Safety and security ▸ Environment and sustainability. The following objectives are of particular relevance to the Project: ▸ Transport connects communities to employment and vital services ▸ Transport facilitates the efficient movement of people and freight to grow Queensland's economy ▸ Transport is safe and secure for customers and goods. The Project represents a significant element of transport infrastructure that will interact with QLD's existing transport network of rail, State-controlled roads (SCRs) and local government road infrastructure.
Transport Infrastructure Act 1994 (Qld) (TI Act)	The overall objective of the TI Act is to provide a regime that allows for and encourages effective integrated planning and efficient management of a system of transport infrastructure. This is consistent with the objectives of the *Transport Planning and Coordination Act 1994*. Any crossings of existing rail lines or works within existing rail corridor will trigger Section 255: Interfering with railway and will require the approval of the railway manager.

Legislation, policy/ strategy or guideline	Relevance to the Project
Transport Infrastructure Act 1994 (Qld) (TI Act) (continued)	Any works within SCRs or access to SCRs (during construction) will trigger Section 50-Ancillary works and encroachments and Section 33-Prohibition on roadworks etc. on State-controlled roads and Section 62-Management of access between individual properties and State-controlled roads / Section 66-Road access works within State-controlled road. The Project interfaces with two SCRs and has tie-ins to the existing West Moreton System rail corridor. Approvals are required for activities and works that interfere with SCRs or railways.
Land Act 1994 (Qld)	The *Land Act 1994* prescribes the framework for the allocation of non-freehold land tenure and its subsequent management. Under Chapter 4, Part 4 of the *Land Act 1994*, permits are required for the occupation of unallocated state land, a reserve or a road. A permit to occupy will also be required for any underground infrastructure that is proposed beneath land governed by State-held tenure. Chapter 3, Part 2, Division 2 of the *Land Act 1994* contains the provisions for relating to the temporary or permanent closure of a road, including SCRs and local government roads, and declared stock routes.
Rail Safety National Law (Queensland) Act 2017 (RSNL Act)	The purpose of the RSNL Act is to provide for safe railway operations in Australia. One objective of the RSNL Act is to establish the Office of the National Rail Safety Regulator (ONRSR) as the rail safety regulator in QLD. The RSNL Act was created following an agreement of the Council of Australian Governments (COAG) to deliver a consistent approach to rail safety policy and regulations (and to remove the inconsistencies) between the previous state and territory rail safety regimes. The RSNL Act governs the safe operation of the rail system in QLD. The ongoing operation of the Project will need to comply with all areas of the RSNL Act, covering rail industry work practices and protocols for safe working in rail corridors and associated accreditation, signalling and control, the ongoing management of structures and civil works, interfaces with public roads and highways and other activities impacting on rail safety.
Local Government Act 2009 (Qld)	The *Local Government Act 2009* sets out the responsibility of local government authorities with regard to the construction, improvement, control and management of traffic on local roads (excluding SCRs). A local government authority may temporarily or permanently close a local road to traffic in accordance with the *Local Government Act 2009*. An adjoining landowner must apply under the *Land Act 1994* to temporarily or permanently close a local road. The Project is within the local government areas (LGAs) of Logan City Council (LCC), Ipswich City Council (ICC) and Scenic Rim Regional Council (SRRC). The Project will adhere to and be carried out in accordance with relevant and applicable local laws, where applicable.
Stock Route Management Act 2002 (Qld)	The QLD stock route network is a network of stock routes and reserves for travelling stock in the State. The *Stock Route Management Act 2002* provides for managing the stock route network, recognising that the network has multiple uses with the primary purpose being for travelling stock (refer Section 98 (2) (a)). Department of Natural Resources, Mines and Energy administers the *Stock Route Management Act 2002*. All stock routes are classified as roads under the *Land Act 1994*.
Local government plans/strategies	
Logan Planning Scheme 2015	The Logan Planning Scheme is a framework for managing development in a way that advances the purpose of the *Planning Act 2016.* The scheme sets out LCC's intention for the development over the next 20 years and seeks to advance State and regional planning through more detailed local response. The *Local Government Infrastructure Plan* is incorporated in the planning scheme and identifies trunk infrastructure necessary to service urban development in a coordinated and cost-effective manner. The Project passes through the LGA of LCC. In accordance with Schedule 6, Part 5, Section 26(2) of the Planning Regulation 2017, provisions of this local government planning scheme do not apply to the Project. Notwithstanding this, the zoning intents determined by the planning schemes have been taken into consideration when determining impacts of the Project on future land uses in the area.
Strategy for Road Safety in the City of Logan (2017–2021)	This strategy is a partnership between LCC, DTMR and Queensland Police Service (QPS), Queensland Health and The Royal Automobile Club of Queensland Limited (RACQ). The strategy outlines several key action areas to improve the safety of roads throughout Logan. The intent is to collaborate with the Logan community to prevent road trauma through safe and responsible road use, safe roads and safe vehicles (Logan City Council, 2017b). As the Project passes through the LGA of LCC, the Project should adopt the actions outlined in the strategy to improve road safety where necessary.

Legislation, policy/ strategy or guideline	Relevance to the Project
Ipswich City Planning Scheme 2006	The purpose of the *Ipswich City Planning Scheme 2006* is to act as a framework for managing development in a way that advances previous planning documents by identifying assessable and self-assessable development and identifying outcomes sought to be achieved in the LGA as the context for assessing development. Part of this scheme includes the *Local Government Infrastructure Plan*. This plan provides desired standards of service for the transport network, plans for trunk infrastructure and a schedule of works for planned infrastructure in Ipswich LGA. The Project passes through the LGA of ICC. In accordance with Schedule 6, Part 5, Section 26(2) of the Planning Regulation, provisions of this local government planning scheme do not apply to the Project. Notwithstanding this, the zoning intents determined by the Ipswich City Planning Scheme have been taken into consideration when determining impacts of the Project on future land uses in the area.
City of Ipswich Transport Plan (2016)	The City of Ipswich Transport Plan outlines the Council's high-level aspirations to advance Ipswich's transport system by identifying current key transport challenges, setting a vision and objective for the transport system and identifying appropriate policy focuses and actions. As the Project passes through the LGA of ICC, the Project should adopt the actions outlined in the transport plan to improve road safety and freight accessibility where necessary.
Scenic Rim Planning Scheme (2020)	The Planning Scheme regulates how land can be used and developed and outlines when a development application is required to be submitted to SRRC, the assessment type and the criteria applicable to the development. This scheme will provide the council's vision for land use and development within the region, identify areas and places to be protected, and outline the desired standards for new developments. This Planning Scheme has replaced the former planning schemes that currently apply to the Beaudesert Shire, Boonah Shire and ICC areas within the Scenic Rim Region. The Project passes through the LGA of SRRC. In accordance with Schedule 6, Part 5, Section 26(2) of the Planning Regulation, provisions of this local government planning schemes do not apply to the Project. Notwithstanding this, the zoning intents determined by the Planning Scheme have been taken into consideration when determining impacts of the Project on future land uses in the area.
Guidelines	
Queensland Level Crossing Safety Strategy 2012–2021	This strategy complements the National Railway Level Crossing Safety Strategy (NRLCSS) (2010–2020), which was released by the Australian Transport Council in 2009 to promote national consistency in addressing level crossing safety. (Note: the NRLCSS has subsequently been superseded by the NRLCSS (2017–2020). However, the Queensland Level Crossing Safety Strategy (QLCSS) refers to the 2010–2020 version). A reliable state transport network is vital for connecting people, places, goods and services. It is in everyone's interests that road and rail users work together to make this network as safe and efficient as possible. The strategy focuses on all users of level crossings, including train crew and passengers, road vehicle drivers, riders, passengers and pedestrians. These crossings, including any that may be accessible to the public, are considered to be a workplace health and safety matter and are managed under separate arrangements (DTMR, 2012). This strategy will be used with its associated key performance indicators in order to ensure that mitigation measures determined for all public road–rail interface locations (level crossings) through the analysis process focus on safety, risk and operational efficiency.
Guideline to Traffic Impact Assessment, commenced July 2017, replaced October 2018	The Guidelines to Traffic Impact Assessment (GTIA) has been used as a point of reference for the traffic and transport assessment, as it relates to roads and intersections affected by the construction and operation of the Project. GTIA provides information about the processes involved to assess road impacts triggered by a proposed development (DTMR, 2017b). While it is not mandatory, the GTIA provides a basis for the assessment of road impacts and has been adopted for the preliminary assessment on traffic and pavement impacts by the Project. Although the guidelines only apply to the SCRs, local government authorities may choose to adopt or use this as a reference. In general, the DTMR will consider a development's road impacts to be 'insignificant' if the development generates an increase in traffic on SCRs of less than 5 per cent over existing levels, either measured in terms of annual average daily traffic (AADT) or standard axle repetitions.

Legislation, policy/ strategy or guideline	Relevance to the Project
Guideline to Traffic Impact Assessment, commenced July 2017, replaced October 2018 (continued)	Inputs to the GTIA process typically include the existing traffic levels, the Project construction timeframe, and that of other projects, volume of construction materials, haul vehicles and their capacities, and therefore the number of new or additional Project-related trips likely to use the network. The use of the assessment process recommended in the GTIA will provide the Project with clarification on likely traffic impacts on nominated haulage routes, intersections and other affected roads.
Manual of Uniform Traffic Control Devices (MUTCD) Part 7: Railway Crossings	The MUTCD series covers all mandatory road- and rail-related traffic control devices likely to be required for the Project. The use of signs, markings and other devices at railway level crossings and affected roads, based on uniform standards and practices, is essential in the interests of safety for both rail traffic and road users. Part 7 of the MUTCD sets out the various controls used at railway, cane railway and combined railway/cane railway level crossings and describes the devices and assemblies, their use and location to achieve these controls (DTMR, 2019c).
Guide to Development in a Transport Environment: Rail (2015)	The DTMR Guide to Development in a Transport Environment: Rail Transport and Main Roads provides important information for the planning, design or delivery of development in the vicinity of railways in QLD. It is intended for use as a technical reference document. The guide provides specific technical guidance to assist development proponents to achieve compliance with the performance outcomes and acceptable outcomes in the QLD State Development Assessment Provisions (SDAP) in relation to managing impacts of development on railway safety, structural integrity and operation (DTMR, 2015). The guide also provides useful information in relation to the operational constraints and requirements when undertaking construction work within the railway environment.
Austroads Guide to Traffic Management Part 12: Traffic Impact Assessments (2016)	This guide helps traffic and transport practitioners identify and manage the impacts on the road arising from land-use developments. The impacts being considered are those directly affecting road users of all classes, from large freight vehicles and buses to cyclists and pedestrians.
Austroads Guide to Traffic Management Part 3: Traffic Studies and Analysis (2017a)	The *Austroads Guide to Traffic Management, Part 3: Traffic studies and analysis* outlines the importance of traffic data and its analysis for traffic management and traffic control within a network. It serves to ensure some degree of consistency in conducting traffic studies and surveys. It provides guidance on the different types of traffic studies and surveys that can be undertaken, their use, application and methods for traffic data collection and analysis.
Austroads Guide to Traffic Engineering Practice Part 2: Roadway Capacity, 1988	The guide provides information regarding roadway capacity for various road types. The guide is used to provide guidance on the assessment approach for mid-block capacity assessments.
Cycling Aspects of Austroads Guides (2017b)	This guideline contains information that relates to the planning, design and traffic management of cycling facilities. The guideline provides: ▸ An overview of planning and traffic management considerations and cross-references to other Austroads Guides and texts for further detailed information ▸ A summary of design guidance and criteria relating to on-road and off-road bicycle facilities together with a high level of cross-referencing to the relevant Austroads Guides for further information ▸ Information and cross-references on the provision for cyclists at structures, traffic control devices, construction and maintenance considerations and end-of-trip facilities.
Australian Level Crossing Assessment Model (ALCAM) (2016)	ALCAM is an assessment tool used to identify key potential risks at level crossings and to assist in the prioritisation of crossings for upgrades. The risk model is used to support a decision-making process for both road- and pedestrian-level crossings.

19.4 Methodology

19.4.1 Traffic and transport study area

The traffic, transport and access study area for the Project consists of:

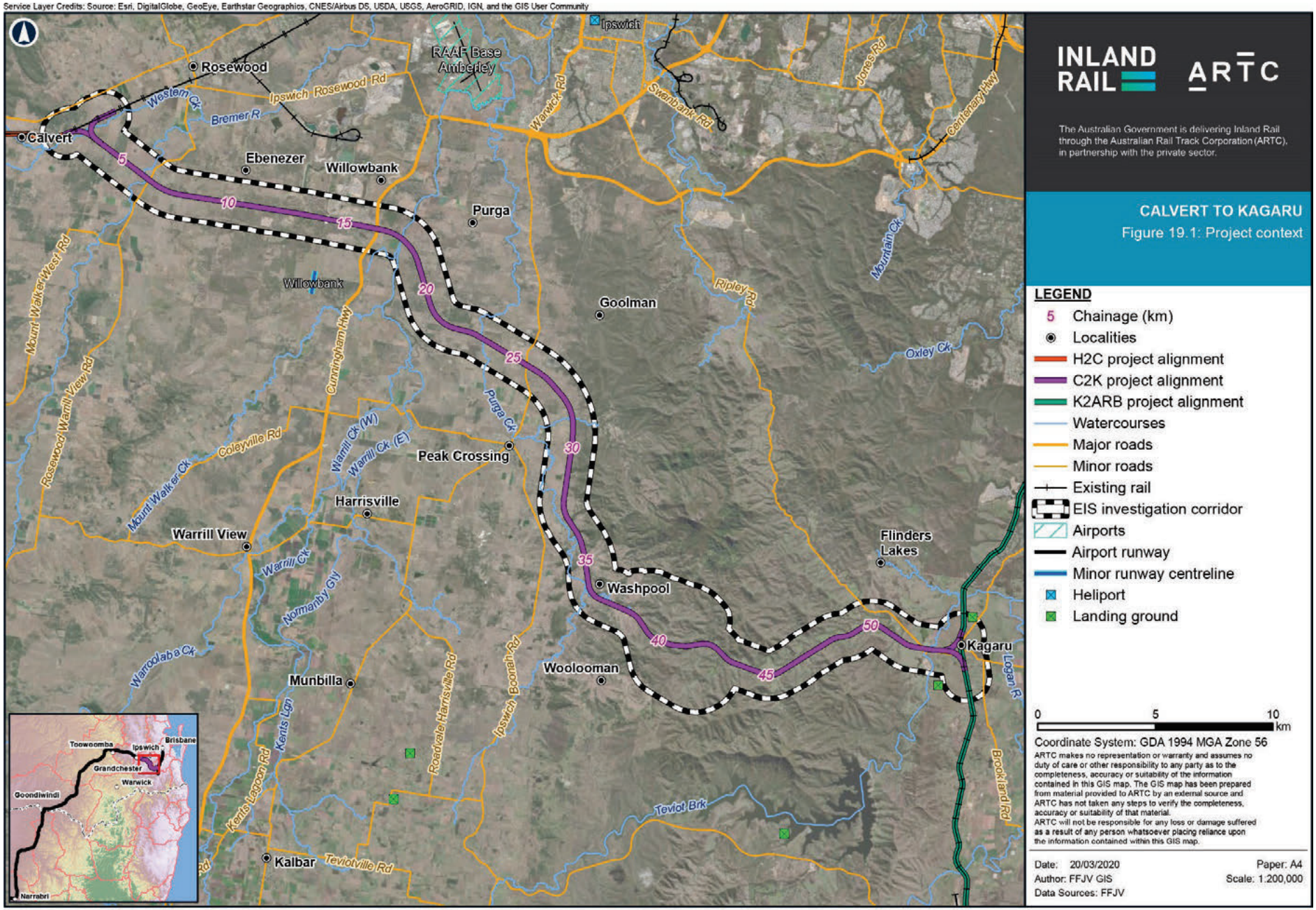
- The public roads intersecting the EIS investigation corridor (road/rail interface locations)
- The road network envisaged for the transport of workforce, materials and equipment during the construction and operational phases of the Project.

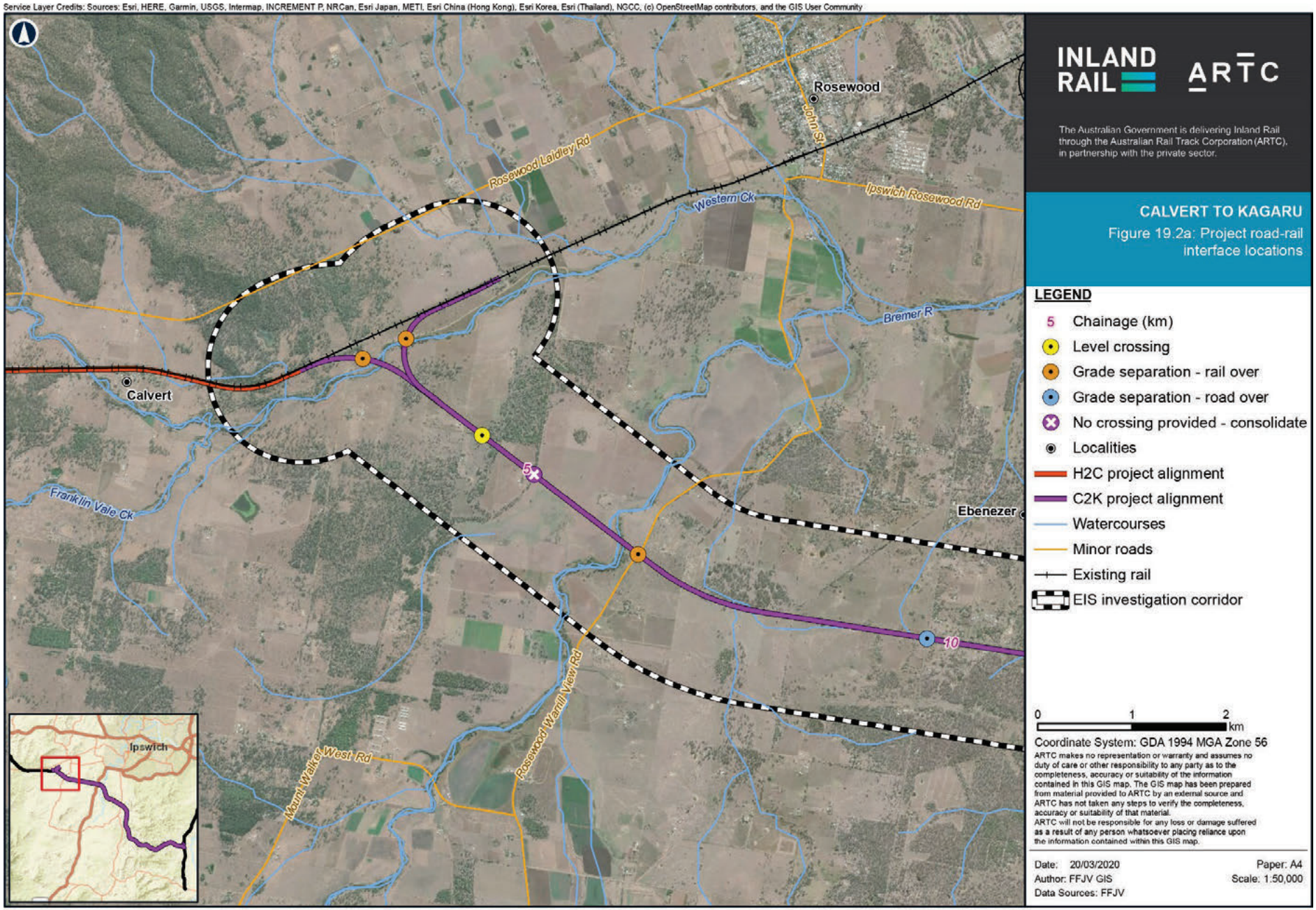
The traffic, transport and access study area establishes the spatial limits for assessing the impacts and determining applicable mitigation measures for the Project. The proposed alignment generally follows the protected Southern Freight Rail Corridor (SFRC), which was gazetted as future railway land by the QLD Government on 5 November 2010. The Project involves the design and construction of approximately 53 km of new dual-gauge track and associated infrastructure. The connection will provide convenient access for freight to major proposed industrial developments at Ebenezer in the City of Ipswich, and at Bromelton near Beaudesert in the Scenic Rim Region. The Project provides a link between the adjacent Inland Rail projects of:

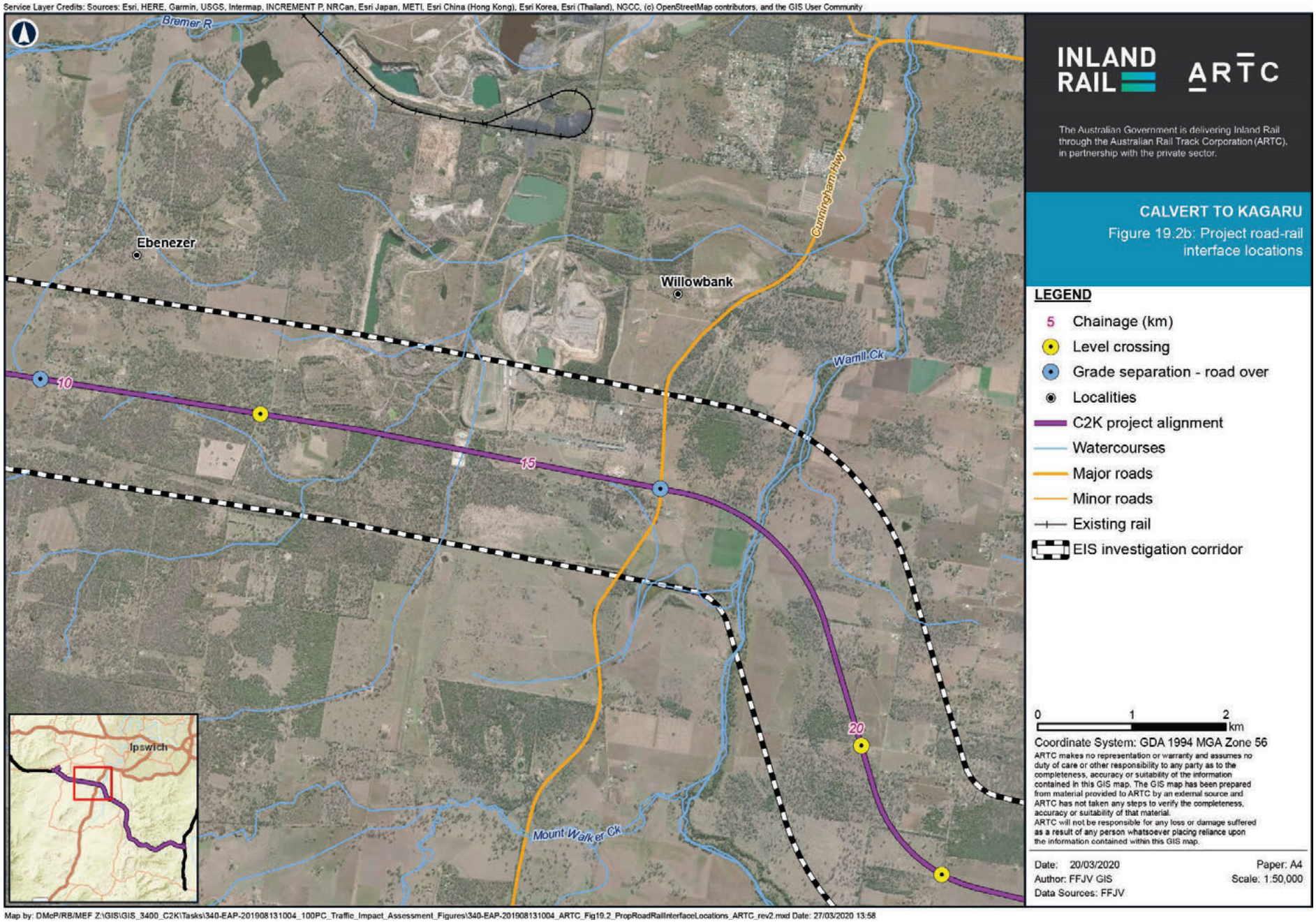
- The Helidon to Calvert project (H2C) in the north-west, where it connects to the Queensland Rail (QR) 'West Moreton System' near Calvert
- The Kagaru to Acacia Ridge and Bromelton project (K2ARB) to the south-east where it connects to the existing operational Sydney to Brisbane Interstate railway line at Kagaru.

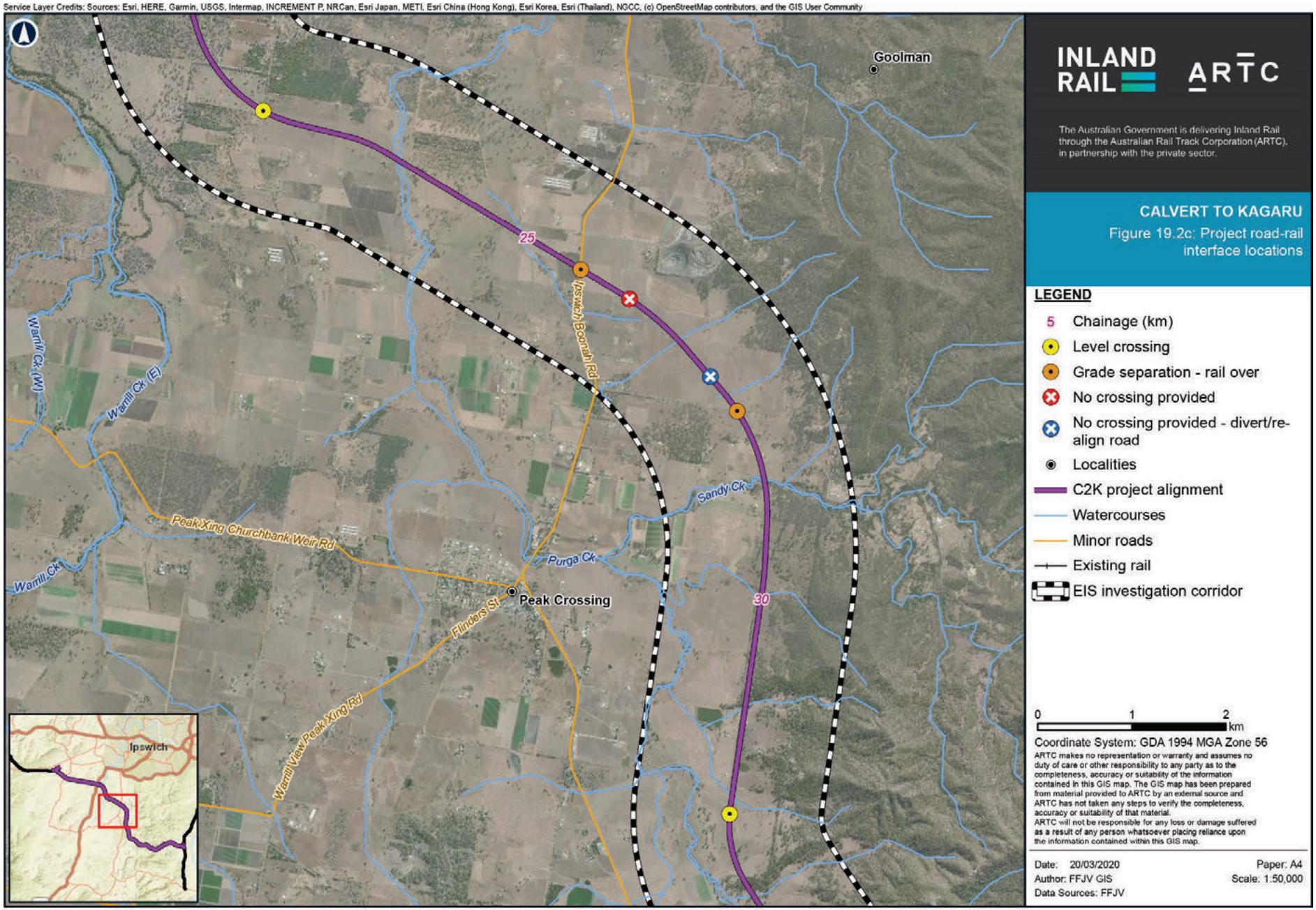
The EIS investigation corridor is illustrated in Figure 19.1. Additional information on the Project location in relation to the SFRC is in Chapter 2: Project Rationale.

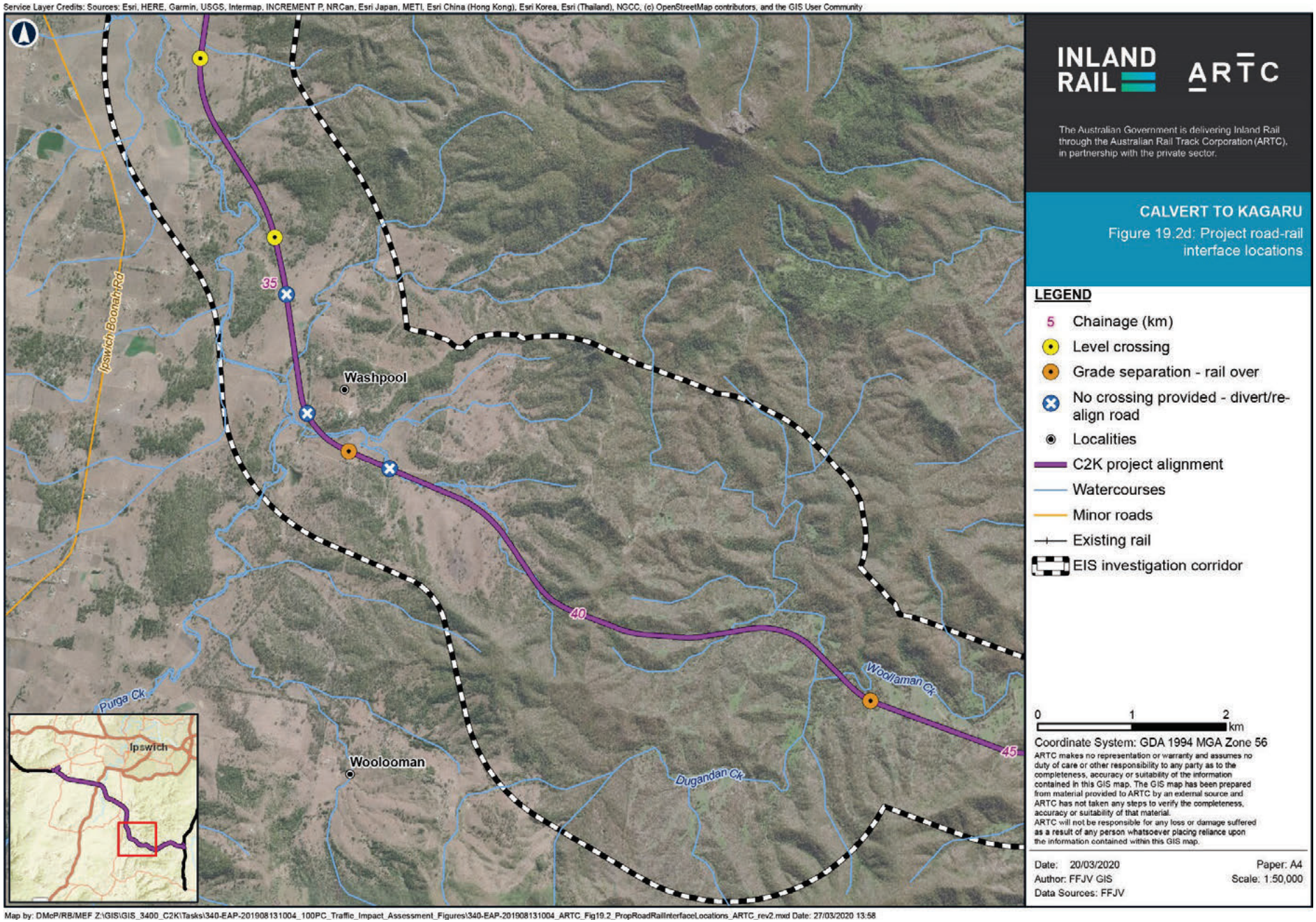
The Project road–rail interface locations are illustrated in Figure 19.2. The road–rail interface locations included in the traffic, transport and access study area are all public road crossings, which are envisaged to intersect the Project.

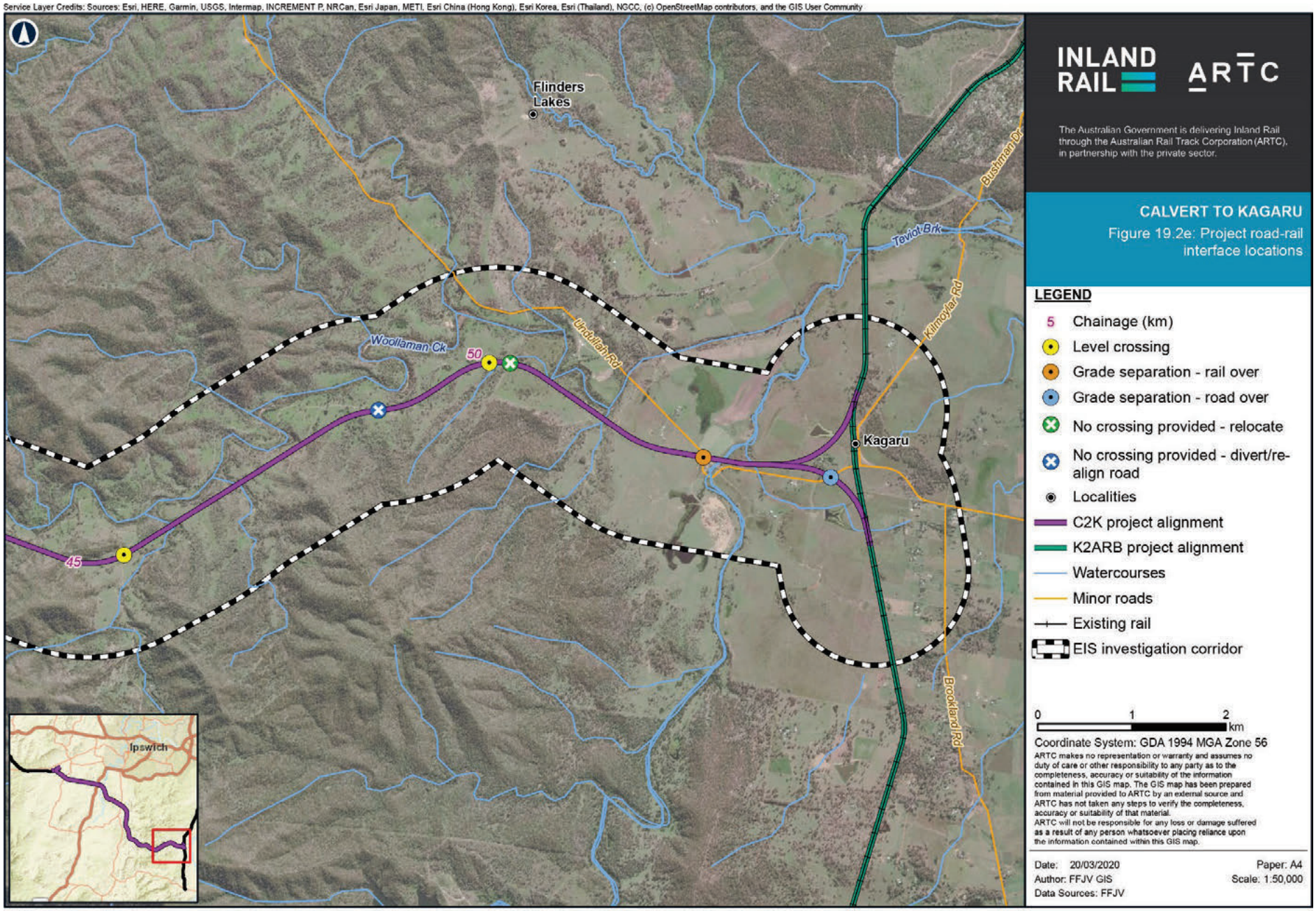

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Ipswich
RAAF Base Amberley
Rosewood
Ipswich Rosewood Rd
Western Ck
Bremer R
Calvert
Ebenezer
Willowbank
Warwick Rd
Swanbank Rd
Jones Rd
Centenary Hwy
Purga
Mountain Ck
Ripley Rd
Willowbank
Goolman
Oxley Ck
Mount Walker West Rd
Rosewood Warrill View Rd
Cunningham Hwy
Purga Ck
Coleyville Rd
Warrill Ck (W)
Warrill Ck (E)
Peak Crossing
Mount Walker Ck
Harrisville
Warrill View
Flinders Lakes
Warrill Ck
Normanby Gly
Washpool
Warroolaba Ck
Munbilla
Woolooman
Kagaru
Logan R
Roadvale Harrisville Rd
Ipswich Boonah Rd
Kents Lagoon Rd
Kents Lgn
Teviot Brk
Brookland Rd
Kalbar
Teviotville Rd
5
10
15
20
25
30
35
40
45
50
Toowoomba
Ipswich
Brisbane
Grandchester
Warwick
Goondiwindi
Narrabri
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 19.1: Project context
LEGEND
5 Chainage (km)
Localities
H2C project alignment
C2K project alignment
K2ARB project alignment
Watercourses
Major roads
Minor roads
Existing rail
EIS investigation corridor
Airports
Airport runway
Minor runway centreline
Heliport
Landing ground
0
5
10
km
Coordinate System: GDA 1994 MGA Zone 56
ARTC makes no representation or warranty and assumes no duty of care or other responsibility to any party as to the completeness, accuracy or suitability of the information contained in this GIS map. The GIS map has been prepared from material provided to ARTC by an external source and ARTC has not taken any steps to verify the completeness, accuracy or suitability of that material.
ARTC will not be responsible for any loss or damage suffered as a result of any person whatsoever placing reliance upon the information contained within this GIS map.
Date: 20/03/2020
Author: FFJV GIS
Data Sources: FFJV
Paper: A4
Scale: 1:200,000
Map by: DMcP/RB/MEF/DTH Z:\GIS\GIS_3400_C2K\Tasks\340-EAP-201908131004_100PC_Traffic_Impact_Assessment_Figures\340-EAP-201908131004_ARTC_Fig19.1_ProjectRailAlignment.mxd Date: 24/03/2020 07:41


Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
Rosewood
John St
Rosewood Laidley Rd
Western Ck
Ipswich Rosewood Rd
Bremer R
Calvert
Franklin Vale Ck
Ebenezer
Mount Walker West Rd
Rosewood Warrill View Rd
Ipswich
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 19.2a: Project road-rail interface locations
LEGEND
5 Chainage (km)
Level crossing
Grade separation - rail over
Grade separation - road over
No crossing provided - consolidate
Localities
H2C project alignment
C2K project alignment
Watercourses
Minor roads
Existing rail
EIS investigation corridor
0 1 2 km
Coordinate System: GDA 1994 MGA Zone 56
ARTC makes no representation or warranty and assumes no duty of care or other responsibility to any party as to the completeness, accuracy or suitability of the information contained in this GIS map. The GIS map has been prepared from material provided to ARTC by an external source and ARTC has not taken any steps to verify the completeness, accuracy or suitability of that material.
ARTC will not be responsible for any loss or damage suffered as a result of any person whatsoever placing reliance upon the information contained within this GIS map.
Date: 20/03/2020
Author: FFJV GIS
Data Sources: FFJV
Paper: A4
Scale: 1:50,000
Map by: DMcP/RB/MEF Z:\GIS\GIS_3400_C2K\Tasks\340-EAP-201908131004_100PC_Traffic_Impact_Assessment_Figures\340-EAP-201908131004_ARTC_Fig19.2_PropRoadRailInterfaceLocations_ARTC_rev2.mxd Date: 27/03/2020 13:58


Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
Bremer R
Ebenezer
Willowbank
Cunningham Hwy
Warrill Ck
10
15
20
Mount Walker Ck
Ipswich
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 19.2b: Project road-rail interface locations
LEGEND
5 Chainage (km)
Level crossing
Grade separation - road over
Localities
C2K project alignment
Watercourses
Major roads
Minor roads
Existing rail
EIS investigation corridor
0 1 2 km
Coordinate System: GDA 1994 MGA Zone 56
ARTC makes no representation or warranty and assumes no duty of care or other responsibility to any party as to the completeness, accuracy or suitability of the information contained in this GIS map. The GIS map has been prepared from material provided to ARTC by an external source and ARTC has not taken any steps to verify the completeness, accuracy or suitability of that material.
ARTC will not be responsible for any loss or damage suffered as a result of any person whatsoever placing reliance upon the information contained within this GIS map.
Date: 20/03/2020
Author: FFJV GIS
Data Sources: FFJV
Paper: A4
Scale: 1:50,000
Map by: DMcP/RB/MEF Z:\GIS\GIS_3400_C2K\Tasks\340-EAP-201908131004_100PC_Traffic_Impact_Assessment_Figures\340-EAP-201908131004_ARTC_Fig19.2_PropRoadRailInterfaceLocations_ARTC_rev2.mxd Date: 27/03/2020 13:58


Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
Goolman
25
Ipswich Boonah Rd
Warrill Ck (W)
Warrill Ck (E)
Peak Xing Churchbank Weir Rd
Warrill Ck
Purga Ck
Sandy Ck
Peak Crossing
Flinders St
30
Warrill View Peak Xing Rd
Ipswich
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 19.2c: Project road-rail interface locations
LEGEND
5 Chainage (km)
Level crossing
Grade separation - rail over
No crossing provided
No crossing provided - divert/re-align road
Localities
C2K project alignment
Watercourses
Minor roads
Existing rail
EIS investigation corridor
0 1 2 km
Coordinate System: GDA 1994 MGA Zone 56
ARTC makes no representation or warranty and assumes no duty of care or other responsibility to any party as to the completeness, accuracy or suitability of the information contained in this GIS map. The GIS map has been prepared from material provided to ARTC by an external source and ARTC has not taken any steps to verify the completeness, accuracy or suitability of that material.
ARTC will not be responsible for any loss or damage suffered as a result of any person whatsoever placing reliance upon the information contained within this GIS map.
Date: 20/03/2020
Author: FFJV GIS
Data Sources: FFJV
Paper: A4
Scale: 1:50,000
Map by: DMcP/RB/MEF Z:\GIS\GIS_3400_C2K\Tasks\340-EAP-201908131004_100PC_Traffic_Impact_Assessment_Figures\340-EAP-201908131004_ARTC_Fig19.2_PropRoadRailInterfaceLocations_ARTC_rev2.mxd Date: 27/03/2020 13:58


Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
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 19.2d: Project road-rail interface locations
LEGEND
5 Chainage (km)
Level crossing
Grade separation - rail over
No crossing provided - divert/re-align road
Localities
C2K project alignment
Watercourses
Minor roads
Existing rail
EIS investigation corridor
35
40
45
Washpool
Wooloman
Ipswich Boonah Rd
Purga Ck
Woolfaman Ck
Dugandan Ck
Ipswich
0 1 2 km
Coordinate System: GDA 1994 MGA Zone 56
ARTC makes no representation or warranty and assumes no duty of care or other responsibility to any party as to the completeness, accuracy or suitability of the information contained in this GIS map. The GIS map has been prepared from material provided to ARTC by an external source and ARTC has not taken any steps to verify the completeness, accuracy or suitability of that material.
ARTC will not be responsible for any loss or damage suffered as a result of any person whatsoever placing reliance upon the information contained within this GIS map.
Date: 20/03/2020
Author: FFJV GIS
Data Sources: FFJV
Paper: A4
Scale: 1:50,000
Map by: DMcP/RB/MEF Z:\GIS\GIS_3400_C2K\Tasks\340-EAP-201908131004_100PC_Traffic_Impact_Assessment_Figures\340-EAP-201908131004_ARTC_Fig19.2_PropRoadRailInterfaceLocations_ARTC_rev2.mxd Date: 27/03/2020 13:58


Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
Flinders Lakes
Woollaman Ck
50
45
Undullah Rd
Kagaru
Teviot Brk
Kilmoylar Rd
Bushman Dr
Brooklands Rd
Ipswich
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 19.2e: Project road-rail interface locations
LEGEND
5 Chainage (km)
Level crossing
Grade separation - rail over
Grade separation - road over
No crossing provided - relocate
No crossing provided - divert/re-align road
Localities
C2K project alignment
K2ARB project alignment
Watercourses
Minor roads
Existing rail
EIS investigation corridor
0 1 2 km
Coordinate System: GDA 1994 MGA Zone 56
ARTC makes no representation or warranty and assumes no duty of care or other responsibility to any party as to the completeness, accuracy or suitability of the information contained in this GIS map. The GIS map has been prepared from material provided to ARTC by an external source and ARTC has not taken any steps to verify the completeness, accuracy or suitability of that material.
ARTC will not be responsible for any loss or damage suffered as a result of any person whatsoever placing reliance upon the information contained within this GIS map.
Date: 20/03/2020
Paper: A4
Author: FFJV GIS
Scale: 1:50,000
Data Sources: FFJV
Map by: DMcP/RB/MEF Z:\GIS\GIS_3400_C2K\Tasks\340-EAP-201908131004_100PC_Traffic_Impact_Assessment_Figures\340-EAP-201908131004_ARTC_Fig19.2_PropRoadRailInterfaceLocations_ARTC_rev2.mxd Date: 27/03/2020 13:58

The traffic, transport and access assessment does not include the consideration of impacts to private roads. Any impacts to private roads are addressed directly with the impacted landholders as part of the Project's wider consultation process. The use of any private roads during construction would require a specific agreement between the delivery contractor and the private road owners. Further details on impacts to private roads are included in Chapter 8: Land Use and Tenure and Chapter 16: Social.

19.4.1.1 Primary construction transport routes

For the purpose of this assessment, it has been assumed that all construction material deliveries are being made to laydown area delivery points along the Project. Primary construction routes determined for the Project are used for the purpose of the assessment. Figure 19.4 illustrates the proposed primary construction transport routes.

Note that the proposed primary construction routes are routes that the construction contractor may use. For the purpose of this assessment, a supplier local to the Project has been assumed for all key materials. However, the construction contractor should consult relevant road authorities to determine the final construction and heavy vehicle routes prior to the Project construction. Envisaged impacts associated with the construction of the Project are explored in detail in Section 19.6.1.

Workforce

A preliminary estimate of the construction workforce required to undertake the works to the nominated program is shown in Figure 19.3. Workforce onsite for the Project is estimated to peak at 620 full-time equivalent (FTE) between weeks 65 and 75. The average number of FTE workforce onsite across the full construction period is planned to be 271 personnel.

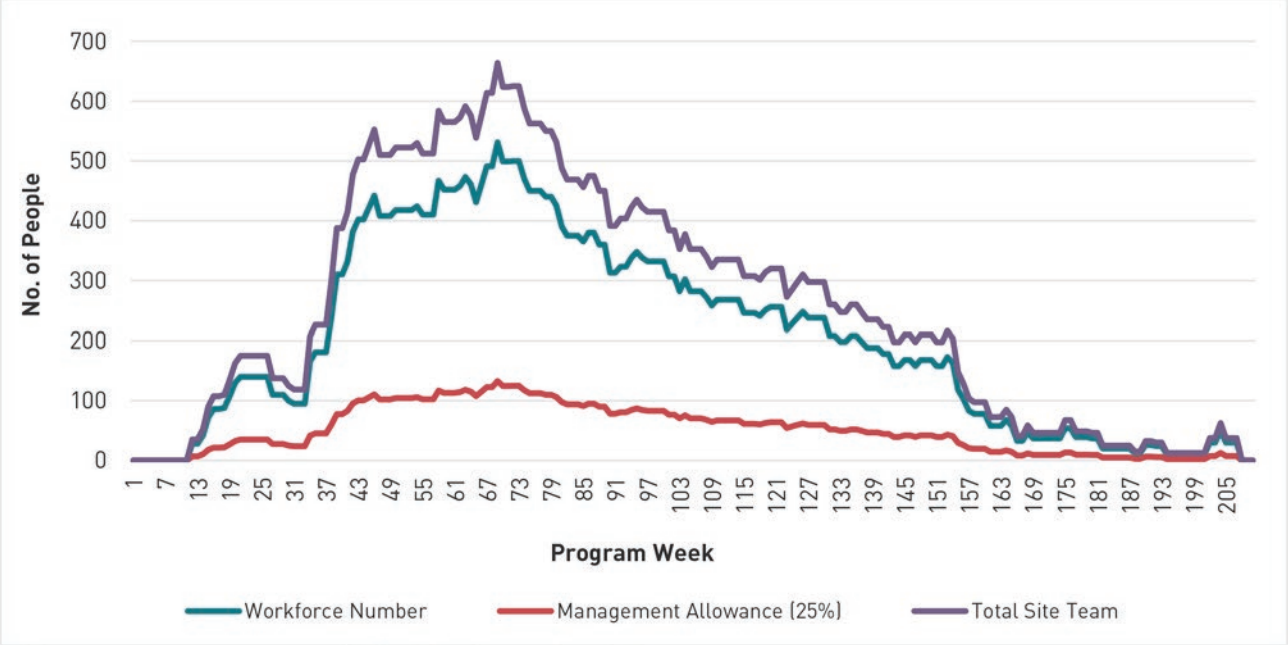
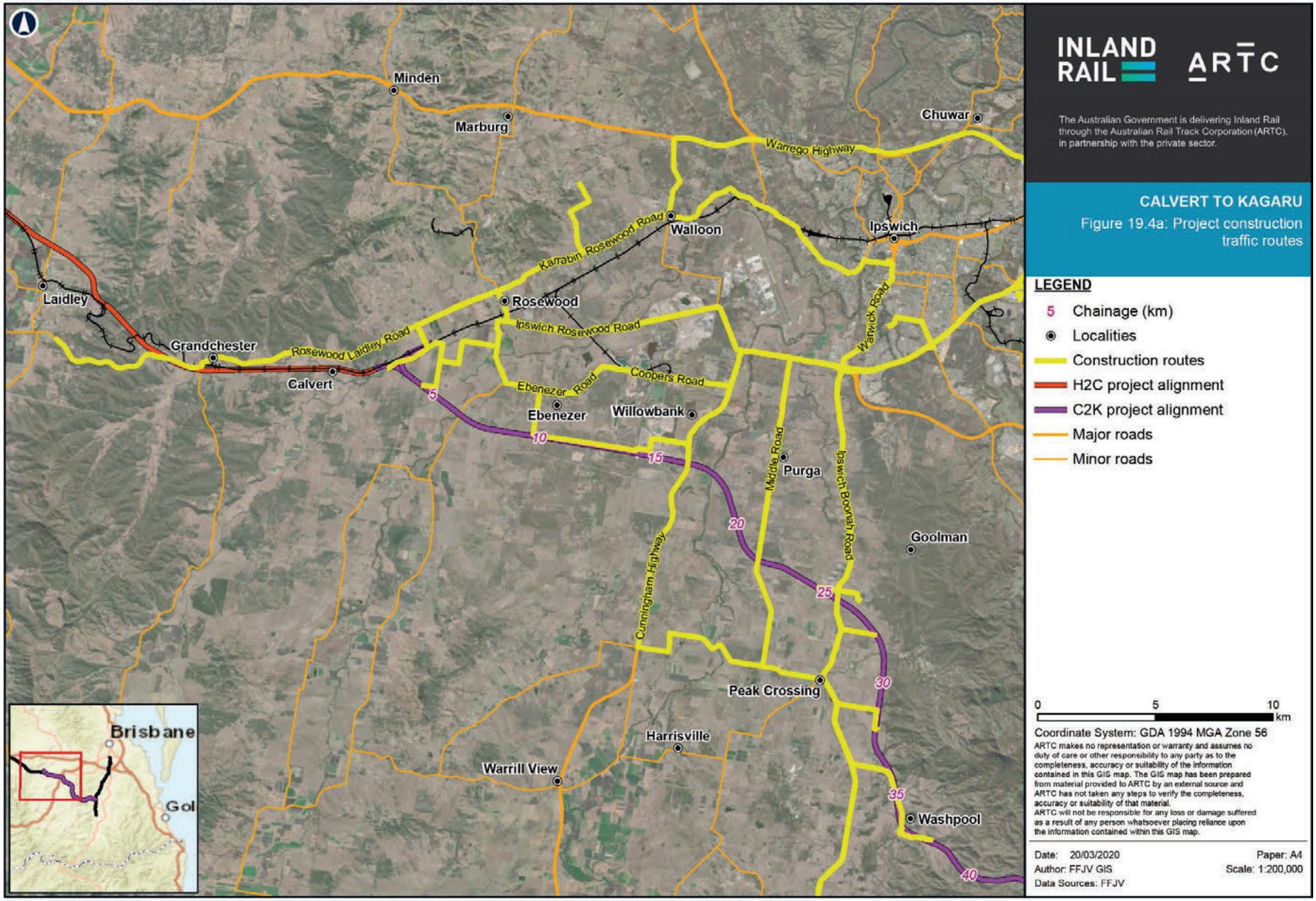
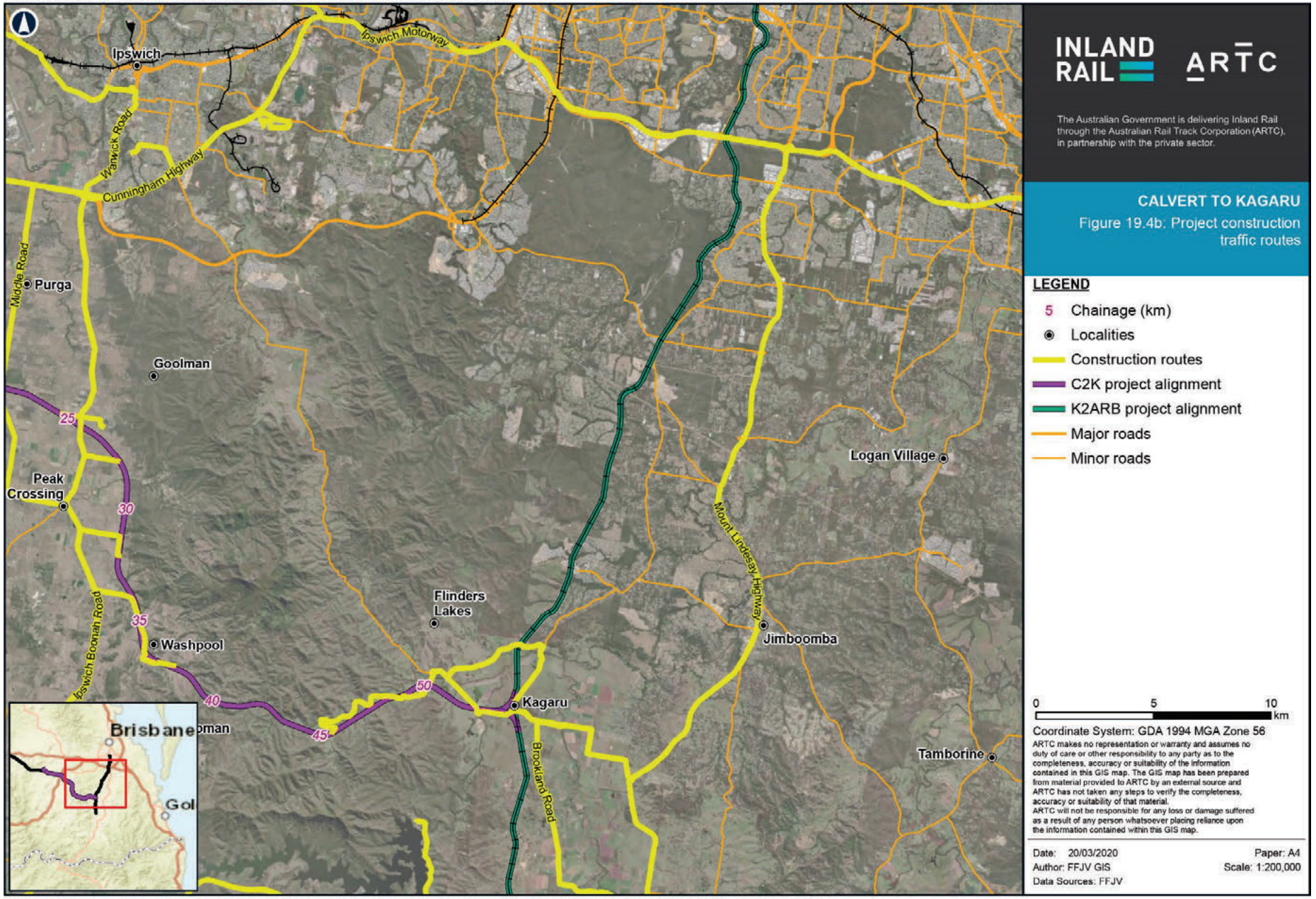


FIGURE 19.3: ESTIMATED SITE WORKFORCE

Despite this number of personnel onsite, an accommodation camp is not considered necessary due to the reasonably close proximity of population centres that will offer both workforce and accommodation options.


Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Minden
Marburg
Chuwar
Warrego Highway
Walloon
Ipswich
Karrabin Rosewood Road
Laidley
Rosewood
Ipswich Rosewood Road
Warwick Road
Grandchester
Rosewood Laidley Road
Calvert
Ebenezer Road
Coopers Road
Ebenezer
Willowbank
5
10
15
Middle Road
Purga
Ipswich Boonah Road
20
Goolman
Cunningham Highway
25
30
Peak Crossing
Harrisville
Warrill View
35
Washpool
40
Brisbane
Gol
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 19.4a: Project construction traffic routes
LEGEND
5 Chainage (km)
Localities
Construction routes
H2C project alignment
C2K project alignment
Major roads
Minor roads
0
5
10
km
Coordinate System: GDA 1994 MGA Zone 56
ARTC makes no representation or warranty and assumes no duty of care or other responsibility to any party as to the completeness, accuracy or suitability of the information contained in this GIS map. The GIS map has been prepared from material provided to ARTC by an external source and ARTC has not taken any steps to verify the completeness, accuracy or suitability of that material.
ARTC will not be responsible for any loss or damage suffered as a result of any person whatsoever placing reliance upon the information contained within this GIS map.
Date: 20/03/2020
Paper: A4
Author: FFJV GIS
Scale: 1:200,000
Data Sources: FFJV
Map by: DMcP/RB/MEF/IW Z:\GIS\GIS_3400_C2K\Tasks\340-EAP-201908131004_100PC_Traffic_Impact_Assessment_Figures\340-EAP-201908131004_ARTC_Fig19.4_OverallConstructionRoutes.mxd Date: 24/03/2020 07:52

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



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 19.4b: Project construction traffic routes

LEGEND

- 5 Chainage (km)
- Localities
- Construction routes
- C2K project alignment
- K2ARB project alignment
- Major roads
- Minor roads

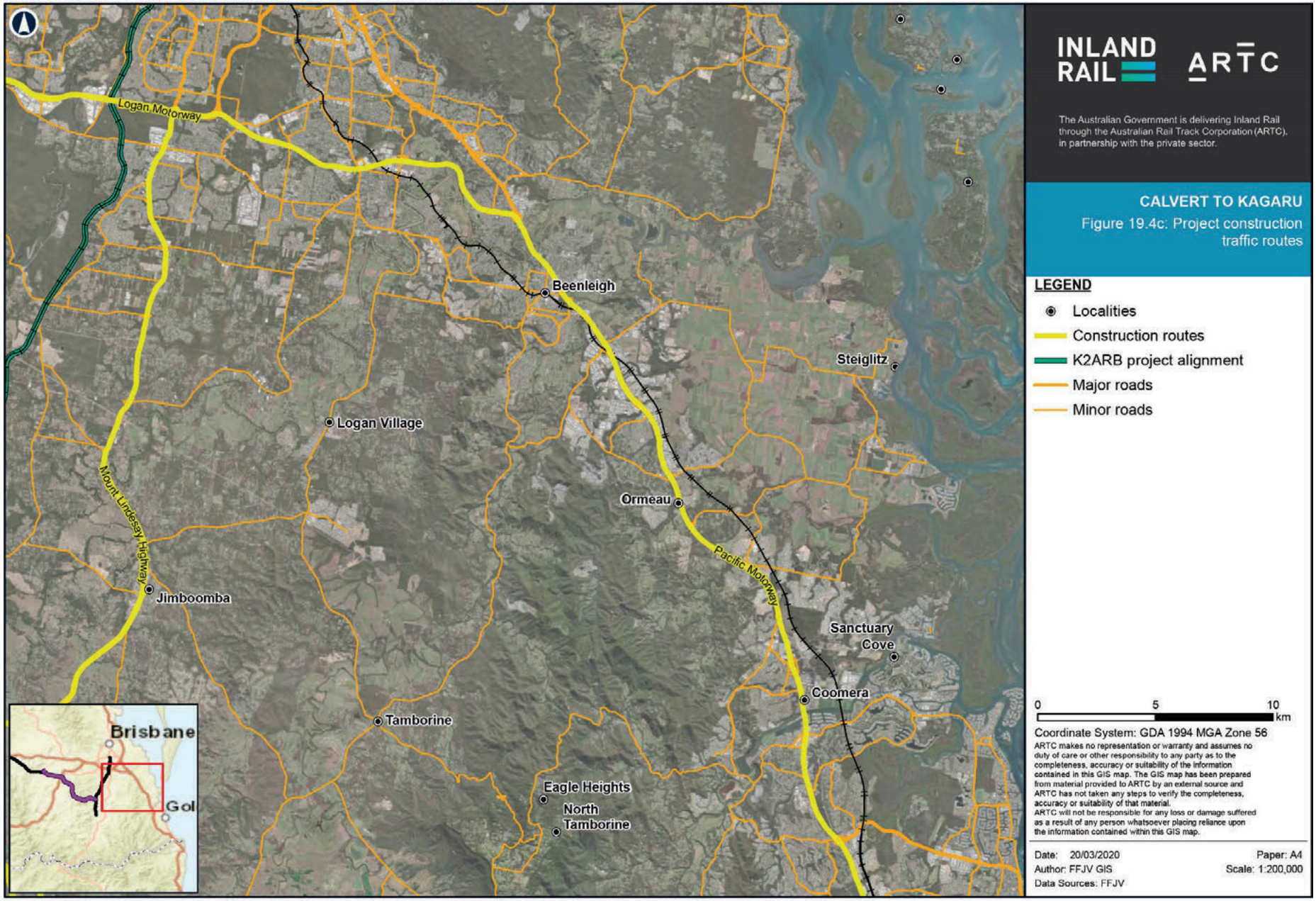
0 5 10 km

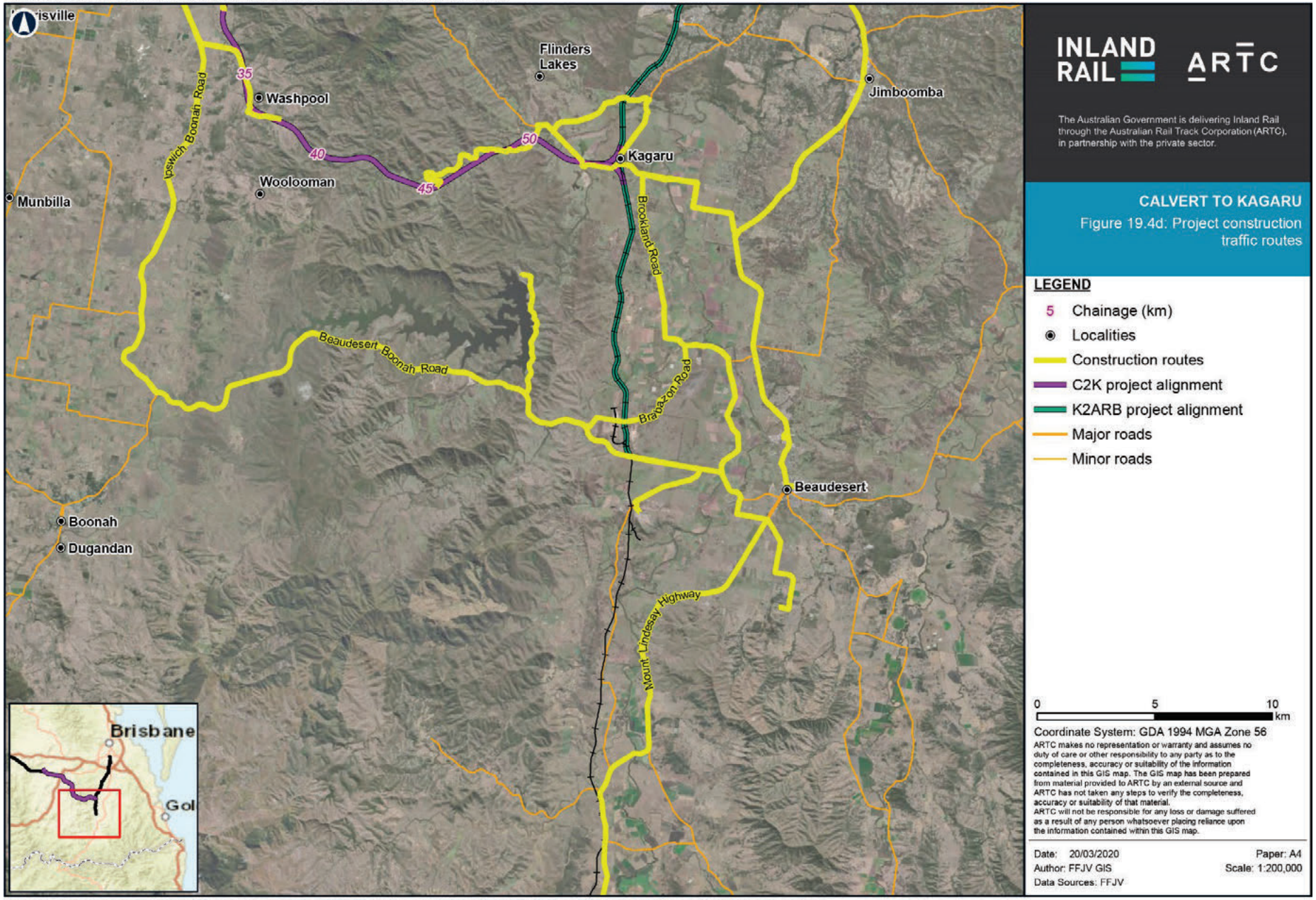
Coordinate System: GDA 1994 MGA Zone 56

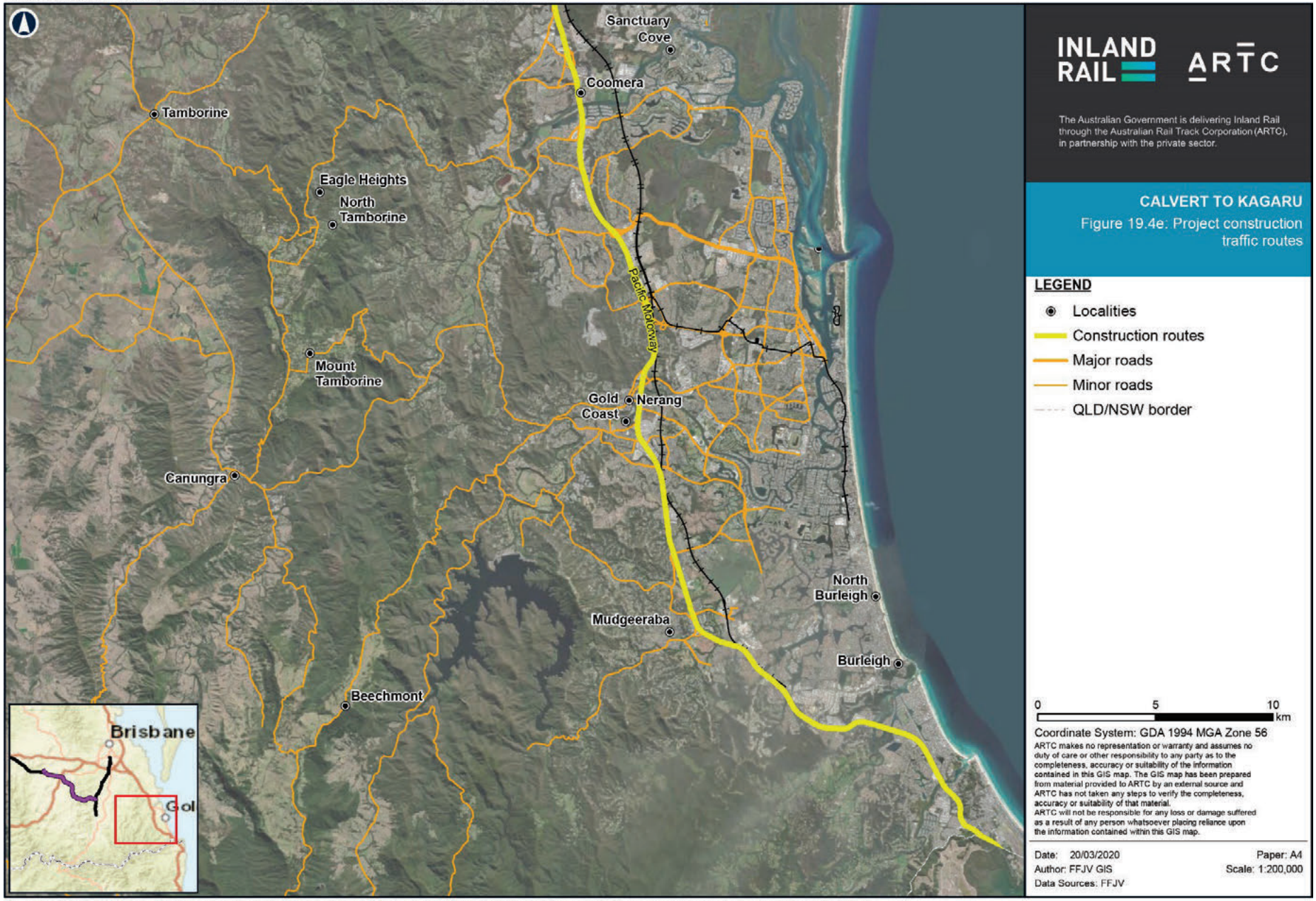
Date: 20/03/2020
Author: FFJV GIS
Data Sources: FFJV

Paper: A4
Scale: 1:200,000

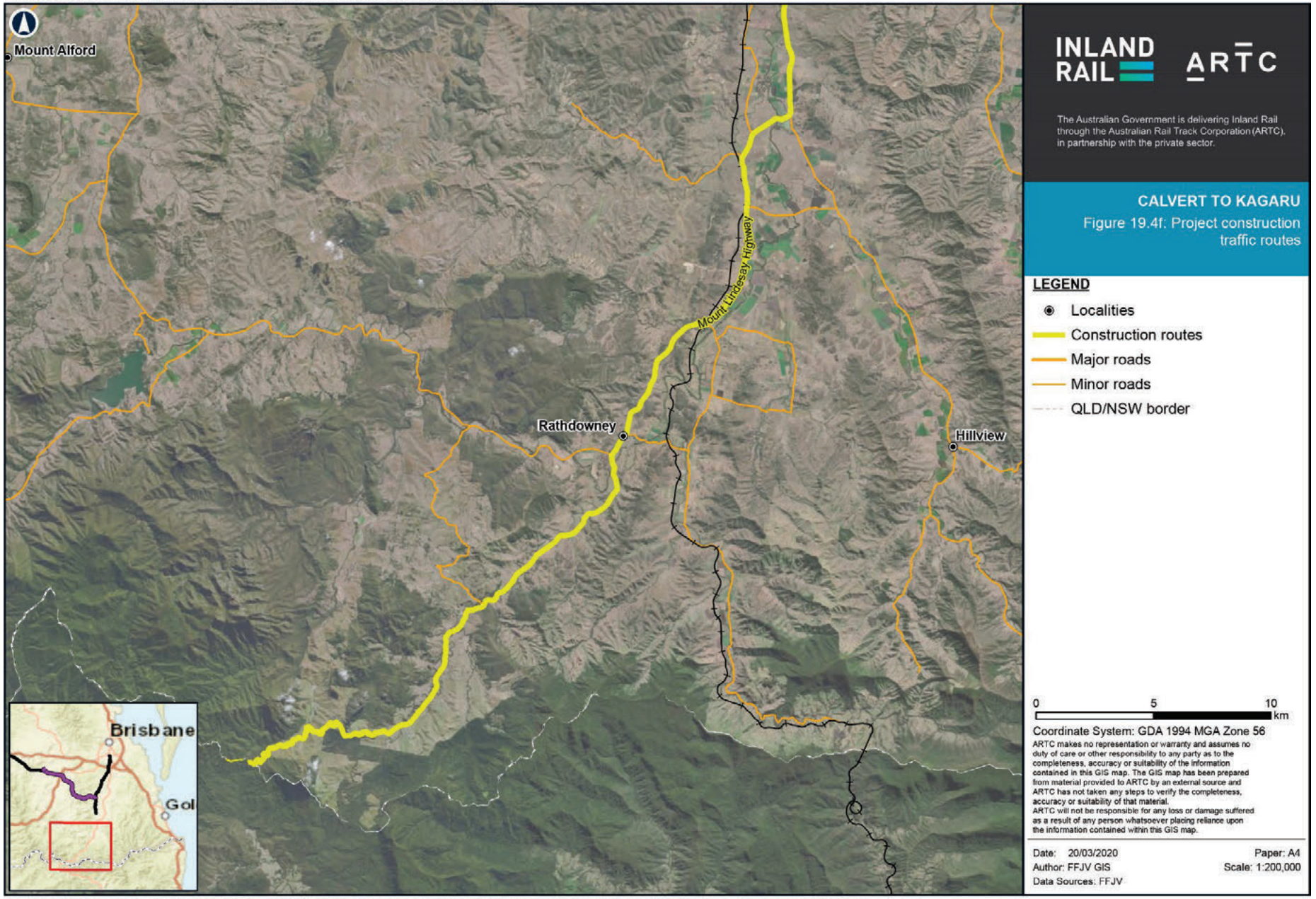
Map by: DMcP/RB/MEF/IW Z:\GIS\GIS_3400_C2K\Tasks\340-EAP-201908131004_100PC_Traffic_Impact_Assessment_Figures\340-EAP-201908131004_ARTC_Fig19.4_OverallConstructionRoutes.mxd Date: 24/03/2020 07:52


Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Logan Motorway
Beenleigh
Steiglitz
Logan Village
Mount Lindesay Highway
Ormeau
Pacific Motorway
Jimboomba
Sanctuary Cove
Coomera
Tamborine
Eagle Heights
North Tamborine
Brisbane
Gol
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 19.4c: Project construction traffic routes
LEGEND
Localities
Construction routes
K2ARB project alignment
Major roads
Minor roads
0
5
10
km
Coordinate System: GDA 1994 MGA Zone 56
ARTC makes no representation or warranty and assumes no duty of care or other responsibility to any party as to the completeness, accuracy or suitability of the information contained in this GIS map. The GIS map has been prepared from material provided to ARTC by an external source and ARTC has not taken any steps to verify the completeness, accuracy or suitability of that material.
ARTC will not be responsible for any loss or damage suffered as a result of any person whatsoever placing reliance upon the information contained within this GIS map.
Date: 20/03/2020
Paper: A4
Author: FFJV GIS
Scale: 1:200,000
Data Sources: FFJV
Map by: DMcP/RB/MEF/IW Z:\GIS\GIS_3400_C2K\Tasks\340-EAP-201908131004_100PC_Traffic_Impact_Assessment_Figures\340-EAP-201908131004_ARTC_Fig19.4_OverallConstructionRoutes_noChainage.mxd Date: 24/03/2020 08:45


Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Flinders Lakes
Jimboomba
Washpool
Kagaru
Woolooman
Munbilla
Ipswich Boonah Road
Brookland Road
Beaudesert Boonah Road
Brabazon Road
Beaudesert
Boonah
Dugandan
Mount Lindesay Highway
35
40
45
50
Brisbane
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 19.4d: Project construction traffic routes
LEGEND
5 Chainage (km)
Localities
Construction routes
C2K project alignment
K2ARB project alignment
Major roads
Minor roads
0 5 10 km
Coordinate System: GDA 1994 MGA Zone 56
ARTC makes no representation or warranty and assumes no duty of care or other responsibility to any party as to the completeness, accuracy or suitability of the information contained in this GIS map. The GIS map has been prepared from material provided to ARTC by an external source and ARTC has not taken any steps to verify the completeness, accuracy or suitability of that material.
ARTC will not be responsible for any loss or damage suffered as a result of any person whatsoever placing reliance upon the information contained within this GIS map.
Date: 20/03/2020
Paper: A4
Author: FFJV GIS
Scale: 1:200,000
Data Sources: FFJV
Map by: DMcP/RB/MEF/IW Z:\GIS\GIS_3400_C2K\Tasks\340-EAP-201908131004_100PC_Traffic_Impact_Assessment_Figures\340-EAP-201908131004_ARTC_Fig19.4_OverallConstructionRoutes.mxd Date: 24/03/2020 07:52


Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Sanctuary Cove
Coomera
Tamborine
Eagle Heights
North Tamborine
Pacific Motorway
Mount Tamborine
Gold Coast
Nerang
Canungra
North Burleigh
Mudgeeraba
Burleigh
Beechmont
Brisbane
Gol
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 19.4e: Project construction traffic routes
LEGEND
Localities
Construction routes
Major roads
Minor roads
QLD/NSW border
0
5
10
km
Coordinate System: GDA 1994 MGA Zone 56
ARTC makes no representation or warranty and assumes no duty of care or other responsibility to any party as to the completeness, accuracy or suitability of the information contained in this GIS map. The GIS map has been prepared from material provided to ARTC by an external source and ARTC has not taken any steps to verify the completeness, accuracy or suitability of that material.
ARTC will not be responsible for any loss or damage suffered as a result of any person whatsoever placing reliance upon the information contained within this GIS map.
Date: 20/03/2020
Paper: A4
Author: FFJV GIS
Scale: 1:200,000
Data Sources: FFJV
Map by: DMcP/RB/MEF/IW Z:\GIS\GIS_3400_C2K\Tasks\340-EAP-201908131004_100PC_Traffic_Impact_Assessment_Figures\340-EAP-201908131004_ARTC_Fig19.4_OverallConstructionRoutes_noChainage.mxd Date: 24/03/2020 08:45

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



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 19.4f: Project construction traffic routes

LEGEND

- Localities
- Construction routes
- Major roads
- Minor roads
- QLD/NSW border

0 5 10 km

Coordinate System: GDA 1994 MGA Zone 56

Date: 20/03/2020
Author: FFJV GIS
Data Sources: FFJV

Paper: A4
Scale: 1:200,000

Map by: DMcP/RB/MEF/IW Z:\GIS\GIS_3400_C2K\Tasks\340-EAP-201908131004_100PC_Traffic_Impact_Assessment_Figures\340-EAP-201908131004_ARTC_Fig19.4_OverallConstructionRoutes_noChainage.mxd Date: 24/03/2020 08:45

Precast concrete routes

It has been assumed that precast concrete for the Project will be delivered from Ipswich and Brisbane. Routes are based on roads most likely to be used for the transportation of precast concrete taking into account input from the National Heavy Vehicle Regulator (NHVR) journey planner, which provides guidance in identifying roads suitable for heavy vehicles. For the transportation of some of the larger precast concrete girders, it is expected that QPS escorts will be required.

Quarry routes

Quarry routes for the Project are currently based on quarries located in Mount Marrow, Purga and Bromelton. These are the closest quarries to the Project likely to be able to provide the required ballast and capping. The quarry in Purga is adjacent to the Project.

It has been assumed that all ballast and capping deliveries will be made by road. Routes are based on roads most likely to be used for the transportation of quarry materials, taking into account distance and, where possible, staying on arterial roads and outside town centres.

Ready-mix concrete routes

Two locations have been identified as potential concrete batch plant sites for the Project and are shown in Table 19.3. These locations are within the vicinity of the EIS investigation corridor. The Tunnel Portal West will provide concrete products for tunnel construction and the site at Undullah Road will assist with limiting travel-time constraints when supplying concrete from established batch plants on the northern side of the Project.

TABLE 19.3: POTENTIAL CONCRETE BATCH PLANTS

ID	Adjoining road	Chainage (km)	Description
C2K-LDN039.5	Tunnel Portal West	39.5	Support tunnel construction activities.
C2K-LDN053.8	Undullah Road	53.8	Support construction activities on eastern side of the tunnel.

Spoil disposal routes

The Project is expected to produce approximately 1,622,504 cubic metres (m^3) of spoil to be managed or treated with the potential for reuse. A number of opportunities exist for the reuse of this material. The sustainable reuse of this material can be investigated in the following areas:

- Wherever possible, spoil will be reused within the Project
- Excess material will be used in adjacent projects, if possible.

The traffic assessment has assumed a worst-case scenario that all of excess spoil material will be transported by road to end-of-life mines, which are located along Ipswich–Rosewood Road (Ebenezer mine and New Hope mine). Approval for these sites to accept this material has yet to be sought.

Opportunities for the beneficial reuse of spoil is further detailed in Chapter 21: Waste and Resource Management and Appendix V: Spoil Management Strategy.

Structural fill and capping

For the purposes of this assessment, it has been assumed that capping material is transported by truck from commercial quarries along the Project. If there is a lack of suitable structural fill material from cuts, it is expected that structural fill will be sourced from the same quarry the capping material is sourced from.

Rail segments routes

It has been assumed that rail will be supplied by a single source and will be distributed from the closest existing QR and ARTC rail network to various points along the Project, where possible. Where further transportation is required to distribute rail to designated areas along the Project, road networks have been identified.

Rail will be delivered to three locations via the rail network—Rosewood, Lanefield and Kagaru. Thereafter, rail will be transported through the EIS disturbance footprint and via the road network, where appropriate. The rail routes that use road networks were formulated using the NHVR journey planner, which provides guidance in identifying suitable roads for heavy vehicles. It is expected that QPS escorts will be required for transporting the rail via the road network.

Consolidated sleeper routes

For the purposes of this assessment, it has been assumed that ARTC will supply all the concrete sleepers. Sleeper routes were formulated using the NHVR journey planner, which provided guidance in identifying suitable roads for heavy vehicles. The sleeper routes will then be consolidated where feasible to minimise the number of roads affected. This was achieved by selecting the same roads where possible in circumstances where the alternate route did not increase the route distance significantly.

Delivery of water

Water supply is assumed to be available from Churchbank Weir, located in south Ipswich, and Wyaralong Dam, located north-west of Beaudesert. Water will be supplied to various points along the Project for activities including earthworks, trackwork and dust suppression.

Laydown areas

Laydown areas will be located approximately every 5 km (avoiding 1% annual exceedance probability (AEP) floodplains where possible) next to the rail corridor to facilitate direct access to/from the laydown to the alignment. Larger sites will be located approximately every 20 km. The laydown areas will act as a centralised point for all material storage. Some laydowns will also include fuel storage areas and site office compounds.

19.4.1.2 Operational transport routes

Movement of the operation and maintenance workforce and the transportation of maintenance materials are expected to be the key transport tasks during the operational stage of the Project. Maintenance vehicles will use the access track that will be constructed for the majority of the inspection and maintenance activities. It is expected that operational traffic will be irregular and inconsequential, with no envisaged impacts to operational conditions of the surrounding road network. Impacts associated with the operation of the Project are explored in detail in Section 19.6.2.

19.4.2 Impact assessment methodology

Desktop studies were undertaken to establish the baseline conditions for the transport infrastructure within the traffic, transport and access study area. The compliance assessment (quantitative) approach was adopted to access potential traffic impacts and opportunities of the Project. The performance criteria outlined by the GTIA (DTMR, 2017b) are to determine the traffic generation related to the construction and operation of the Project and assess the potential impacts on the transport infrastructure and facilities. Following the traffic analysis, proposed mitigation measures have been identified to be applied in the detailed design, pre-construction, construction and operational phases of the Project to address specific issues and opportunities, address legislative requirements, accepted government plans, policy and practice. The compliance assessment methodology is presented in Chapter 4: Assessment Methodology.

As part of the desktop studies, the existing road, rail and port facilities were assessed to generate an overview of existing transport modal operations. The delivery of materials and machinery will make use of the existing road and rail network during the construction and operation of the Project. Therefore, most project impacts are considered to be road-and-rail network related. A summary of the transport tasks by mode is presented in Table 19.4.

TABLE 19.4: SUMMARY OF TRANSPORT TASKS BY MODE

Project phase	Road	Rail	Port and airport	Active transport[1]
Construction	Transport of construction material, plant and equipment. The transport of workforce to and from site	Transport of construction material	No impact expected	No impact expected
	Impact of permanent road closures and realignments on surrounding road network and road–rail interface locations			
	Impact of rail crossings on vehicle queues and nearby intersections			
Operation	Rail maintenance workforce movements	Operations and maintenance	No impact expected	No impact expected
	Impact of permanent road closures and realignments on surrounding road network and road–rail interface locations			
	Transport of maintenance materials as required			
	Impact of rail crossings on vehicle queues and nearby intersections			

Table notes:
1. Active transport includes non-motorised forms of transport involving physical activity, most commonly walking and cycling.

For the impact analysis, Figure 19.5 illustrates the methodology adopted to identify the background and Project-related traffic volumes. This methodology focused on establishing a background 'without development' traffic scenario for the identified traffic, transport and access study area and comparing this to the scenario including the Project-generated traffic (i.e. the 'with development' scenario).

The process allowed for the assessment of the Project's traffic impacts on road safety, access and frontage, intersections, road links, pavement and road/rail interfaces. Following the impact assessment and, if necessary, potential mitigation and management measures were developed to address the potential traffic impacts caused by the Project.

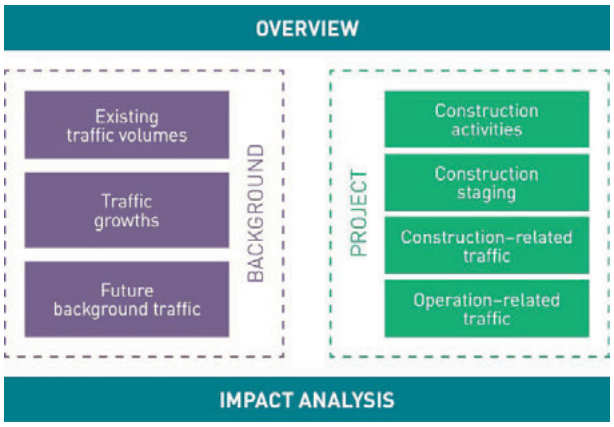


FIGURE 19.5: BACKGROUND AND PROJECT TRAFFIC VOLUMES

The key tasks for traffic and transport assessment include:

- Desktop review and data collection
- Impact assessment and mitigation.

19.4.2.1 Desktop review and data collection

The key data and information inputs required to undertake the traffic and transport impact assessment are listed below:

- Local government and State policies and strategies potentially influencing the traffic and transport impact assessment for the Project
- Road configurations and access policies (existing and proposed)
- Road network and hierarchy maps
- Road link capacity thresholds
- Road classification details, including typical cross sections
- Existing traffic data
- Traffic growth
- Programmed road works and upgrades
- Future planned road network
- Approved and future development plans
- Road-use management plans
- Designated freight and seasonal traffic routes
- Dangerous goods vehicle routes

- Bus and school bus routes
- Emergency service access
- Stock routes and travelling stock routes
- Multi-combination routes and zones
- Standard axle loads and existing pavement condition
- Prevailing structural integrity issues (i.e. vulnerable structures)
- Structural capacity/life of structures
- Crash data.

Background traffic volumes

The following section describes the approach for obtaining background and Project traffic volumes used in the traffic impact assessment.

Existing traffic volumes

Existing traffic volumes (link and intersections) in the first instance were gathered from road-controlling authorities. Traffic surveys were commissioned at key locations where traffic data was unavailable. Table 19.5 illustrates the approach that was proposed to determine the road segments within the traffic, transport and access study area where traffic surveys were recommended, taking into consideration the increase in traffic volumes due to the Project and the duration of construction. In instances where traffic data was both unavailable from road controlling authorities or traffic surveys, traffic volumes were estimated based on the *Austroads Part 2—Guide to Traffic Engineering Practice: Roadway Capacity* guideline and stakeholder consultation.

Further details on existing traffic volume rates are included in Appendix U: Traffic Impact Assessment Technical Report.

Traffic growth rates

Traffic growth rates on SCRs were derived based on historic permanent census traffic data where available. Linear traffic growth rates were determined for road segments along SCRs envisaged to be impacted by the Project. An evaluation of the traffic growth rates revealed an overall annual average daily traffic growth rate (AADT) of 2 per cent, which was adopted in the analyses. In the absence of data to determine traffic growth rates, an average annual growth rate of 2 per cent for SCRs and local government authority roads was assumed.

Further details on traffic growth rates are included in Appendix U: Traffic Impact Assessment Technical Report.

Future background traffic

Traffic growth obtained from road controlling authorities was applied to existing traffic volumes to estimate the future background traffic. Redistributed background traffic from permanent road closures due to the Project were accounted for in future year traffic estimates by means of manual reassignment of traffic demands on reasonably assumed diversions.

19.4.2.2 Project traffic

Traffic generators

- **Construction activities**
  The major construction activities include: delivery of quarry materials (ballast, capping materials, precast concrete, ready-mix concrete, rail, consolidated sleepers, earthworks materials); workforce; delivery of water; and transportation/collection of plant, tools and other materials.
- **Construction staging**
  Staging will relate to construction start and end dates of all construction-related activities within the envisaged construction period. To determine the peak period for the Project, the start and end dates of all associated construction were considered.
- **Construction-related traffic**
  The number of trips generated by each construction activity were estimated for light vehicle and heavy vehicle trips based on the transport of material quantities and associated construction schedules. The traffic loads/trips were assigned to the corresponding transport route for each construction activity. This allowed for the estimation peak construction traffic for each construction route and also for separate road sections.

  For further details on the construction-related traffic generation, distribution and assignment, refer Appendix U: Traffic Impact Assessment Technical Report.
- **Operational traffic**
  Rail maintenance workforce movements and the delivery of maintenance materials are expected to be the major transport tasks during Project operation. It is anticipated that operational traffic will be insignificant due to low-maintenance vehicle movements and transportation of maintenance material within the rail corridor.
- **Seasonal variation**
  Based on the dominant rural land uses of the traffic, transport and access study area, traffic volumes on the road network are likely to increase during harvesting season. During harvesting season, heavy vehicles usage on the local and state roads in the study area increases as trucks transport grain and tractors and harvesters move between properties. Farming machinery is generally much larger and slower than other vehicles using the roads and may result in localised delays.

The impact of seasonal variation was considered as part of the traffic analyses, especially at road-rail interface locations, where the analysis outcomes have provided input into the design. The impact of seasonality was taken into consideration by means of the following:

- Road–rail interface analysis: It was considered to adopt 95th percentile output results from SIDRA modelling results instead of industry standard 85th percentile outputs. This is considered conservative as it accounts for additional vehicle queue and delay, which might be induced through higher traffic volumes and slower moving vehicles.
- The level of service (LOS) thresholds and associated K-values used within the analyses per road type as derived from the *Austroads Part 2—Guide to Traffic Engineering Practice: Roadway Capacity* (Austroads, 1988) already accounts for the 30th highest hour traffic volumes of similar road types. This provides for upper LOS threshold limits, which accounts for any micro-fluctuations and peaks in traffic throughout the year.
- **Cumulative impacts**

  Construction schedules relating to other Inland Rail projects and major developments in the region were considered to establish schedule overlaps (i.e. where construction routes are used for several Inland Rail packages during the peak period).

  For further details, refer Section 19.9, Chapter 22: Cumulative Impacts and Appendix U: Traffic Impact Assessment Technical Report.

Data sources

To identify additional data requirements from other data sources, such as traffic surveys, a gap analysis of received data/information was undertaken. The following approach was used to select road segments within the traffic, transport and access study area where data needed to be obtained from traffic surveys:

- Assign road details to each road segment within the traffic, transport and access study area: number of lanes, posted speed limited, road surface etc.
- Identify the duration each road segment will be used for construction transport. Durations were identified with nominated assumed periods (i.e. short: <6 months; moderate 6–12 months; long: >12 months).
- Determine the road segments where traffic surveys were recommended, taking into consideration the increase in traffic volumes due to the Project and the duration of construction (refer Table 19.5).

TABLE 19.5: PROPOSED SELECTION CRITERIA FOR TRAFFIC SURVEY LOCATIONS

Increase in traffic due to Project	Long duration	Moderate duration	Short duration
High increase	Survey recommended	Survey recommended	No survey recommended
Moderate increase	Survey recommended	No survey recommended	No survey recommended
Low increase	No survey recommended	No survey recommended	No survey recommended

Traffic data obtained from road controlling authorities on road links that was considered appropriate for use in the traffic impact assessment did not require traffic surveys. The following methodology was developed to aid in the selection of intersections within the traffic, transport and access study area where data was gathered from traffic surveys:

- Undertake a 5 per cent comparison analysis for road segments to:
  - Identify where the Project traffic will equate to or exceed 5 per cent of base traffic
  - Identify intersections where construction traffic is planned to undertake turn manoeuvres
  - Determine where the traffic growth rate is either moderate or high
  - Referring to the intersections identified above, surveys where possible were undertaken based on the suggested selection criteria presented in Table 19.5.
- Road links envisaged to be impacted by construction routes that did not have available background traffic information either sourced or collected by means of traffic surveys were assumed by adopting the following process.

Classify each road segment within the traffic and transport study area based on the following assumed classification:

- Urban Local Road
- Urban Collector Road
- Urban Arterial Road
- Rural Local Road
- Rural Collector Road
- Rural Arterial Road.

Flow rates were estimated based on the following:

- Urban Local Road: Volumes derived by assuming LOS A with associated AADT of 2000 vehicles as depicted in RTA Guide to Traffic Generating Developments, 2002 as adopted from the *Austroads Part 2—Guide to Traffic Engineering Practice: Roadway Capacity* (Austroads, 1988)
- Urban Collector Road: Volumes derived by assuming LOS B with associated AADT of 3800 vehicles as depicted in *RTA Guide to Traffic Generating Developments* (RTA, 2002) as adopted from the *Austroads Part 2—Guide to Traffic Engineering Practice: Roadway Capacity* (Austroads, 1988)
- Urban Arterial Road: Volumes derived by assuming LOS B with K-value of 0.12 with associated AADT of 2000 vehicles as depicted *in Austroads Part 2—Guide to Traffic Engineering Practice: Roadway Capacity* (Austroads, 1988)
- Rural Local Road: Volumes derived by assuming 400 AADT based on a review of proximate rural local roads
- Rural Collector Road: Volumes derived by assuming LOS A with K-value of 0.12 with associated AADT of 2000 vehicles as depicted in *Austroads Part 2—Guide to Traffic Engineering Practice: Roadway Capacity* (Austroads, 1988)
- Rural Arterial Road: Volumes derived by assuming LOS A with K-value of 0.15 with associated AADT of 1600 vehicles as depicted in *Austroads Part 2—Guide to Traffic Engineering Practice: Roadway Capacity* (Austroads, 1988).

Peak-hour flow rates obtained from various sources were converted to average daily traffic volumes.

19.4.2.3 Impact assessment and mitigation

Traffic

The operational performance of the road network in the traffic, access and transport study area has been assessed to develop an understanding on the potential traffic impacts from the Project according to the GTIA (DTMR, 2017b) process shown in Figure 19.6.

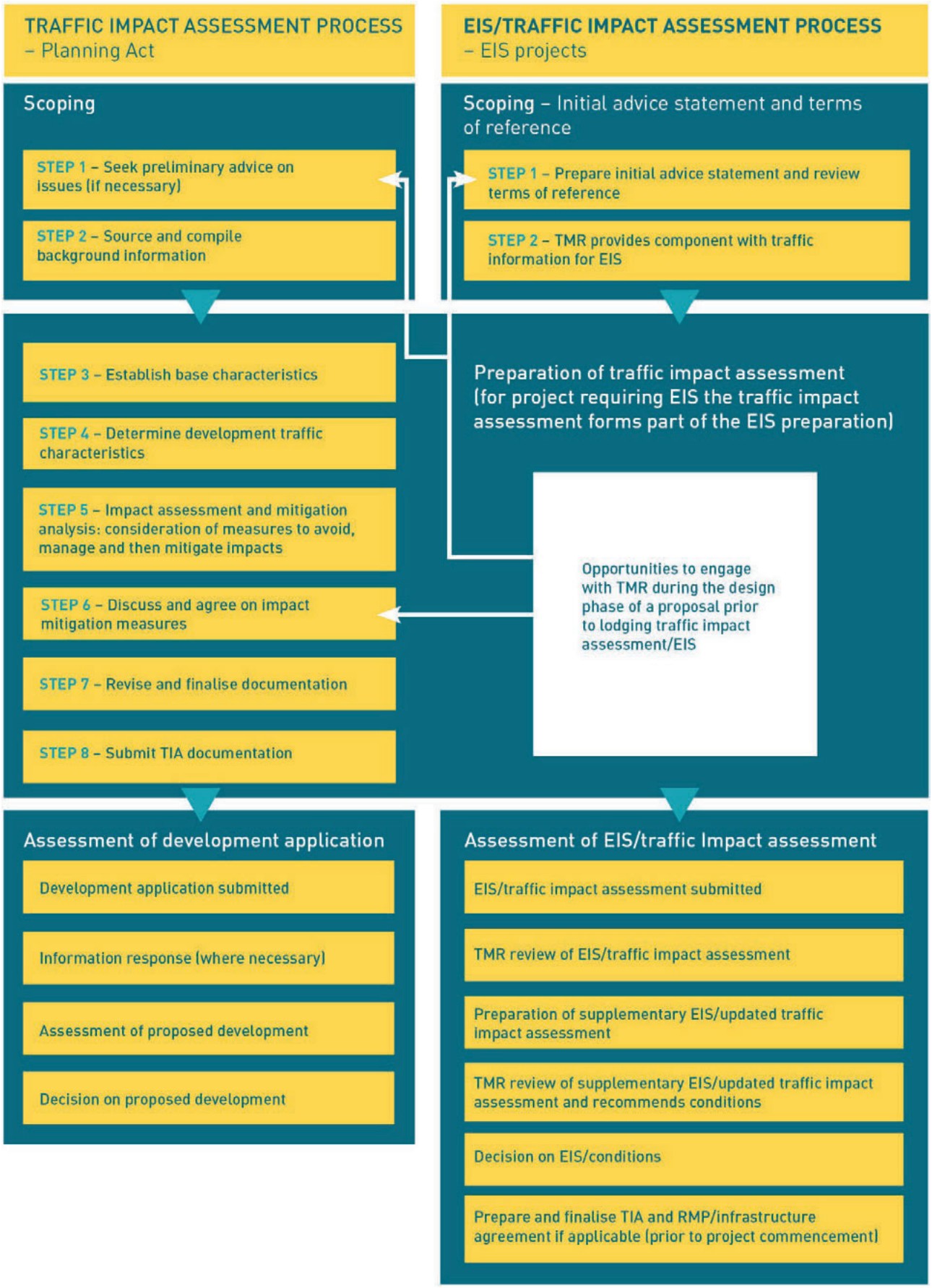


FIGURE 19.6: TRAFFIC IMPACT ASSESSMENT PROCESS

Source: DTMR GTIA, September 2017b

The GTIA (DTMR, 2017b) impact assessment manual process was developed for the SCR network and has been extended to the local government road network. The process does not apply to private roads.

While use of the guideline is not mandatory for a traffic impact assessment, they provide a basis for assessing potential impacts from the construction and operation of the Project on the local and regional transport network.

The extent of the impacts of development traffic on other users and on infrastructure can range from being localised to quite dispersed. The GTIA defines conditions for determining an analysis boundary within which to assess a reasonable level of impact of the additional development traffic. This boundary is the impact assessment area. The impact assessment area defines where impacts would most likely occur at intersections and on links in the network surrounding the traffic, transport and access study area.

The GTIA conditions for determining the impact assessment area are provided in Table 19.6.

TABLE 19.6: IMPACT ASSESSMENT AREA BY IMPACT TYPE

Impact type	Impact assessment area
Road safety	All intersections where the development traffic exceeds 5 per cent of the base traffic for any movement in the design peak periods in the year of opening of each stage. All road links where the development traffic exceeds 5 per cent of the base traffic in either direction on the link in the design peak periods in the year of opening of each stage.
Access and frontage	Potential construction accesses/lay down areas on limited access roads in the DTMR networks.
Intersection delay	All intersections where the development traffic exceeds 5 per cent of the base traffic for any movement in the design peak periods in the year of opening of each stage.
Road link capacity	All road links where the development traffic exceeds 5 per cent of the base traffic in either direction on the link's AADT in the year of opening of each stage.
Pavement	All road links where the development standard axle repetitions (SARs) exceed 5 per cent of the base traffic in either direction on the link's SARs in the year of opening of each stage.
Transport infrastructure	All road links where the development traffic exceeds 5 per cent of the base traffic in either direction on the link's AADT in the year of opening of each stage, or where DTMR identifies prevailing structural integrity issues of transport infrastructure (for example, bridges or culverts).

The performance criteria for assessment of traffic and transport impact is outlined in Table 19.7. LOS criteria are as defined in the *Austroads Guide to Traffic Management: Part 3 Traffic Studies and Analysis* (2017).

TABLE 19.7: PERFORMANCE CRITERIA

Assessment type	Performance criteria
Traffic impact assessment	Construction and operational traffic generated by the development equals or exceeds 5 per cent of the existing AADT on the road section.
	LOS C can be considered the minimum standard on rural roads. However, LOS D may be accepted in case of event traffic.
	LOS E should be considered the limit of acceptable for urban area operation and remedial works would be needed if LOS F would otherwise result.
Pavement impact assessment	Construction and operational traffic generated by the development equals or exceeds 5 per cent of the existing SARs on the road section.

The impact assessment year is the year the impacts of the development are assessed. The impact assessment year varies by impact type because the effects of development can be quite different on infrastructure than they are on other users. The impact years to be assessed were adopted from GTIA and summarised in Table 19.8.

TABLE 19.8: IMPACT ASSESSMENT YEARS

Impact type	Impact assessment years
Road safety	Years of construction + year of opening of each stage including the final stage
Access and frontage	Years of construction + year of opening of each stage including the final stage and 10 years after the year of opening of the final stage for access intersections (includes both new and amended accesses)
Intersection delay	Years of construction + year of opening of each stage including the final stage
Road link capacity	Years of construction + year of opening of each stage including the final stage
Pavement	Years of construction + year of opening of each stage including the final stage over a 20-year design period
Transport infrastructure	Years of construction + year of opening of each stage including the final stage.

The impact assessment and mitigation processes contained in the GTIA (DTMR, 2017b) was adopted to determine appropriate mitigation measures on road impacts. The mitigation framework is provided in Figure 19.7.

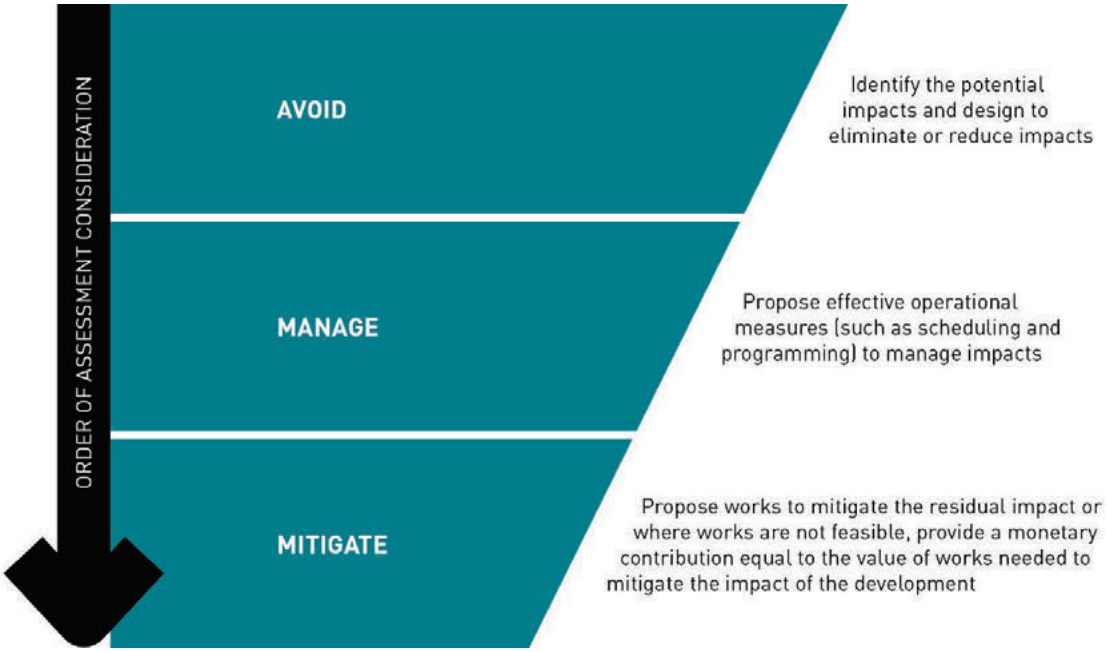


FIGURE 19.7: MITIGATION FRAMEWORK

Source: GTIA (DTMR, 2017b)

19.4.2.4 Other impacts and mitigation measures

There are a number of strategic benefits of freight travelling by rail rather than road. The Project is expected to remove a portion of heavy freight trips from the road network, therefore improving safety for all road users. The key strategic benefits of Inland Rail are listed below and discussed in further detail in Chapter 2: Project Rationale. Key benefits of the Inland Rail Program are to:

- Provide a rail link between Melbourne and Brisbane that is interoperable with train operations to Perth, Adelaide and other locations on the standard gauge rail network. This will serve future rail freight demand and stimulate growth for inter-capital and bulk rail freight.
- Provide an increase in productivity that will benefit consumers through lower freight transport costs
- Provide a step-change improvement in rail service quality in the Melbourne to Brisbane corridor and deliver a freight rail service that is competitive with road transport
- Improve safety, alleviate congestion and reduce environmental impacts by moving freight from road to rail
- Bypass bottlenecks within the existing metropolitan rail networks and free up train paths for other services along the coastal routes
- Act as an enabler for regional economic developments along the Inland Rail Program corridor.

Direct benefits

Foreseeable direct benefits associated with Inland Rail, as identified by the *Program Business Case* (ARTC, 2015a), are as follows.

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, longer curves, resulting in shorter transit times and avoided incidents and flooding
- Linkages between existing rail networks, such as the existing 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.

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 SCRs 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 utilise rail in accessing key local and international markets.

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.

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
- Reduces 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 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.

19.4.3 Rail crossing impact assessment

Level crossings can introduce dangerous points at which trains, cars and pedestrians can intersect. The majority of level-crossing incidents are classified as 'near miss' incidents between trains, road vehicles, and pedestrians. While rare, actual collisions can occur at level crossings, which can cause property damage, service disruptions, impact to adjacent infrastructure, injury and, in some traffic cases, death.

The rail-crossing impact assessment centred on vehicle delay and queueing analysis of Project traffic at rail crossings, and at neighbouring closely spaced intersections. This analysis was undertaken for the Project at proposed rail crossings only as there are no existing operational rail crossings within the traffic, transport and access study area.

A safety-based risk assessment was undertaken for the road-rail interfaces proposed for the Project, with a 'high' risk rating assigned to each level-crossing location. Mitigation measures have been developed to reduce the risk associated with these crossings so far as reasonably practicable. This includes the application of ALCAM and the measures informed by the key actions and areas of focus of the Queensland Level Crossing Safety Strategy (2012–2021).

19.4.4 Rail network impact assessment

Scope exists within the disturbance footprint for the Project to be constructed parallel to sections of existing operational railway without impacting operations. Therefore, the operational performance of the existing rail network in the traffic, transport and access study area is not anticipated to be significantly impacted as a result of the Project construction. Construction of connections to the existing rail network is planned to occur during routine maintenance periods. Therefore, impacts to the rail network are not expected.

19.4.5 Impacts on ports and airports (other modes and intermodal terminals)

During the construction and operational phases, the expected impact from the Project on ports and airports is not considered to be significant as the transport of materials, workforce and equipment is expected to primarily use the existing road and rail transport networks.

While the Inland Rail Program proposes to use the existing freight line from Acacia Ridge to the Port of Brisbane, this particular Project (Calvert to Kagaru) is not located within close proximity to the Port. The Project will not impact on the safety or efficient operation of any strategic ports. Impacts from the Project on the operation and throughputs at ports (freight containers) is not in the scope of this chapter and has not been assessed.

The Project is located in excess of 5 km from the nearest strategic airport, RAAF Base Amberley (the closest strategic airport). The Project is located within the 8 km and 13 km wildlife hazard buffer zone, and the 45 m and 90 m height restriction zone (which applies to defence airfields and joint-user airfields and may limit the height of new structures or additions to existing structures). Due to the height restriction zones, use of construction plant, placement of bridges, or operation of double-stacked freight could impact RAAF Base Amberley. However, the Project is not proposed to result in incompatible intrusions or compromise the safety of the RAAF Base Amberley.

While it is expected that construction traffic routes will use Ipswich–Rosewood Road, a major road adjacent to RAAF Base Amberley, it is not expected to impact on the operations of RAAF Base Amberley.

19.4.6 Stakeholder consultation

Consultation with impacted stakeholders was undertaken throughout the development of the traffic impact assessment. The stakeholder engagement process includes sending emails as well as formal meetings that addressed the proposed traffic impact assessment process, impacted assets, adopted manuals and procedures, assumptions (such as traffic growth rates, assumed base volumes etc.) and proposed mitigation measures. The key stakeholders consulted were:

- DTMR
- LCC
- SRRC
- ICC
- Emergency services
- QR
- Rosewood State High School
- Rosewood State School.

Consultation with stakeholders and the community has also informed the development of some design aspects, including road realignments and level crossing solutions, which are discussed in the Appendix C: Consultation Report, and project design outcomes described in Chapter 6: Project Description.

19.5 Existing environment

19.5.1 Existing rail facilities

QR owns Queensland's regional freight network and operates both suburban and long-distance passenger services for the QLD Government. QR's regional freight network comprises seven different systems in the state, with the Project to link the West Moreton system east of Calvert to the interstate Brisbane to Sydney railway near Kagaru, north of Beaudesert. The Interstate network between the NSW border and Acacia Ridge Intermodal Freight Terminal is leased to ARTC.

19.5.1.1 Existing rail crossings

There are currently no existing operational level rail crossings within the EIS investigation corridor that would be impacted. The traffic, transport and access study area consists of greenfield rail that will encompass new proposed level crossings. Therefore, no assessment is necessary for existing rail crossings as part of the Project.

19.5.1.2 Road network

Several SCRs and local government roads are encompassed in the EIS investigation corridor that serve as main transport routes for the Project. This section does not identify roads that are to be used during the Project's operation, as the operational phase traffic would only account for irregular maintenance and emergency service vehicles. The existing road system is envisaged to be used by the operational traffic and account for low-volume traffic with no impact on existing operations.

19.5.1.3 State-controlled roads

Three SCRs have been identified that will interface with the proposed rail alignment. These roads are included in Table 19.9 and shown in Figure 19.1.

TABLE 19.9: STATE-CONTROLLED ROADS INTERSECTING THE EIS INVESTIGATION CORRIDOR

Road name	Road ID: road section
Rosewood Warrill View Road	305:Rosewood Warrill View Road (between Ch 5.0 and Ch 6.0 km)
Cunningham Highway	17B:Cunningham Highway (between Ch 23.0 and Ch 25.0 km)
Ipswich Boonah Road	211:Ipswich–Boonah Road (between Ch 10.0 km and Ch 11.0 km)

SCRs that are proposed to be used to transport construction materials, equipment and workforce during construction of the Project are included in Table 19.10 and shown in Figure 19.1.

TABLE 19.10: STATE-CONTROLLED ROADS: PROJECT PRIMARY CONSTRUCTION ROUTES

Road name	Road ID—road section
State-controlled roads: DTMR	
Beaudesert–Boonah Road	212: Between Ipswich Boonah Road and Wyaralong Dam Access
	212: Between Wyaralong Dam Access and Tilley Road
	212: Between Tilley Road and Sandy Creek Road
	212: Between Sandy Creek Road and Bromelton House Road
	212: Between Bromelton House Road and Ilbogan Road
Cunningham Highway	17B: Between Ipswich Motorway and Redbank Plains Road
	17B: Between Redbank Plains Road and Ripley Road
	17B: Between Ripley Road and Ipswich–Boonah Road
	17B: Between Ipswich–Boonah Road and Middle Road
	17B: Between Middle Road and Ipswich–Rosewood Road
	17B: Between Ipswich–Rosewood Road and Champions Way
	17B: Between Champions Way and Mutdapilly Churchbank Weir Road
Haigslea Amberley Road	3041: Between Karrabin Rosewood Road and Warrego Highway
Ipswich–Boonah Road	211: Between Cunningham Highway and Mt Flinders Road
	211: Between Mt Flinders Road and Warrill View Peak Crossing Road

Road name	Road ID—road section
Ipswich–Boonah Road (continued)	211: Between Warrill View Peak Crossing Road and Dwyers Road
	211: Between Dwyers Road and Washpool Road
	211: Between Washpool Road and Beaudesert–Boonah Road
Ipswich Motorway	17A: Between Cunningham Highway and Logan Motorway
Ipswich–Rosewood Road	304: Between Cunningham Highway and Ipswich–Rosewood Road
	304: Between Ipswich–Rosewood Road and Karrabin–Rosewood Road
Karrabin–Rosewood Road	3002: Between Rosewood–Laidley Road and Haigslea–Amberley Road
	3002: Between Haigslea–Amberley Road and Moffatt Street
Logan Motorway	Between Ipswich Motorway and Pacific Motorway
	Between Ipswich Motorway and Centenary Highway
	Between Centenary Highway and Mount Lindesay Highway
Mount Lindesay Highway	25B: Between Thiedke Road and NSW/QLD Border
	25A: Between Logan Motorway and Undullah Road
	25A: Between Undullah Road and Allan Creek Road
	25A: Between Allan Creek Road and Eaglesfield Street
Pacific Motorway	12A: Between Logan Highway and NSW/QLD Border
Rosewood–Laidley Road	308: Between Karrabin Rosewood Road and Lane Road
	308: Between Lane Road and Grandchester–Mount Mort Road
	308: Between Grandchester–Mount Mort Road and Crown Street
Rosewood–Warrill View Road	305: Between Ipswich–Rosewood Road and Reillys Road
	305: Between Reillys Road and Ebenezer Road
Warrego Highway	18A: Between Haigslea Amberley Road and Brisbane Valley Highway
	18A: Between Brisbane Valley Highway and Pine Mountain Road
	18A: Between Pine Mountain Road and Cunningham Highway
Warrill View–Peak Crossing Road	216: Between Peak Crossing–Churchbank Weir Road and Ipswich–Boonah Road
Warwick Road	301: Between Moffatt Road and Lobb Street
	301: Between Lobb Street and Cunningham Highway

19.5.1.4 Local government roads

Several local government roads directly intersect the EIS investigation corridor. These roads fall within the jurisdiction of two local government authorities—ICC and SRRC—and are included in Table 19.11 and shown in Figure 19.1.

TABLE 19.11: LOCAL GOVERNMENT ROADS INTERSECTING THE EIS INVESTIGATION CORRIDOR (WEST TO EAST)

Road name	Road ID—road section
Scenic Rim Regional Council	
Dwyers Road	340-9-P-7a
Washpool Road	340-10-P-3a
Washpool Road	340-10-P-4a
Washpool Road	340-10-P-4d
Washpool Road	340-10-P-4f
Washpool Road	340-11-P-2
Wild Pig Creek Road	340-13-P-3
Wild Pig Creek Road	340-14-P-1

Road name	Road ID—road section
Proposed Wild Pig Creek Road	340-15-P-2b
Wild Pig Creek Road	340-15-P-3
Undullah Road	340-16-P-1
Undullah Road	340-16-P-3
Ipswich City Council	
Waters Road	340-1-P-2
Waters Road	340-1-P-4
Hayes Road	340-1-P-
Coveney Road	340-1-P-9
Mount Forbes Road	340-3-P-1
M Hines Road	340-3-P-11
Glencairn Road	340-6-P-2
Middle Road	340-6-P-7
Castle Hill Lane	340-8-P-1
Shepherd Road (Truloff Road)	340-8-P-3
Mount Flinders Road	340-8-P-4

It is proposed that several local government roads that fall within the jurisdiction of ICC, LCC and SRRC will be used to transport construction materials, equipment and workforce during construction of the Project as indicated in Table 19.12.

TABLE 19.12: LOCAL GOVERNMENT ROADS: PROJECT CONSTRUCTION ROUTES

Road name	Description
Local Government Roads: ICC	
Briggs Road	Full extent
Champions Way	Between Cunningham Highway and Paynes Road
Coopers Road	Between Cunningham Highway and Ebenezer Road
Coveney Road	Full extent
Ebenezer Road	Between Coopers Road and Rosewood–Warrill View Road
Edwards Street	Between Ripley Road and Briggs Road
Fairbank Place	Full extent
Hayes Road	Full extent
Hillside Road	Full extent
Lane Road	Between Rosewood Laidley Road and Waters Road
Macalister Street	Between Moffatt Street and Park Street
Middle Road	Between Cunningham Highway and Bill Morrow Road
	Between Bill Morrow Road and Ipswich City Council Boundary
Moffatt Street	Between Karrabin–Rosewood Road and Macalister Street
	Between Macalister Street and Warwick Road
Mount Flinders Road	Between Ipswich–Boonah Road and Shepherd Road
Mount Forbes Road	Between Ebenezer Road and Paynes Road
Mount Marrow Quarry Road	Full extent
Newhill Drive	Full extent
Noblevale Way	Full extent
Old Grandchester Road	Between Lane Road and Strongs Road

Road name	Description
Old Toowoomba Road	Between Toongarra Road and Moffatt Street
Park Street	Between Macalister Street and Warwick Road
Paynes Road	Between Champions Way and Mount Forbes Road
Redbank Plains Road	Between Cunningham Highway and Newhill Drive
Reillys Road	Between Strongs Road and Rosewood Warrill View Road
Ripley Road	Between Cunningham Highway and Edwards Street
Rob Roy Way	Full extent
Strongs Road	Between Coveney Road and Rileys Road
	Between Old Grandchester Road and Coveney Road
T Morrows Road	Full extent
Thagoona Haigslea Road	Between Mount Marrow Quarry Road and Karrabin–Rosewood Road
Toongarra Road	Between Karrabin Rosewood Road and Old Toowoomba Road
Waters Road	Between Lane Road and Kuss Road
Local Government Roads: LCC	
Kilmoylar Road	Between Logan City Council Boundary and Wyatt Road
Undullah Road	Between Mount Lindesay Highway and Logan City Council Boundary
	Between Wyatt Road and Wild Pig Creek Road
Wild Pig Creek Road	Full extent
Wyatt Road	Between Kilmoylar Road and Undullah Road
Local Government Roads: SRRC	
Allan Creek Road	Between Mount Lindesay Highway and Brookland Road
Brabazon Road	Between Beaudesert Boonah Road and Allan Creek Road
Bromelton House Road	Between Allan Creek Road and Beaudesert–Boonah Road
Brookland Road	Between Undullah Road and Allan Creek Road
Cryna Road	Full extent
Dwyers Road	Full extent
Eaglesfield Street	Between Mount Lindesay Highway and Tina Street
Enterprise Drive	Full extent
Ilbogan Road	Between Beaudesert–Boonah Road and Thiedke Road
Kilmoylar Road	Between Undullah Road and Logan City Council Boundary
Middle Road	Between Ipswich City Council Boundary and Peak Crossing–Churchbank Weir Road
Mutdapilly Churchbank Weir Road	Between Peak Crossing–Churchbank Weir Road and Cunningham Highway
Peak Crossing Churchbank Weir Road	Between Warrill View–Peak Crossing Road and Mutdapilly–Churchbank Weir Road
	Between Mutdapilly–Churchbank Weir Road and Ipswich–Boonah Road
Sandy Creek Road	Between Beaudesert–Boonah Road and Swan Gully Road
Thiedke Road	Between Ilbogan Road and Mt Lindesay Highway
Tilley Road	Between Beaudesert–Boonah Road and Allan Creek Road
Undullah Road	Between Logan City Council Boundary and Brookland Road
	Between Brookland Road and Kilmoylar Road
	Between Kilmoylar Road and S of Brennans Dip Road
Washpool Road	Between Ipswich–Boonah Road to 5.5k E of Ipswich–Boonah Road
Wild Pig Creek Road	Full extent

19.5.2 Public transport networks

The existing public transport routes within QLD that are likely to be impacted by construction traffic and/or proposed and existing road rail crossings have been identified through a review of TransLink data. Identified routes that may be impacted are provided in Table 19.13.

TABLE 19.13: IMPACTED PUBLIC TRANSPORT NETWORKS

Services	Weekday frequency	Impacted roads
509	2 per hour	Warwick Road, Ripley Road
515	3 per hour	Warwick Road, Coopers Road
539	1 per hour	Rosewood–Laidley Road

Given the low frequency of individual public bus route services, the impact on QLD public transport networks is expected to be negligible. While Warwick Road has five total services an hour, the headways of 30 minutes and 20 minutes for the 509 and 515, respectively, are broad enough to absorb most potential traffic changes.

19.5.3 School bus routes

Existing school bus routes that are likely to be impacted by construction traffic and/or proposed and existing road rail crossings has been identified through a review of data sourced from the QLD Government. Identified routes that may be impacted are provided in Table 19.14.

TABLE 19.14: IMPACTED SCHOOL BUS ROUTES

Services	Weekday frequency	Impacted roads	Road rail crossings
S848 AM and PM Grandchester, Laidley State High School	1 x AM 1 x PM	Rosewood–Laidley Road	-
S187 AM and PM Calvert, Ashwell Area, Ashwell SS and Rosewood SHS	1 x AM 1 x PM	Rosewood–Laidley Road	-
S175 AM and PM Rosevale, Mt Walker Areas, Rosewood SHS	1 x AM 1 x PM	Rosewood–Warrill Road	340-2-P-2
S743 AM and PM Lower Mt Walker Area, Rosewood SHS	1 x AM 1 x PM	Rosewood–Warrill Road	340-2-P-2
S646 AM and PM Mt Forbes Area, Rosewood SHS	1 x AM 1 x PM	Mount Forbes Road, Cunningham Highway	340-3-P-1
P1422 AM and PM Service—Purga to Peak Crossing SS	1 x AM 1 x PM	Peak Crossing–Churchbank Weir Road	340-6-P-7 340-6-P-5
S258 AM and PM Peak Crossing, Purga Area to Bremer SHS	1 x AM 1 x PM	Peak Crossing– Churchbank Weir Road	340-6-P-7 340-7-P-5
IP1701 SWD AM and PM run, Boonah to Ipswich	1 x AM 1 x PM	Ipswich–Boonah Road, Cunningham Highway	340-7-P-5
P1241 AM and PM Peak Crossing Area, Peak Crossing SS	1 x AM 1 x PM	Washpool Road	340-10-P-4a
IP1502 AM and PM Hatton Vale, Lowood, Fernvale, Ironbark area to Ipswich Special Schools	1 x AM 1 x PM	Moffatt Street, Cunningham Highway	-
IP1503 AM Hatton Vale/Marburg Area to Ipswich Special Schools	1 x AM 1 x PM	Cunningham Highway	-
P429 AM and PM Gleneagle Area, Gleneagle SS and Beaudesert SHS	1 x AM 1 x PM	Allan Creek Road, Mt Lindesay Highway	-

The increase in construction traffic volume could potentially impact these school bus routes. However, given the low frequency of these school bus routes, it is expected that Project construction would not substantially impact the operational and service reliability of school bus services. Nonetheless, the relevant local government authorities should be consulted once construction routes have been finalised to ensure that all public transport routes that may be impacted by construction traffic have been considered.

19.5.4 Long-distance coach services

Existing long-distance coach services that may be impacted by construction traffic and/or proposed and existing road rail crossings has been identified through a review of data sourced from the QLD Government. Identified routes that may be impacted are provided in Table 19.15.

TABLE 19.15: IMPACTED LONG-DISTANCE COACH SERVICES—QLD ROUTES

Services	Weekday frequency	Impacted roads
Brisbane to Mount Isa (private coach service)	1 per day 7 days per week	Cunningham Highway
		Moffatt Street
		Karrabin Rosewood Road
		Warrego Highway
Brisbane to Charleville	1 per day 7 days per week	Cunningham Highway
		Moffatt Street
		Karrabin Rosewood Road
		Warrego Highway

Given the low frequency of long-distance coach services, it is expected that long-distance coaches would not be impacted as a result of the construction of the Project.

19.5.5 Stock routes

The Queensland Stock Route Network provides pastoralists with a means of moving stock around QLD's main pastoral districts as an alternative to motorised transport. Stock routes comprise pathways for moving stock on roads, reserves, unallocated state land and pastoral leases and have no separate title or tenure information. The Stock Route Network is safeguarded by the Stock Route Network Management Strategy 2009–14 and is administered under the *Stock Route Management Act 2002*.

There are no known stock routes within the traffic, transport and access study area.

19.5.6 Seasonal variation

Based on the dominant rural land uses of the traffic, transport and access study area, traffic volumes on the road network are likely to increase during harvesting season. Key winter crops in the traffic, transport and access study area include wheat, barley, oats and cereal rye. During this season, heavy vehicle usage on local and main roads increases as trucks transport grain and tractors and harvesters move between properties. Farming machinery is generally much larger and slower than other vehicles using the roads and may result in localised delays. The impact of seasonal variation was taken into account especially at road–rail interface locations, where the analysis outcomes provide input into the design.

19.5.7 Strategic tourist routes

Primary construction routes that are envisaged to occur along existing strategic tourist routes were considered as part of this assessment. Strategic tourist routes that are likely to be impacted include:

- Adventure Way, along Warrego Highway between Haigslea Amberley Road and Ipswich Motorway
- Warrego Way, along Warrego Highway between Haigslea Amberley Road and Ipswich Motorway
- Pacific Coast Way, along Pacific Highway between Logan Motorway and Smith Street Motorway.

The increase in construction traffic, in particular, heavy vehicles, has the potential to impact these strategic tourist routes. The impact of this will has been considered in conjunction with the construction traffic link analysis and is explored in detail in Section 19.8.1.

19.5.8 Cycling and pedestrian network

A review of the Queensland Principal Cycle Network Plans (PCNP) was undertaken to identify any existing active transport networks that may coincide with proposed construction traffic routes within QLD. The review indicated that the following cycle routes within the PCNP coincide with proposed construction traffic routes:

- Edwards Street, between Briggs Road and Ripley Road
- Moffatt Street, between Brisbane Street and Warwick Road
- Mt Lindesay Highway, between Cunningham Highway and Cusack Lane
- Redbank Plains Road, between Cunningham Highway and Newhill Drive
- Ripley Road, between Edwards Street and Cunningham Highway
- Warwick Road, between Cunningham Highway and Saleyards Road.

In addition to the PCNP, proposed construction routes may coincide with sections of the Boonah-to-Ipswich Trail, the multi-use recreation trail connecting Ipswich and Boonah. This may include sections of Wild Pig Creek Road. There are no dedicated pedestrian level crossings with the proposed rail alignment.

19.5.9 Crash history analysis

A review of five-year crash data (between 2012 and 2017) provided by DTMR was undertaken to assess the proposed construction traffic routes. A tabulated summary is provided in Table 19.16. Further discussion on the crash history analysis is included in Appendix U: Traffic Impact Assessment Technical Report.

TABLE 19.16: CRASH HISTORY

Road name	Length (km)	Background volume (AADT)	Peak construction volume (ADT)	Total 5-yr crashes
SCRs: DTMR				
Beaudesert–Boonah Road	6	3,300	125	4
Cunningham Highway	31.7	6,800–42,000	306	112
Haigslea Amberley Road	3.4	5,000	8	8
Ipswich–Boonah Road	17.6	3,400–4,000	326	29
Ipswich Motorway	8.4	54,000	45	104
Ipswich–Rosewood Road	12.8	3,100–7,700	347	11
Karrabin–Rosewood Road	18.5	3,700–4,700	58	60
Logan Motorway	30	109,000	45	264
Mt Lindesay Highway	54.8	2,100–24,000	127	315
Pacific Arterial	66.6	49,000	45	1,104
Rosewood–Laidley Road	16.5	1,800–3,100	35	23
Rosewood–Warrill View Road	No crashes			
Warwick Road	5.4	12,000–16,228	192	48
Warrego Highway	18.2	33,000–58,000	8	148
Warrill View Peak Crossing Road	No crashes			
LCC				
Kilmoylar Road	No crashes			
Undullah Road	11.6	58–122	137	1
Wyatt Road	No crashes			
Wild Pig Creek Road	11.6	157	141	1
SRRC				
Allan Creek Road	3.1	598	133	1
Brabazon Road	No crashes			
Bromelton House Road	5.3	1,162	133	1
Brookland Road	7.1	290	133	3
Cryna Road	No crash data available			
Dwyers Road	No crashes			
Eaglesfield Street	0.7	1,800	116	11
Enterprise Drive	No crashes			
Ilbogan Road	No crashes			
Kilmoylar Road	3.6	542	137	3
Middle Road	13.4	468	4	2
Mutdapilly–Churchbank Weir Road	No crashes			
Peak Crossing–Churchbank Weir Road	4.7	200–654	13	2

Road name	Length (km)	Background volume (AADT)	Peak construction volume (ADT)	Total 5-yr crashes
Sandy Creek Road	No crashes			
Thiedke Road	No crashes			
Tilley Road	No crashes			
Undullah Road	11.6	58	128	1
Washpool Road	No crashes			
Wild Pig Creek Road	11.6	157	141	1
ICC				
Briggs Road	No crashes			
Champions Way	No crashes			
Coopers Road	5.4	5,424	34	1
Coveney Road	No crashes			
Ebenezer Road	No crashes			
Edwards Street	1.1	5,258	27	3
Fairbank Place	No crashes			
Hayes Road	No crashes			
Hillside Road	No crashes			
Lane Road	No crashes			
Macalister Street	No crashes			
Middle Road	8.7	468	144	2
Moffatt Street	1.2	10,128	192	6
Mount Flinders Road	No crashes			
Mount Forbes Road	No crashes			
Mount Marrow Quarry Road	No crashes			
Newhill Drive	No crashes			
Noblevale Way	No crashes			
Old Grandchester Road	No crashes			
Old Toowoomba Road	No crashes			
Park Street	No crashes			
Paynes Road	No crashes			
Redbank Plains Road	1	15,711	7	4
Reillys Road	No crashes			
Ripley Road	1	9,872	27	12
Rob Roy Way	No crashes			
Strongs Road	No crashes			
T Morrows Road	No crashes			
Thagoona–Haigslea Road	No crashes			
Waters Road	No crashes			

19.6 Potential impacts

19.6.1 Construction

Major construction activities will consist of the delivery of quarry materials (ballast, capping materials) precast concrete, ready-mix concrete, rail, consolidated sleepers, earthworks materials, workforce, delivery of water, delivery/collection of plant, tools and other materials.

The construction hours for the construction stage are expected to be 6.30 am to 6.00 pm every Monday to Friday, 6.30 am to 1.00 pm every Saturday as per normal construction working hours. The haulage activity of construction equipment and material is anticipated to occur seven days a week.

19.6.1.1 Rail network

No level crossings that currently exist within the EIS investigation corridor would be impacted. Therefore, no assessment is necessary for existing rail crossings.

19.6.1.2 Road network

It is expected that construction materials will be delivered to laydown area delivery points along the EIS investigation corridor. These delivery points will have accessibility and safe manoeuvrability for transport and off-loading of vehicles and there will also be a centralised location for further construction laydown areas around the vicinity of the laydown area delivery points. Figure 19.4 illustrates the proposed construction routes.

19.6.1.3 Active transport

A review of the QLD PCNP identified existing on-road cycleways that may coincide with proposed construction routes within the QLD region. The PCNP is a guide for future cycleway planning and it presents the core routes that are required to increase cycling among the population. The result of this review revealed that six cycling paths within the PCNP coincide with proposed construction traffic routes:

- Edwards Street, between Briggs Road and Ripley Road
- Moffatt Street, between Brisbane Street and Warwick Road
- Mt Lindesay Highway, between Cunningham Highway and Cusack Lane
- Redbank Plains Road, between Cunningham Highway and Newhill Drive
- Ripley Road, between Edwards Street and Cunningham Highway
- Warwick Road, between Cunningham Highway and Saleyards Road.

However, no cycle paths under the PCNP would be affected by proposed road rail interfaces. Regardless, the presence of pedestrian and cycle routes should be considered in the preparation of final construction routes under the design and construction phase of the Project in agreement with the relevant local government.

19.6.2 Operation

Impacts to the road network during the operation of the Project are expected to be negligible, because of the low volumes of traffic associated with operation of the Project. Traffic is expected to be limited to a small maintenance crew using RMAR to inspect the new track once a month.

19.6.2.1 Rail network

The Project will provide convenient access for freight to major proposed industrial developments at Ebenezer in the City of Ipswich, and at Bromelton near Beaudesert in the Scenic Rim Region. Table 19.17 tabulates the proposed public road/rail interface locations and road closures along public formed roads within the traffic, transport and access study area. The Project road/rail interface locations are illustrated in Figure 19.1.

TABLE 19.17: PROPOSED PUBLIC ROAD/RAIL INTERFACE LOCATIONS

Interface ID	Road name	Proposed treatment
DTMR		
340-2-P-2	Rosewood–Warrill View Road	Grade separation—rail over
340-5-P-2	Cunningham Highway	Grade separation—road over
340-7-P-5	Ipswich–Boonah Road	Grade separation—rail over
SRRC		
340-9-P-7a	Dwyers Road	Active level crossing
340-10-P-3a	Washpool Road	Active level crossing
340-10-P-4a	Washpool Road	No crossing provided—road divert/re-align
340-10-P-4d	Washpool Road	No crossing provided—road divert/re-align

Interface ID	Road name	Proposed treatment
340-10-P-4f	Washpool Road	Grade separation—rail over
340-11-P-2	Washpool Road	No crossing provided—road divert/re-align
340-13-P-3	Wild Pig Creek Road	Grade separation—rail over
340-14-P-1	Wild Pig Creek Road	Active level crossing
340-15-P-2b	Wild Pig Creek Road	Active level crossing
340-15-P-3	Wild Pig Creek Road	No crossing provided—relocate
340-16-P-1	Undullah Road	Grade separation—rail over
340-16-P-3	Undullah Road	Grade separation—road over
ICC		
340-1-P-2	Waters Road	Grade separation—rail over
340-1-P-4	Waters Road	Grade separation—rail over
340-1-P-6	Hayes Road	Active level crossing
340-1-P-9	Coveney Road	No crossing provided—consolidate
340-3-P-1	Mount Forbes Road	Grade separation—road over
340-3-P-11	M Hines Road	Passive level crossing
340-6-P-2	Glencairn Road	Active level crossing
340-6-P-7	Middle Road	Active level crossing
340-8-P-1	Castle Hill Lane	No crossing provided
340-8-P-3	Shepherd Road (Truloff Road)	No crossing provided—road divert/re-align
340-8-P-4	Mount Flinders Road	Grade separation—rail over

19.6.2.2 Road network

During the operational phase of the Project, it is anticipated that occasional access to and from the rail corridor will be required to conduct routine inspection and maintenance tasks. It is assumed that workforce during operational stages will reside within local surrounding towns along the Project alignment and be made up of local resident employees. Maintenance vehicles will use access tracks for the majority of the inspection and maintenance activities. These activities are likely to be infrequent and the related traffic volumes are likely to be minimal with no envisaged impact to operational conditions of the surrounding road network. A detailed analysis of the road network is therefore not required.

19.6.2.3 Active transport

Traffic volumes associated with operational activities are likely to be minimal with no envisaged impact to operational conditions of the surrounding road network and cycle paths under the PCNP.

19.6.2.4 Emergency service vehicles

During construction and operations, response times for emergency services may be delayed if encountering significant roadworks or passing trains at level crossings. ARTC will work with emergency services to develop protocols and joint working arrangements to address potential impacts on emergency services and service response times during construction and operation and ensure that access is retained as required.

The operational workforce will not create any significant population increase and is therefore unlikely to result in any other significant increased demand for services or infrastructure.

The emergency services in QLD should be consulted prior to construction of emergency access points to identify possible solutions to minimise the potential impacts.

19.7 Mitigation

This section outlines the traffic mitigation measures included as part of the Project design and the mitigation measures that are proposed for the Project to manage predicted environmental impacts. The impacts are initially assessed with consideration of the design mitigation measures and then reassessed to determine residual risk after the inclusion of the proposed mitigation measures.

Construction risks have been assessed in accordance with the qualitative impact assessment methodology presented in Chapter 4: Assessment Methodology.

19.7.1 Design considerations

The mitigation measures and controls presented in Table 19.18 have been factored into the designs for the Project. These design considerations are proposed to minimise the environmental impacts of the Project and therefore contribute to a lowering of the initial impact risk rating for each potential impact.

TABLE 19.18: INITIAL MITIGATION THROUGH DESIGN RESPONSES

Aspect	Initial design measures
Road safety	▸ Safety reviews have been undertaken on level crossing concept designs to ensure that: ▸▸ The level of protection is appropriate ▸▸ The infrastructure is appropriate for the traffic conditions ▸▸ The crossing is designed to provide suitable stacking and sight distance ▸ Road safety audits in accordance with Austroads guidelines will be undertaken on the approach roads to the level crossings during detailed design. ▸ The rail corridor has been designed with fencing to protect adjoining lands from trespass and to prevent stock on such adjoining land from gaining access to the railway.
Road network	▸ The Project is generally located within the existing SFRC, which was gazetted as a future rail corridor in 2010. The design has been developed to use the existing rail corridor protection and minimise land severance to the greatest extent possible. ▸ Alterations to the public road network have been designed to minimise permanent changes to existing traffic patterns and distributions ▸ The road alignment (horizontal and vertical) of road sections impacted by the rail corridor have been designed and refined to be better accommodated within the railway, existing landform and terrain. Refinement of the road cross-section was undertaken to meet the relevant road authority design and safety requirements and minimise environmental impacts.
Road/rail interface	▸ Threshold and ALCAM assessments have been undertaken by ARTC to determine the appropriate protection type for the proposed crossing. The resulting road–rail interface treatments have been selected and designed by: ▸▸ Elimination, so far as is reasonably practical, by not providing a crossing at an interface that is not required at this time, consolidating with other interfaces, relocating the interface or diverting roads to avoid an interface requirement ▸▸ Grade separation in accordance with ARTC's policy ▸▸ Level crossings: either passive level crossings with stop signs or active level crossings ▸ Where a new level crossing has been proposed, this has been designed to eliminate or minimize safety risks as far as reasonably practical ▸ Level crossings have been designed to provide sufficient stacking and sight distances ▸ Level crossings have been designed with warning signage, line marking, and other relevant controls; in accordance with the relevant national and ARTC standards.
Access	▸ A Rail Maintenance Access Road Strategy has been developed as a part of the design to provide access to the rail corridor during construction and operation for emergency service vehicles.

19.7.2 Proposed mitigation measures

To further manage Project risks, a number of mitigation measures have been proposed for implementation in future phases of project delivery, as presented in Table 19.19. These proposed mitigation measures have been identified to be applied in the detailed design, pre-construction, construction and operational phases of the Project to address specific issues and opportunities, address legislative requirements, accepted government plans, policy and practice.

Table 19.19 identifies the relevant project phase, the aspect to be managed, and the proposed mitigation measure, which is then factored into the assessment of residual risk/significance in Table 19.20. Chapter 23: Draft Outline Environmental Management Plan provides further context and the framework for implementation of these proposed mitigation and management measures.

TABLE 19.19: PROPOSED MITIGATION MEASURES

Delivery phase	Aspect	Proposed mitigation measures
Pre-construction/ detailed design	Pavement/road safety	▸ Develop procedures for managing and responding to road impacts for the duration of the construction period in consultation with DTMR and relevant local governments. ▸ Developed procedures will be communicated to the project consultation team for inclusion within community consultation plans. ▸ Road safety audits will be undertaken for all road designs in accordance with the Austroads guidelines. Level crossing treatments and suitability will be determined through the Australian Level Crossing Assessment Model (ALCAM) risk tool to confirm: ▸ The level of protection continues to be appropriate ▸ The infrastructure is appropriate for the traffic conditions ▸ The crossing is designed to provide suitable stacking and sight.
	Road network	▸ A Construction Traffic Management Plan is to be prepared prior to construction. This plan will identify the impacts that construction traffic (including workforce commuting) is likely to have on the local transport infrastructure and road users and detail ameliorative measures required to avoid, reduce or mitigate all identified impacts of the project. It will also establish performance criteria and monitoring requirements during construction. The Plan will be developed in consultation with DTMR, relevant local governments and emergency services. ▸ A Road Use Management Plan (RUMP) is to be prepared and implemented for the Project, in accordance with GTIA (DTMR, 2017b) . Where road realignments or closures are envisaged, traffic management requirements associated with these works will have to be included in the RUMP. This will need to include the requirements for obtaining necessary approvals and permits from relevant authorities as well as notifying the community on any changes to traffic conditions during the construction and operations phase.
	Intersections	▸ Traffic management plans, traffic control plans and temporary road works arrangements, including diversion and signage should be prepared prior to construction in accordance with the latest edition of the *Traffic Control at Work Sites: Technical Manual* (Transport for New South Wales, 2018a) and *Australian Standard 1742.3 Manual of uniform traffic control devices—Traffic control for works on roads*. Traffic management plans should consider construction activity delivery timeframes that avoid peak hour travel conditions.
	Access	▸ Ongoing consultation with local government/DTMR and asset owners will be undertaken to ensure proposed access arrangements are suitable. ▸ The rail maintenance access road (RMAR) strategy developed during the detailed design phase to be reviewed and updated to ensure it remains effective.
Pre-construction	Management plans	▸ The RMAR strategy, traffic management plans and traffic control plans developed during the detailed design phase to be reviewed and updated to ensure they remain effective and appropriate to the construction activities and staging.
Construction and commissioning	Road safety	▸ Temporary traffic management will be implemented, as per the Construction Traffic Management Plan. ▸ Fatigue management measures will be introduced and enforced for all workers during construction. ▸ Road safety measures will be implemented taking into consideration speed restrictions, driver fatigue, in-vehicle communications, signage, demarcations, maintenance, safety checks, and interaction with public transport, transport of hazardous and dangerous goods and emergency response and disaster management. ▸ Relevant emergency services will be notified in advance prior to the movement of all hazardous/dangerous or oversize construction material and equipment.

Delivery phase	Aspect	Proposed mitigation measures
Construction and commissioning (continued)	Road safety (continued)	▸ Appropriate construction traffic controls will be implemented where construction traffic is required to travel on school bus routes during pick-up and set-down times on school days. This may include limiting construction traffic at these times or installing appropriate school bus infrastructure. ▸ All over-size and/or over-mass and restricted access vehicles will comply with the *Guideline for Excess Dimension Vehicles in Queensland version 8*, (DTMR, 2013d), in terms of transport safety.
	Road network and intersections	▸ A Construction Traffic Management Plan will be implemented and reviewed periodically for effectiveness by relevant stakeholders including local governments, DTMR, police and emergency services. ▸ Ongoing consultation with relevant local government, DTMR, police, emergency services and affected landholders to provide information on project status and likely traffic disruptions and temporary road closures. ▸ Directional signage and line marking around construction sites and the surrounding network will be implemented as per Traffic Management Plans, including using variable message signs (VMS) if appropriate. ▸ Relevant emergency services will be notified in advance prior to the movement of all hazardous/dangerous or oversize construction material and equipment. ▸ Secondary alternative construction route activities will be determined as part of the traffic management plans, in the event of the primary route is blocked off by an emergency/accident. ▸ Traffic management plans, traffic control plans and temporary road works to be implemented and reviewed periodically with relevant stakeholders to ensure effectiveness.

	Road–rail Interface	▸ Road safety audits will be undertaken post construction in accordance with the Austroads guidelines (refer Table 19.7).
		▸ Level crossings will be assessed through ALCAM post-construction to confirm:
		  ▸ The level of control continues to be appropriate
		  ▸ The infrastructure is appropriate for the traffic conditions.

	Pavement—dirt tracking/debris management	▸ Install rumble grids and inspection points at exits onto the sealed road from unpaved roads to reduce potential for rocks and debris transporting offsite. ▸ For local government roads, undertake a condition assessment prior to and at ongoing intervals during construction and at the conclusion of construction activities in consultation with local governments. ▸ Implement procedures for managing and responding to road impacts for the duration of the construction period in consultation with DTMR and relevant local governments. This may entail works such as crack sealing, pothole patching, edge repairs, resealing and grading (of gravel roads) etc.
Operation	Level crossings	▸ Develop a location-specific protocol between ARTC and emergency service providers, defining appropriate and co-ordinated responses and communication in the event of emergencies during operations, (e.g. access to real time information about crossing times and access to alternate crossing points).

19.8 Impact assessment

Potential impacts to traffic impacts associated with the Project in the construction and operational phases are outlined in Table 19.20. These impacts have been subjected to a risk assessment as per methodology outlined in the GTIA (DTMR, 2017b).

The initial risk assessment was undertaken on the basis that the design measures (or initial mitigation measures) have been incorporated into the Project design. Proposed mitigation measures in Table 19.19 were then applied as appropriate to the phase of the Project to reduce the level of potential impact.

The residual risk level of the potential impacts was then reassessed after the proposed mitigation measures were applied. The residual risk levels were compared to the initial risk levels in order to assess the effectiveness of the mitigation measures. The resulting residual risk levels are shown in Table 19.19 and summarised in Appendix U: Traffic Impact Assessment Technical Report. In all instances, the residual risk levels were lower than the initial levels.

TABLE 19.20: IMPACT ASSESSMENT FOR POTENTIAL TRAFFIC IMPACTS ASSOCIATED WITH THE PROJECT

	Description of impact					
Aspect	**Primary impacting process**	**Magnitude of impact**	**Likelihood of impact**	**Initial risk rating**	**Proposed additional mitigation measures**	**Residual risk**
Traffic impacts from construction activities						
Road safety	Safety	Moderate Decreased road safety along construction traffic routes as a result of increased traffic, changes in heavy vehicle mix, or fatigue for long-distance trips	Possible It is reasonable to assume that an incident involving a project construction vehicle is possible over the construction period	Moderate	▸ Introduce and enforce fatigue-management measures for all workers during construction ▸ Implement road safety measures taking into consideration speed restrictions, driver fatigue, in-vehicle communications, signage, demarcations, maintenance, safety checks, and interaction with public transport, transport of hazardous and dangerous goods and emergency response and disaster management ▸ Notify relevant emergency services in advance prior to the movement of all hazardous/dangerous or oversize construction material and equipment ▸ Consider limiting construction traffic on school bus routes during pick-up and set-down times on school days, alternatively appropriate school bus infrastructure could be installed ▸ Make workers aware of school bus routes as well as typical pick-up and drop-off times in the vicinity of accommodation ▸ Temporary traffic management to be implemented, for example road signs stipulating reduced speed limits as per Traffic Management Plans ▸ Road closures (if required) to be performed by QPS escorts (should it be required) with closure times limited to a maximum of 15 minutes ▸ All oversize overmass (OSOM) and restricted-access vehicles (RAV) should comply with the *Guideline for Excess Dimension Vehicles in Queensland version 8* (DTMR, 2013d) in terms of transport safety	Low

	Description of impact					
Aspect	**Primary impacting process**	**Magnitude of impact**	**Likelihood of impact**	**Initial risk rating**	**Proposed additional mitigation measures**	**Residual risk**
Road network	Operational efficiency	Moderate Traffic impacts along primary construction routes affecting traffic operations along key routes	Possible It is reasonable to say that some traffic impacts along primary construction routes will probably occur over the construction period	Moderate	▸ Traffic demand management campaign to inform the public on works and its effect on network operations to be implemented ▸ Construction Traffic Management Plan to be implemented and reviewed periodically by stakeholders ▸ Ongoing consultation with relevant local governments, DTMR, police, emergency services and affected property owners/occupiers to inform of project status and likely traffic disruptions and temporary road closures ▸ Directional signage and line marking around construction sites and the surrounding network to be implemented as per Traffic Management Plans, including using VMS if appropriate ▸ Relevant emergency services should be notified in advance of the movement of all hazardous/dangerous or oversize construction material and equipment ▸ Secondary alternative construction route activities should be determined as part of the Traffic Management Plans, in the event of the primary route is blocked off by an emergency/accident	Low
Road / rail interface	Safety	Extreme Introducing open level crossings on the road network may result in high severity crashes between traffic and trains	Possible Without appropriate mitigation strategies, the likelihood of an incident occurring at a rail crossing is probable	High	▸ Road safety audits will be undertaken at level crossings post-construction in accordance with the Austroads guidelines. Level crossings will be reviewed to confirm: ▸ The level of protection continues to be appropriate ▸ The infrastructure is appropriate for the traffic conditions	Low
Intersection	Operational efficiency	Moderate Traffic impacts at key intersections impacting operations. Adequate intersection configuration to cater for haulage vehicles	Possible It is reasonable to say that some traffic impacts at key intersections will probably occur during the construction period	Moderate	▸ Traffic Management Plans, traffic control plans and temporary road works to be implemented and reviewed to ensure effectiveness ▸ Construction Traffic Management Plan to be implemented and reviewed periodically by stakeholders to ensure intersection operations are effective.	Low

	Description of impact					
Aspect	**Primary impacting process**	**Magnitude of impact**	**Likelihood of impact**	**Initial risk rating**	**Proposed additional mitigation measures**	**Residual risk**
Pavement	Operational efficiency	Moderate Increased volume of project construction traffic along SCRs resulting in pavement degradation	Possible It is reasonable to assume that some pavement degradation as a result of project construction traffic will probably occur over the construction period	Moderate	▸ Mitigation measures may include but are not limited to: ▸ Undertaking visual assessments prior to, during and post-construction activities, with the impacted road improved to a similar condition to the initial visual pavement condition ▸ Installation of wheel washers on all project vehicles travelling from unsealed to sealed roads ▸ Installation of shaker grids or rumble pads at site exit points from construction activities ▸ Routine maintenance activities and repairs will be carried out to retain the integrity of the pavement ▸ Provision of gross load limit signs on selected routes	Low
Access	Safety	Moderate Increased construction activity may result in the need for emergency vehicle access to the site	Possible It is reasonable to assume that design changes will result in changes to site accesses	Moderate	▸ The Rail Maintenance Access Road strategy to be reviewed and updated to ensure it remains effective	Low
Road safety	Safety	Moderate Decreased road safety due to increased traffic, changes in heavy vehicle mix or fatigue for long distance trips	Possible It is reasonable to assume that an incident involving a project construction vehicle is possible over the construction period	Moderate	▸ Fatigue management measures should be introduced and enforced for all workers during construction ▸ Road safety measures to be implemented, taking into consideration speed restrictions, driver fatigue, in-vehicle communications, signage, demarcations, maintenance, safety checks, and interaction with public transport, transport of hazardous and dangerous goods and emergency response and disaster management ▸ Relevant emergency services should be notified in advance prior to the movement of all hazardous/dangerous or oversize construction material and equipment ▸ Consideration should be given to limiting construction traffic on school bus routes during pick-up and set-down times on school days, alternatively appropriate school bus infrastructure could be installed ▸ Workers should be made aware of school bus routes as well as typical pick-up and drop-off times in the vicinity of the accommodation ▸ Temporary traffic management to be implemented, for example road signs stipulating reduced speed limits as per Traffic Management Pans ▸ Road closures (if required) to be performed by QPS escorts (should it be required) with closure times limited to a maximum of 15 minutes ▸ All OSOM and RAV vehicles should comply with *Guideline for Excess Dimension Vehicles in Queensland version 8*, (DTMR, 2013d) in terms of transport safety	Low

	Description of impact					
Aspect	**Primary impacting process**	**Magnitude of impact**	**Likelihood of impact**	**Initial risk rating**	**Proposed additional mitigation measures**	**Residual risk**
Traffic impacts from operational activities						
Road network	Operational efficiency	Moderate Delay to emergency service vehicles resulting from longer crossing closure times	Probably It is reasonable to assume that an emergency service vehicle will cross the Project	Moderate	▸ Develop a protocol between ARTC and emergency service providers, defining appropriate and co-ordinated responses and communication in the event of emergencies during operations, (e.g. access to real time information about crossing times and access to alternate crossing points)	Low
Road / rail interface	Safety	Extreme Introduction of open level crossings on the road network may result in high severity crashes between traffic and trains	Probable Without appropriate mitigation strategies, the likelihood of an incident occurring at a rail crossing is probable	High	▸ Road safety audits will be undertaken at the level crossings post opening in accordance with the Austroads guidelines. Level crossings will be reviewed to confirm: ▸ The level of protection continues to be appropriate ▸ The infrastructure is appropriate for the traffic conditions	Moderate

19.8.1 Traffic analysis

The Project-related traffic consists of traffic generated by both construction and operational activities. It is anticipated that the impacts would primarily be during the construction phase of the Project. Throughout the operational phase, the impacts from the Project are expected to be low given the expected nature of operations (i.e. infrequent vehicle movements to/from depots, transportation of maintenance material within the rail corridor).

19.8.2 Construction

The three traffic analysis parameters used below were based on identified construction routes and at public road/rail interface locations:

- 5 per cent increase in traffic compared to existing traffic (road links and intersections)
- LOS analysis
- Intersection performance analysis.

19.8.2.1 Traffic comparison on road links

A 5 per cent traffic comparison analysis was undertaken and a list of road sections where Project traffic will equate to or exceed 5 per cent is provided Table 19.21. According to the GTIA (DTMR, 2017b), for the 5 per cent traffic comparison, the percentage of traffic impact is calculated by expressing the traffic generated by the Project (future design years) as a percentage of the background traffic. Note that some percentages appear high due to low volumes of existing background traffic.

TABLE 19.21: 5 PER CENT TRAFFIC COMPARISON ANALYSIS ON ROAD LINKS

Road name	Road ID—Road section	5% comparison analysis
SCRs: DTMR		
Beaudesert–Boonah Road	212: Between Ipswich–Boonah Road and Wyaralong Dam Access	5.7%
	212: Between Wyaralong Dam Access and Tilley Road	6.5%
	212: Between Tilley Road and Sandy Creek Road	6.5%
	212: Between Sandy Creek Road and Bromelton House Road	6.5%
Ipswich–Boonah Road	211: Between Cunningham Highway and Mt Flinders Road	10.2%
	211: Between Mt Flinders Road and Warrill View Peak Crossing Road	8.9%
	211: Between Warrill View–Peak Crossing Road and Dwyers Road	15.5%
	211: Between Dwyers Road and Washpool Road	14.7%
	211: Between Washpool Road and Beaudesert–Boonah Road	5.7%
Ipswich–Rosewood Road	34: Between Cunningham Highway and Ipswich–Rosewood Road	8.1%
Warrill View–Peak Crossing Road	216: Between Peak Crossing–Churchbank Weir Road and Ipswich–Boonah Road	13.9%
Local Government Roads: ICC		
Clarke Road	Full Extent	9.8%
Champions Way	Between Cunningham Highway and Paynes Road	7.8%
Coveney Road	Full Extent	398.7%
Ebenezer Road	Between Coopers Road and Rosewood–Warrill View Road	5.4%
Hayes Road	Full Extent	100.9%
Hillside Road	Full Extent	25.8%
Lane Road	Between Rosewood–Laidley Road and Waters Road	35.5%
Macalister Street	Between Moffatt Street and Park Street	30.7%
Middle Road	Between Cunningham Highway and Bill Morrow Road	63.0%

Road name	Road ID—Road section	5% comparison analysis
Mount Flinders Road	Between Ipswich–Boonah Road and Shepherd Road	12.3%
Mount Forbes Road	Between Ebenezer Road and Paynes Road	9.8%
Mount Marrow Quarry Road	Full Extent	7.0%
Old Grandchester Road	Between Lane Road and Strongs Road	104.9%
Park Street	Between Macalister Street and Warwick Road	
Paynes Road	Between Champions Way and Mount Forbes Road	9.6%
Reillys Road	Between Strongs Road and Rosewood Warrill View Road	177.8%
Strongs Road	Between Coveney Road and Rileys Road	151.7%
	Between Old Grandchester Road and Coveney Road	104.9%
T Morrows Road	Full Extent	54.5%
Thagoona Haigslea Road	Between Mount Marrow Quarry Road and Karrabin–Rosewood Road	7.6%
Waters Road	Between Lane Road and Kuss Road	28.2%
Local Government roads: LCC		
Kilmoylar Road	Between Logan City Council Boundary and Wyatt Road	69.4%
Undullah Road	Between Mount Lindesay Highway and Logan City Council Boundary	193.2%
	Between Wyatt Road and Wild Pig Creek Road	385.8%
Wyatt Road	Between Kilmoylar Road and Undullah Road	238.7%
Wild Pig Creek Road	Full Extent	306.4%
Local Government roads: SRRC		
Allan Creek Road	Between Mount Lindesay Highway and Brookland Road	38.7%
Bromelton House Road	Between Allan Creek Road and Beaudesert–Boonah Road	19.9%
Brookland Road	Between Undullah Road and Allan Creek Road	52.7%
Dwyers Road	Full Extent	120.6%
Eaglesfield Street	Between Mount Lindesay Highway and Tina Street	12.2%
Ilbogan Road	Between Beaudesert Boonah Road and Thiedke Road	13.1%
Kilmoylar Road	Between Undullah Road and Logan City Council Boundary	44.0%
Mutdapilly–Churchbank Weir Road	Between Peak Crossing–Churchbank Weir Road and Cunningham Highway	30.5%
Peak Crossing–Churchbank Weir Road	Between Warrill View–Peak Crossing Road and Mutdapilly–Churchbank Weir Road	11.9%
Thiedke Road	Between Ilbogan Road and Mt Lindesay Highway	15.7%
Undullah Road	Between Logan City Council Boundary and Brookland Road	374.8%
	Between Brookland Road and Kilmoylar Road	742.5%
	Between Kilmoylar Rd and S of Brennans Dip Road	89.3%
Washpool Road	Between Ipswich–Boonah Road to 5.5k E of Ipswich Boonah Road	320.9%
Wild Pig Creek Road	Full extent	306.4%

19.8.2.2 Intersection analysis

For the transportation of materials, workforce, as well as equipment, key transport routes have been identified. From the analysis of these transport corridors, intersections have been identified that are expected to cater to the movement of construction-related activities during the various construction stages.

An assessment of base traffic flows and construction flows has been undertaken to determine intersections that are expected to require upgraded turning treatments to accommodate construction traffic flows consistent with the warrants outlined in *Austroads Guide to Traffic Management Part 6* (Austroads, 2020). These intersections are summarised in Table 19.22. Detailed discussion on the intersection analysis for each of the locations listed in Table 19.22 is provided in Appendix U: Traffic Impact Assessment Technical Report.

These upgrades are required only temporarily for construction traffic. Therefore, discussions will be required with DTMR and local governments during the next phase of the Project to determine the permanence of such upgrades. Given the short duration of construction-related traffic, traffic management strategies may be introduced to mitigate construction-related traffic impacts at intersections.

TABLE 19.22: INTERSECTIONS WITH CONSTRUCTION TRAFFIC TURN MOVEMENTS

Name	Joint ownership
DTMR	
Beaudesert–Boonah Road/Bromelton House Road	SRRC
Beaudesert–Boonah Road/Sandy Creek Road	SRRC
Beaudesert–Boonah Road/Wyaralong Dam Access	SRRC
Beaudesert–Boonah Road/Ilbogan Road	SRRC
Beaudesert–Boonah Road/Tilley Road	SRRC
Cunningham Highway/Champions Way	ICC
Cunningham Highway/Coopers Road	ICC
Cunningham Highway/Ipswich–Rosewood Road	
Cunningham Highway/Middle Road	ICC
Ipswich–Boonah Road/Dwyers Road	SRRC
Ipswich–Boonah Road/Mt Flinders Road	SRRC
Ipswich–Boonah Road/T Morrows Road	ICC
Ipswich–Boonah Road/Warrill View–Peak Crossing Road	
Ipswich–Boonah Road/Washpool Road	SRRC
Ipswich–Rosewood Road/Rosewood–Warrill View Road/School Street	ICC
Karrabin–Rosewood Road/Haigslea–Amberley Road	ICC
Karrabin–Rosewood Road/Thagoona–Haigslea Road	ICC
Mt Lindesay Highway/Eaglesfield Street	SRRC
Mt Lindesay Highway/Enterprise Drive	SRRC
Mt Lindesay Highway/Mt Lindesay Highway	
Mt Lindesay Highway/Thiedke Road	SRRC
Mt Lindesay Highway/Undullah Road	LCC
Rosewood–Laidley Road/Karrabin–Rosewood Road/Ipswich Rosewood Road	
Rosewood–Laidley Road/Lane Road	ICC
Rosewood–Warrill View Road/Reillys Road	ICC
Rosewood–Warrill View Road/Ebenezer Road	ICC
Warrill View–Peak Crossing Road/Peak Crossing–Churchbank Weir Road	
Warwick Road/Moffatt Street	ICC

Name	Joint ownership
ICC	
Briggs Rd/Edwards Street	
Coveney Road/Hayes Road	
Ebenezer Road/Mt Forbes Road	
Macalister Street/Moffatt Street	
Macalister Street/Park Street	
Mt Forbes Road/Paynes Road	
Thagoona–Haigslea Road/Mt Marrow Quarry Road	
Noblevale Way/Fairbank Place	
Old Toowoomba Road/Moffatt Street	
Old Toowoomba Road/Toongarra Road	
Ripley Road/Edwards Street	
Rob Roy Way/Newhill Drive	
Rob Roy Way/Noblevale Way	
Strongs Road/Coveney Road	
Strongs Road/Reillys Road	
Thagoona–Haigslea Road/Thagoona–Haigslea Road	
Waters Road/Lane Road/Old Grandchester Road	
LCC	
Kilmoylar Road/Wyatt Road	
Undullah Road/Undullah Road	
Undullah Road/Wyatt Road	
Undullah Road/Wild Pig Creek Road	
SRRC	
Allan Creek Road/Brabazon Road	
Ilbogan Road/Thiedke Road	
Mutdapilly–Churchbank Weir Road/Mutdapilly–Churchbank Weir Road	
Peak Crossing–Churchbank Weir Road/Middle Road	
Undullah Road/Brookland Road	
Undullah Road/Kilmoylar Road	

19.8.2.3 Pavement impacts on road links

A preliminary desktop pavement impact assessment was undertaken on all potentially affected DTMR SCRs based on the existing background traffic data available for the relevant road sections. The following is a summary of the approach and methodology adopted for the preliminary desktop pavement impact assessment for affected SCRs:

- Determine the number and types of vehicles that will be generated by the development in both construction and operation and determine sections of the network where pavement assessment is most likely required for each year of implementation
- The development traffic volumes were converted into SARs based on the assumed number of SARs per vehicle
- Undertake a 5 per cent comparison of the background SARs and Project generated SARs for each link identified to be most likely impacted by the proposed development.

A list of SCR road segments that are likely to equate to or exceed 5 per cent SAR threshold is provided in Table 19.23.

TABLE 19.23: FIVE PER CENT STANDARD AXLE REPETITIONS ON STATE-CONTROLLED ROAD SEGMENTS

Road name	Road ID: road section	5% comparison analysis
Beaudesert–Boonah Road	212: Between Ipswich–Boonah Road and Wyaralong Dam Access	110.7%
	212: Between Wyaralong Dam Access and Tilley Road	123.7%
	212: Between Tilley Road and Sandy Creek Road	125.6%
	212: Between Sandy Creek Road and Bromelton House Road	123.7%
	212: Between Bromelton House Road and Ilbogan Road	6.9%
Cunningham Highway	17B: Between Ipswich–Boonah Road and Middle Road	20.2%
	17B: Between Middle Road and Ipswich–Rosewood Road	27.7%
	17B: Between Champions Way and Mutdapilly–Churchbank Weir Road	7.4%
Ipswich–Boonah Road	211: Between Cunningham Highway and Mt Flinders Road	78.7%
	211: Between Mt Flinders Road and Warrill View–Peak Crossing Road	80.7%
	211: Between Warrill View–Peak Crossing Road and Dwyers Road	182.4%
	211: Between Dwyers Road and Washpool Road	180.6%
	211: Between Washpool Road and Beaudesert–Boonah Road	111.7%
Ipswich–Rosewood Road	34: Between Cunningham Highway and Ipswich–Rosewood Road	112.4%
	34: Between Ipswich–Rosewood Road and Karrabin–Rosewood Road	7.2%
Karrabin–Rosewood Road	32: Between Rosewood–Laidley Road and Haigslea–Amberley Road	7.0%
Rosewood–Laidley Road	38: Between Grandchester–Mount Mort Road and Crown Street	7.7%
Rosewood–Warrill View Road	35: Between Ipswich–Rosewood Road and Reillys Road	7.1%
	35: Between Reillys Road and Ebenezer Road	6.4%
Warrill View–Peak Crossing Road	216: Between Peak Crossing–Churchbank Weir Road and Ipswich–Boonah Road	174.5%

These findings show that several SCRs are likely to cross the 5 per cent SAR threshold, with several road segments exceeding this threshold by a significant margin. It is worth noting that this analysis is based on the assumption of fully loaded vehicles in each direction is conservative to ensure no underestimation of pavement impacts.

This assessment shows that while the development SARs are expected to increase over the duration of construction activities, this would be a temporary increase in pavement loadings over the pavement mitigation period of 20 years. The analysis indicates that the SCR road segments located in QLD would have a minimal pavement impact given the duration of the construction activities and pavement loading.

A pavement impact assessment was not conducted for envisaged affected local government roads as the GTIA (DTMR, 2017b) currently only requires this assessment for SCRs. Appropriate pavement mitigation measures were developed in consultation with relevant LGAs and are to be applied to both SCRs and local government roads. These mitigation measures are provided in Section 19.7.

An updated version of the GTIA was released in December 2018, after the ToR for the Project was released. An accompanying practice note (*Guide to Traffic Impact Assessment Practice Note: Pavement Impact Assessment* (DTMR, 2018)) was also released at this time. This assessment has been undertaken consistent with the GTIA (DTMR, 2017b), which is consistent with the ToR. However, as per the GTIA, the traffic impact assessment will need to be finalised when project contractors are appointed and the final traffic generation is clearer. It is recommended that the updated traffic impact assessment be prepared consistent with the December 2018 version of the GTIA, and the associated Pavement Impact Assessment Practice Note.

Further details on the pavement impacts on road links are included in Appendix U: Traffic Impact Assessment Technical Report.

19.8.3 Operation

It is assumed that during the operational stages, the workforce will reside within local towns surrounding the Project. It is expected that no new trips will be generated as existing trips would be accounted for and the dispersed nature of these trips across the road network would have a minimal impact on road network operational performance.

It is also anticipated that occasional access to and from the corridor will be required to conduct routine inspection and maintenance works during the Project operational stage. However, inspection and maintenance activities are likely to be infrequent and the related traffic volumes are likely to be minimal with no envisaged impact to operational conditions of the surrounding road networks.

19.8.3.1 Rail crossings

The operational performance of public level crossings in the traffic, transport and access study area was assessed to provide an understanding of the impacts on performance during operation stages. Any potential impact of diverted traffic created by road closures was also taken into account. The rail crossing impact assessment focuses on vehicle delay and queueing analysis, demonstrating how the development generated traffic impacts on vehicle delays and queuing issues at the rail crossing, and at nearby closely spaced intersections.

The Future Years 2026 and 2036 AM and PM peak hour analysis of proposed crossings: Operational Railway Traffic with background road traffic + operational traffic + traffic diversions if any (only at locations where short stacking might be of impact) scenario was evaluated.

The following process was used from a traffic perspective for evaluating level crossing impacts and complying with the requirements of the *Australian Standard 1742.7, MUTCD—Railway crossings* and the *Queensland Level Crossing Safety Strategy 2012-2021* (DTMR, 2012):

- Identify the expected traffic distribution on the road network as a result of the Project
- Identify railway level crossings likely to be impacted by traffic generated by the Project
- Agree the expected timeframe for the delivery of the Project including the commencement of construction, each stage and the ultimate development
- Demonstrate how the traffic generated by the Project will not worsen vehicular queuing issues (short stacking) over the impacted railway level crossings
- Determine the maximum size and type of vehicle anticipated over the railway level crossings as a result of the development during construction and at the commencement of each development stage
- Demonstrate that there is sufficient clearance from the railway crossing to allow the maximum size of vehicle used in the operation to queue at any intersection or proposed access point perpendicular to the railway crossing
- Evaluate safety conditions of the level crossing to inform the design.

The analysis indicated that acceptable LOS would prevail with minimal impact to vehicle queueing and delay should the proposed level crossings be implemented. The following rail crossing wait times were calculated:

- 340-6-P-7 Middle Road: 104 seconds
- 340-10-P-3a Proposed Washpool Road: 161 seconds.

The following tables outline the analysis results (refer Table 19.24 and Table 19.25), which show the additional waiting time and estimated queue length associated with the proposed level crossings for the two future-year scenarios.

TABLE 19.24: RAIL CROSSING OPERATIONAL PERFORMANCE DURING AM PEAK HOURS

Intersection	Opening year 2026 average AM peak delays (with development)	Future year 2036 average AM peak hour delay (with development)	Longest estimated queue length at the year 2036 (with development)	Impact on queue storage capacity
340-6-P-7 Middle Road (Northbound)	3.4 seconds	3.4 seconds	9.4 m	No impact
340-6-P-7 Middle Road (Southbound)	3.4 seconds	3.5 seconds	14.0 m	No impact
340-10-P-3a Proposed Washpool Road (Eastbound)	7.9 seconds	7.9 seconds	10.5 m	No impact
340-10-P-3a Proposed Washpool Road (Westbound)	7.9 seconds	7.9 seconds	7.4 m	No impact

TABLE 19.25: RAIL CROSSING OPERATIONAL PERFORMANCE DURING PM PEAK HOURS

Intersection	Opening year 2026 average PM peak hour delay (with development)	Future year 2036 average PM peak hour delay (with development)	Longest estimated queue length at the year 2036 (with development)	Impact on queue storage capacity
340-6-P-7 Middle Road (Northbound)	3.5 seconds	3.5 seconds	21.5 m	No impact
340-6-P-7 Middle Road (Southbound)	3.4 seconds	3.4 seconds	11.3 m	No impact
340-10-P-3a Proposed Washpool Road (Eastbound)	7.9 seconds	7.9 seconds	8.4 m	No impact
340-10-P-3a Proposed Washpool Road (Westbound)	7.9 seconds	7.9 seconds	8.1 m	No impact

19.9 Cumulative impact assessment

The potential for traffic generation from other developments in the region at planning, design or construction stages were considered as part of the traffic and transport cumulative impact assessment (CIA). The area of influence (AOI) for the traffic, transport and access CIA included the road network likely to be affected by more than just the Project. This included the road network envisaged for the transport of workforce, materials and equipment during the construction and operational phases of the Project. The projects considered in the CIA are listed in Chapter 22: Cumulative Impacts and included:

- K2ARB
- H2C
- Greater Flagstone Priority Development Area
- Bromelton State Development Area
- Ripley Valley PDA
- South West Pipeline: Bulk Water Connection to Beaudesert
- RAAF Base Amberley future works
- Cross River Rail
- Remondis Waste to Energy Facility.

Two types of cumulative impacts were included in this assessment:

- Temporal impacts—the potential for works to occur on multiple projects at the same time
- Spatial operational impacts—the potential for works to occur on multiple projects in the same area, that is similar construction routes.

As each of these projects have an overlap in construction schedules and potential proposed construction routes, the cumulative traffic and transport impacts are considered to be of medium significance.

Additional information on the potential cumulative impacts relating to traffic and transport are presented in Chapter 22: Cumulative Impacts.

19.10 Conclusion

The Project is one of the 13 separate projects that complete the Inland Rail Program. The Project involves the design and construction of approximately 53 km of new single-track dual-gauge railway. The connection will provide convenient access for freight to major proposed industrial developments in the Scenic Rim Region. This traffic, transport and access assessment has focused on the Project's impact on the existing road and rail transport infrastructure in QLD. The following conclusions were made:

- Existing operational conditions:
  - The traffic, transport and access study area encompass several SCRs and local government roads that serve as main transport corridors for the Project. The traffic analysis indicated that:
    - Three SCRs have been identified that will interface with the proposed rail alignment, and four SCRs within the traffic, transport and access study area are expected to see construction traffic exceed 5 per cent of the background traffic.
    - 37 local government roads have been identified that are expected to see construction traffic exceed 5 per cent of the background traffic; however, the impact to many of these roads is expected to be minimal as the high percentage of construction traffic is a function of low existing traffic volumes.
    - Six cycle routes are identified in QLD that might be impacted by construction traffic, however only Warwick Road between Cunningham Highway and Saleyards Road is expected to experience construction traffic in excess of 5 per cent of the background traffic. There is no impact to cycle routes expected during operations.
    - Three existing public transport services within QLD may be impacted by construction traffic and/or proposed and existing road/rail crossings. Given that only one road (Warwick Road) along the routes is expected to have construction traffic exceed 5 per cent of background traffic, combined with the relatively low frequency of these services, the impact is expected to be negligible during the construction and operational phases.
    - 12 existing school bus routes that are likely to be impacted by construction traffic have been identified using data sourced from TransLink, of which only 6 are expected to experience construction traffic in excess of 5 per cent of the background traffic. Given the low frequency of school bus services, it is expected that there will be minimal impact to services as a result of the construction of the Project.
    - Three existing long-distance coach services might be impacted by construction traffic. However, the impacts on these long-distance coach services are expected to be minimal due to the low frequency of the services.
    - No stock routes within the traffic, transport and access study area would be impacted by the Project.
    - Construction of connections to existing rail network is planned to occur during routine maintenance periods. Therefore, impacts to the existing rail network are not expected.
- Rail operational traffic and maintenance processes:
  - Rail operational traffic volumes are likely to be negligible with no envisaged impact to operational conditions of the surrounding road networks.
- Traffic impact assessments:
  - The Project-related traffic consists of traffic generated by both construction and operational activities. It is anticipated that the impacts would primarily be during the construction phase.
  - Certain road sections will generate construction related traffic volumes in excess of 10 per cent of the background traffic during the construction phase. The results of the LOS comparison between the 'with' and 'without' development scenarios indicated that the Project may potentially cause a minor change in LOS for some road sections during each year of construction.
  - Based on the LOS comparison, the Project is not expected to generate the need to upgrade the road network for such a short duration of impact, but adequate traffic and road use management strategies and mitigation measures would be required.