CHAPTER

19

Traffic, transport and access

Helidon to Calvert 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 Summary

This chapter provides an overview of existing transport network conditions for the Helidon to Calvert (H2C) Project (the Project). This overview includes existing roads, active transport and rail infrastructure for the Project. For the proposed construction and operation of the Project, desktop studies and site surveys were undertaken to establish baseline conditions. Potential traffic generation related to the construction and operation of the Project was determined and potential impacts on existing and planned transport infrastructure and facilities assessed.

Project-related traffic consists of traffic generated by both construction and operational activities. The construction transport mode for the Project will primarily be road and rail. The greatest potential for impact would be during the construction phase of the Project. Construction-related traffic has the potential to generate volumes equal to, or greater than, 5 per cent of the background traffic on multiple links. The level of service on the road network has the potential to reduce during the construction period.

A number of the proposed construction routes will traverse through areas of moderate-to-high pedestrian activity. Key areas include the city centres of Toowoomba, Gatton, Helidon, Laidley and North Ipswich. While increased heavy-vehicle movements through these locations may potentially impact pedestrian movements, the majority of these routes currently facilitate a high proportion of heavy-vehicle movements.

Impacts to the road network during the operation of the Project are expected to be negligible. Access to and from the corridor will be infrequent and required to undertake routine inspection and maintenance works during the Project operational phase (typically monthly).

The Project is expected to increase potential vehicle exposure at public road–rail interfaces (level crossings). All public level crossings will be designed to provide for safe stacking, sight distances, lane marking, and signage. Potential operational impacts will be mitigated by ensuring that all appropriate design standards are implemented.

The *Queensland Level Crossing Strategy 2012–2021* (Department of Transport and Main Roads (DTMR), 2012) will be used with its associated key performance indicators to ensure all level crossings have appropriate mitigations in place. The focus for all level crossings will be on safety, risk and operational efficiency.

In addition, threshold and Australian Level Crossing Assessment Model (ALCAM) (2016) assessments will be undertaken by the Australian Rail Track Corporation (ARTC) to determine the appropriate level of protection and type to be applied.

The Project will maintain the safety and efficiency of all affected transport modes, including the Project workforce and all other key transport system users. The Project will maintain the condition of transport infrastructure and ensure any works (proposed, undertaken and/or as-built) maintain compatibility with existing transport infrastructure and future transport corridors.

19.2 Scope of chapter

This section describes the scope of the Environmental Impact Statement (EIS) Traffic, Transport and Access chapter. The chapter focuses on the potential impact of the Project on the existing road and rail transport infrastructure, and provides:

- An overview of existing transport network conditions, including existing road, active transport and rail traffic
- An overview of baseline operations associated with intersections, road links, pavements, existing road–rail interface locations and road safety
- A description of how existing and proposed transport infrastructure will be affected by Project transport at the local and regional level
- A summary of the total Project transport tasks including workforce, haulage routes, inputs and outputs during the construction and operational phases
- A summary of rail operational traffic and maintenance processes, as an input to the impact assessment
- The outcomes of the traffic, transport and access impact assessments (as related to intersections, road links, road–rail interfaces, pavements, road safety, access and frontage)
- An outline of any cumulative impacts on the wider transport network
- Identification of the potential impacts arising from the Project on road, rail, active transport and airports/ports during its construction and operation
- Mitigation measures to address the identified traffic 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.

The assessment does not include potential impacts to private roads during the construction phase. Potential impacts to private roads are addressed directly with the landowners as part of the Project's stakeholder engagement and consultation processes. The use of any private roads during construction would require specific agreement between the construction contractor with the private road owner, if required. Further detail is in Chapter 16: Social.

Note that during the construction and operational phases, the expected impact of the Project on ports and airports is not considered to be significant as the transport of materials, workforce and equipment is expected to primarily utilise the road and rail transport networks. Impacts from the Project on the operation and throughputs at ports (containers) have not been assessed as it is not considered to be materially affected by the Project.

19.3 Terms of Reference requirements

The Terms of Reference (ToR) describe the matters the proponent must address in the EIS for the Project. The matters relating to traffic, transport and access are contained in ToR 11.109 through ToR 11.117. These matters are outlined in Table 19.1. Appendix B: Terms of Reference Compliance Table also provides a cross-reference for each ToR against relevant sections in this EIS.

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

Terms of Reference requirements		Where addressed
Transport		
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 19.7 Appendix U: Traffic Impact Assessment, Section 2
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 19.5 and Figure 19.1 Chapter 2: Project rationale, Section 2.7, and Figures 2.3 to 2.7
11.111.	Describe how the project complies with the *Queensland Level Crossing Safety Strategy 2012-2021* for new road/rail interfaces and the impacts on existing road/rail interfaces	Sections 19.4, 19.6.3 and 19.7 Appendix U: Traffic Impact Assessment, Sections 1.3, 1.5.2.2 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 19.8, 19.9 and 19.11 Appendix U: Traffic Impact Assessment, Sections 6 and 11 Chapter 22: Cumulative impacts, Section 22.6
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 19.5, 19.8 and 19.9 Appendix U: Traffic Impact Assessment, Sections 3, 5, 6 and 12 and Appendix G to O
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 19.8 and 19.9 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 19.7, 19.8 and 19.9 Appendix U: Traffic Impact Assessment, Section 6

Terms of Reference requirements		Where addressed
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*	Section 19.6 Appendix U: Traffic Impact Assessment, Section 1.5
Mitigation Measures		
11.117.	Discuss and recommend how identified impacts will be mitigated. Mitigation strategies are to be prepared in close consultation with relevant transport authorities (including Local Government)	Section 19.10 Appendix U: Traffic Impact Assessment, Section 9 Chapter 23: Draft Outline Environmental Management Plan, Section 23.13.10 Additional detail is provided in Chapter 5: Stakeholder engagement, Chapter 16: Social and Appendix C: Consultation Report

19.4 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 transport infrastructure in the context of the Project in Queensland. A summary of the applicable legislation, policies and guidelines is 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) (TPC Act)	The overall objective of the TPC Act 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) *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 Queensland's existing transport network of rail, State-controlled road 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 TPC Act. Any crossings of existing rail lines or works within existing rail corridor will trigger S255—*Interfering with railway* and will require the approval of the railway manager. Any works within State-controlled roads (SCRs) or access to State-controlled roads (during construction) will trigger S50—*Ancillary works and encroachments* and S33—*Prohibition on roadworks etc. on State-controlled roads* and S62—*Management of access between individual properties and State-controlled roads* and S66—*Road access works within State-controlled roads.* The Project interfaces with five State-controlled roads 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.

Legislation, policy/ strategy or guideline	Relevance to the Project
Land Act 1994 (Qld) (Land Act)	The Land Act prescribes the framework for the allocation of non-freehold land tenure and its subsequent management. Under Chapter 4, Part 4 of the Land Act, 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 contains the provisions for relating to the temporary or permanent closure of a road, including State-controlled roads and local government roads, and declared stock routes.
Rail Safety National Law Act 2017 (Qld) (RSNL Act)	The purpose of the RSNL Act is to provide for safe railway operations in Australia. One object of the Act is to establish the Office of the National Rail Safety Regulator (ONRSR) as the rail safety regulator in Queensland. 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 Queensland. The ongoing operation of the Project will need to comply with all areas of the RSNL Act. This will, cover safe working in rail corridors, signalling and control, ongoing management of structures and civil works, interfaces with public roads and highways and rail safety activities.
Stock Route Management Act 2002 (Qld) (SRM Act)	The Queensland stock route network is a network of stock routes and reserves for travelling stock in the State. The SRM Act 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)). The Department of Resources (formerly the Department of Natural Resources, Mines and Energy) administers the SRM Act. All stock routes are classified as roads under the Land Act.
Local Government Act 2009 (Qld) (LG Act)	The LG Act sets out the responsibilities of local government authorities (LGAs) with regard to the construction, improvement, control and management of traffic on local roads (excluding SCRs). An LGA may temporarily or permanently close a local road to traffic in accordance with the LG Act. An adjoining landowner must apply under the Land Act to temporarily or permanently close a local road. The Project is within the LGAs of Lockyer Valley Regional Council (LVRC) and Ipswich City Council (ICC). The Project will adhere to and be carried out in accordance with relevant and applicable local laws, where applicable.
Local Government Plans/Strategies	
Draft Lockyer Valley Planning Scheme	The Project is located within the Lockyer Valley local government area (LGA). The planning schemes currently in force and effect within the Lockyer Valley LGA are those of the former Gatton and Laidley Shires, which were in place when these shires were amalgamated in 2008, as well as the *Grantham Reconstruction Area Development Scheme*. These planning schemes continue to apply until the new *Lockyer Valley Planning Scheme* has been adopted. At the time of writing, the *Lockyer Valley Planning Scheme* is a draft and has not yet been released for public consultation.
Draft Lockyer Valley Priority Infrastructure Plan	The Lockyer Valley Regional Council has developed a *Draft Lockyer Valley Priority Infrastructure Plan*. This plan identifies the infrastructure the Lockyer Valley will need between 2014 and 2024 to service the expected population and employment growth over the road network, as well as for community facilities, water supply and sewerage.
iGo Ipswich Transport Plan (Ipswich City Council (ICC) 2016a)	The *iGo 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.
Ipswich Planning Scheme (ICC, 2006)	The *Ipswich Planning Scheme* (2006) is the primary planning instrument for land within the Ipswich LGA. The Project is partially located within the Ipswich LGA. In accordance with Schedule 6, Part 5, Section 26(2) of the Planning Regulation 2017, development for the construction of transport infrastructure, where the infrastructure is government supported transport infrastructure, is exempt from assessment under the relevant local categorising instruments. Although the provisions of the *Ipswich Planning Scheme* do not apply to the Project, the zoning intent for the area (as determined by the planning scheme) has been considered with regard to the Project and future land uses in the area.

Legislation, policy/ strategy or guideline	Relevance to the Project
Gatton Shire Planning Scheme 2007 (Gatton Shire Council, 2007)	The Project is partially located within the Lockyer Valley LGA, formerly the Gatton Shire. The *Gatton Shire Planning Scheme* is the primary planning document for land located within the former Gatton Shire Council area (with the exception of land that is subject to the Grantham Reconstruction Area). This area now forms part of the Lockyer Valley LGA. LVRC administers all development and land use planning for this area. The Gatton Shire Planning Scheme outlines the level of assessment and requirements for undertaking development in the former Gatton Shire Council area. In accordance with Schedule 6, Part 5, Section 26(2) of the Planning Regulation 2017, development for the construction of transport infrastructure, where the infrastructure is government supported transport infrastructure, is exempt from assessment under the relevant local categorising instruments. Although the provisions of the *Gatton Shire Planning Scheme* do not apply to the Project, the zoning intent for the area (as determined by the planning scheme) has been considered with regard to the Project and future land uses in the area.
Laidley Shire Planning Scheme 2003 (Lockyer Valley Regional Council (LVRC), 2003)	The Project is located within the former Laidley Shire, now Lockyer Valley LGA. In accordance with Schedule 6, Part 5, Section 26(2) of the Planning Regulation 2017, development for the construction of transport infrastructure, where the infrastructure is government supported transport infrastructure, is exempt from assessment under the relevant local instruments. Although the provisions of the provisions of the *Laidley Shire Planning Scheme* do not apply to the Project, the zoning intent for the area (as determined by the planning scheme) has been considered with regard to the Project and future land uses in the area.
Guidelines	
Queensland Level Crossing Safety Strategy 2012–2021 (QLCSS) (DTMR, 2012)	The QLCSS 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. The NRLCSS has subsequently been superseded by the NRLCSS (2017–2020). However, the 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 interest 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.
Guide to Traffic Impact Assessment (GTIA), (DTMR, 2018)	The 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. The GTIA provides information on assessing road impacts. While it is not mandatory, the GTIA provides a basis for assessment and has been adopted for the EIS. 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. Although the guidelines only apply to the SCRs, local 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. An updated version of the GTIA was released in December 2018, after the ToR for the Project was released. This assessment has been undertaken consistent with the 2017 GTIA, which is generally in accordance with the 2018 GTIA (with no material implications to assessment outcomes).
Manual of Uniform Traffic Control Devices Part 7: Railway Crossings (MUTCD) (DTMR, 2019c)	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 level crossings and describes the devices and assemblies, their use and location to achieve these controls.

Legislation, policy/ strategy or guideline	Relevance to the Project
DTMR Guide to Development in a Transport Environment: Rail (DTMR, 2015b)	This guide provides information for planning, design or delivery of development in the vicinity of railways in Queensland. It is intended for use as a technical reference document. Specific technical guidance is provided to assist development proponents achieve compliance with the performance outcomes and acceptable outcomes in the Queensland *State Development Assessment Provisions* (SDAP). The focus is on managing impacts of development on railway safety, structural integrity and operation. The guide also provides information on operational constraints and requirements when undertaking works within the railway environment.
Guide to Traffic Management Part 12: Integrated Transport Assessments for Development (Austroads, 2019)	This guide assists traffic and transport practitioners identify and manage potential 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.
Guide to Pavement Technology Part 2: Pavement Structural Design (Austroads, 2012)	This guide provides advice on the structural design of sealed road pavements. It covers subgrade evaluation, pavement materials evaluation, analysis of traffic loading and structural design in addition to other relevant factors.
Guide to Traffic Management Part 3: Traffic Studies and Analysis (Austroads, 2017a)	The guide outlines traffic data requirements and its analysis for traffic management and traffic control within a network. It provides consistency in conducting traffic studies and surveys and provides guidance on varying methods for studies and surveys, their use and application, and data collection and analysis.
Guide to Traffic Engineering Practice Part 2: Roadway Capacity (Austroads, 1988)	The guide provides information regarding roadway capacity for various road types. Guidance is provided on the assessment approach for mid-block capacity assessments.
Cycling Aspects of Austroads Guides (Austroads, 2017b)	This guideline contains information for 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 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 relevant Austroads guides for further information ▸ Information and cross-references 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 and to help determine cost-effective treatments.

19.5 Traffic, transport and access study area

The traffic, transport and access study area (herein referred to as the transport study area) comprises:

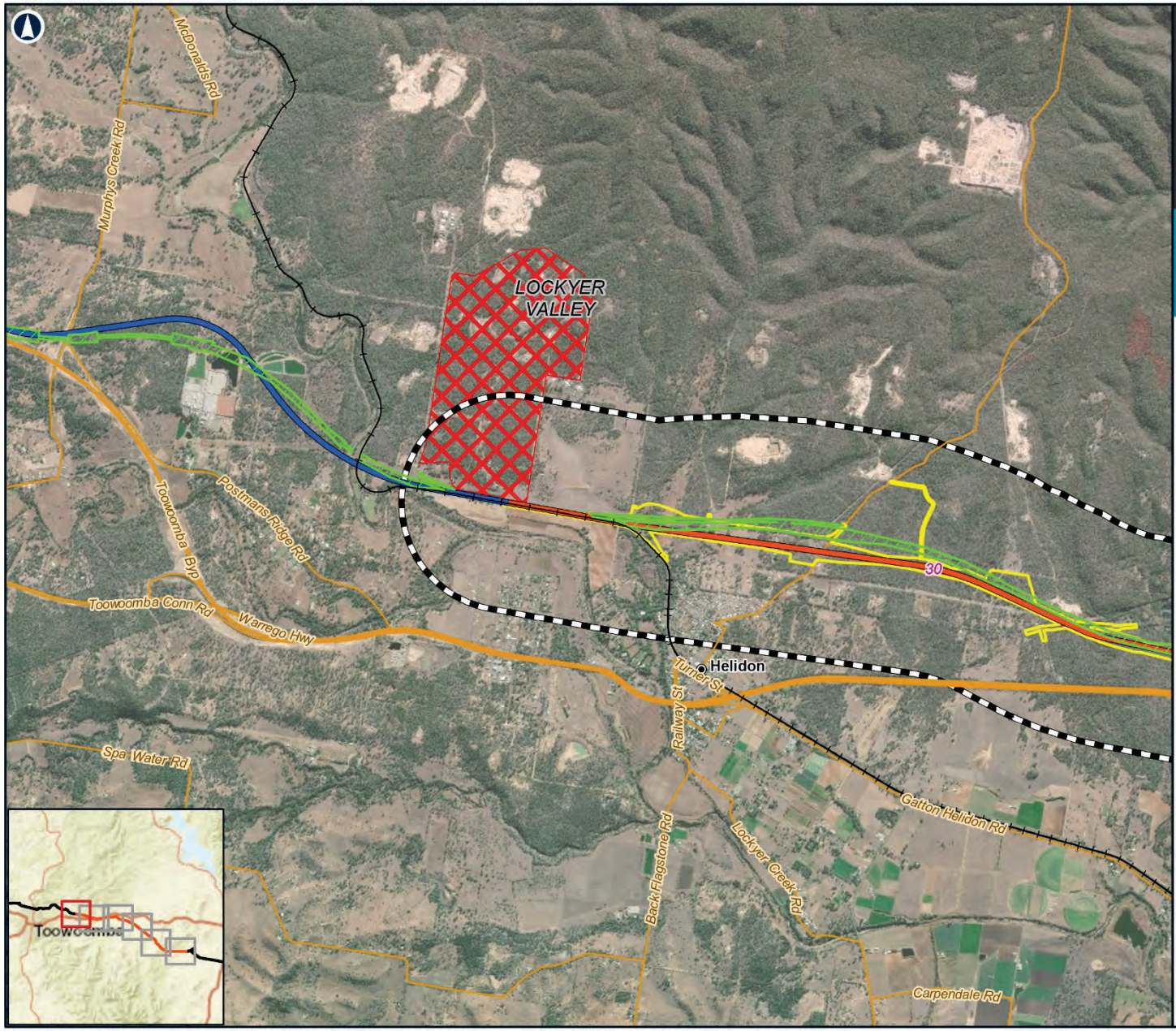
- Extent of the proposed Project alignment, including public roads intersecting the rail corridor (road–rail interface locations) (refer Figure 19.2)
- Road network envisaged for the transport of workforce, materials and equipment during the construction and operational phases of the Project (refer Figure 19.3).

The Project alignment is illustrated in Figure 19.1a to Figure 19.1f. The Project provides a link between: Calvert to Kagaru (C2K) in the south-east, where it connects to the Queensland Rail (QR) 'West Moreton System'; and Gowrie to Helidon (G2H) Project to the north-west.

The Project alignment generally follows the State's strategic rail corridor. The alignment has, however, been optimised in various locations to reduce impact to stakeholders and to reduce cost. The sections where the alignment deviates from the strategic rail corridor are at chainages (Ch) 26.80 km to Ch 32.00 km, Ch 33.60 km to Ch 37.20 km and Ch 58.20 km to Ch 66.80 km.

The Project alignment and road–rail interface locations are illustrated in Figure 19.2a to Figure 19.2d. The road–rail interface locations included in the transport study area are all public road crossings that intersect the Project alignment.

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.

HELIDON TO CALVERT

Figure 19.1a: Project rail alignment

LEGEND

- 5 Chainage (km)
- Localities
- Existing rail
- G2H project alignment
- H2C project alignment
- Major roads
- Minor roads
- EIS disturbance footprint
- EIS investigation corridor
- Local Government
- Reserve for explosives magazine

QLD strategic rail corridor

- Gowrie to Grandchester future State transport corridor

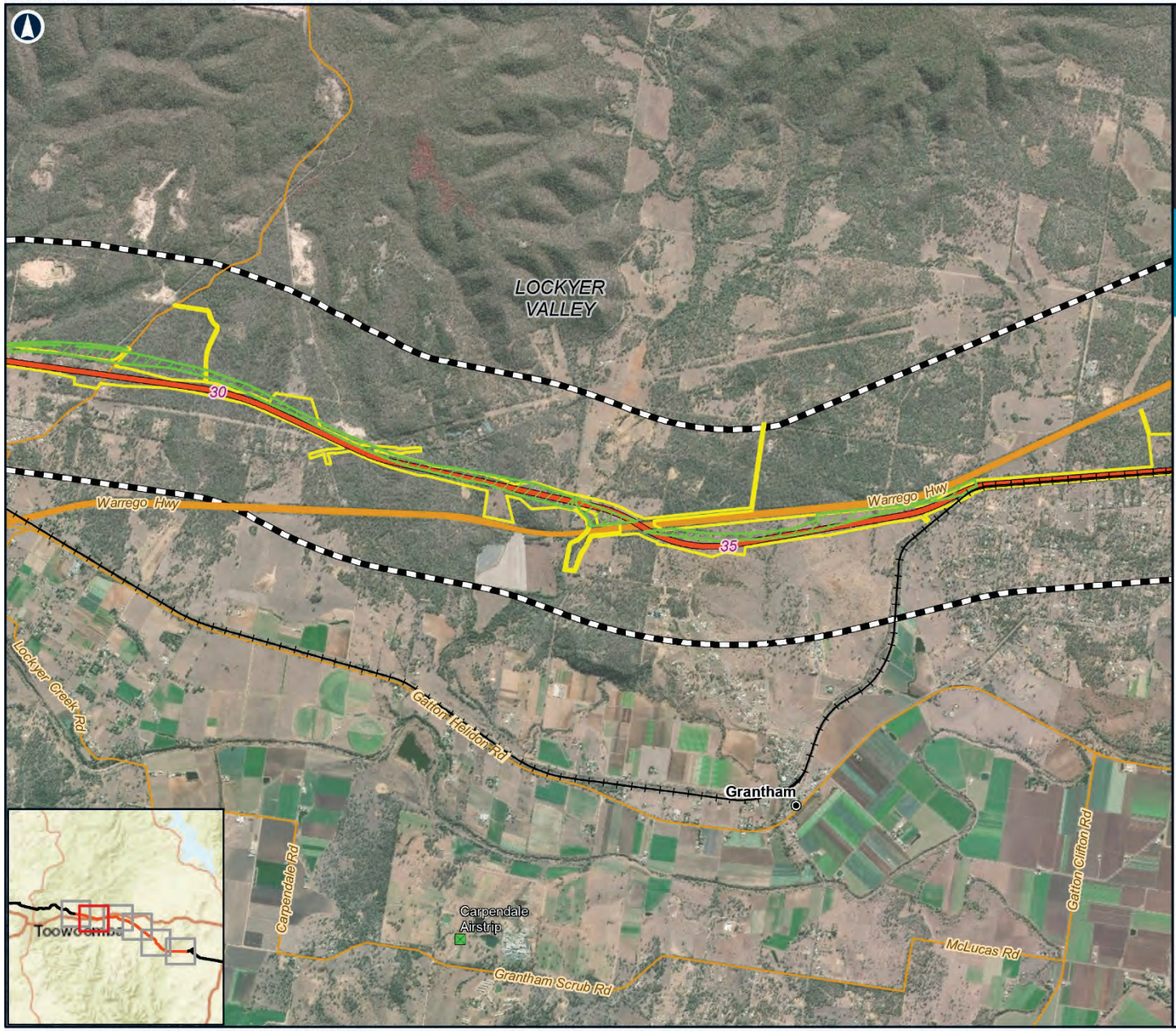
0 1 2 km

Coordinate System: GDA 1994 MGA Zone 56

Date: 24/04/2020 Paper: A4
Author: FFJV GIS Scale: 1:50,000
Data Sources: FFJV

Map by: CW / RB / DTH / GN / MF Z:\GIS\GIS_3300_H2C\Tasks\330-ITR-201907101026_95PC_Figures_and_Appendices\330-ITR-201907101026_Fig19.1_Alignment_DDv4.mxd Date: 24/04/2020 14:56

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.

HELIDON TO CALVERT

Figure 19.1b: Project rail alignment

LEGEND

- 5 Chainage (km)
- Localities
- Landing ground
- Existing rail
- H2C project alignment
- Major roads
- Minor roads
- EIS disturbance footprint
- EIS investigation corridor
- Local Government

QLD strategic rail corridor

- Gowrie to Grandchester future State transport corridor

0 1 2 km

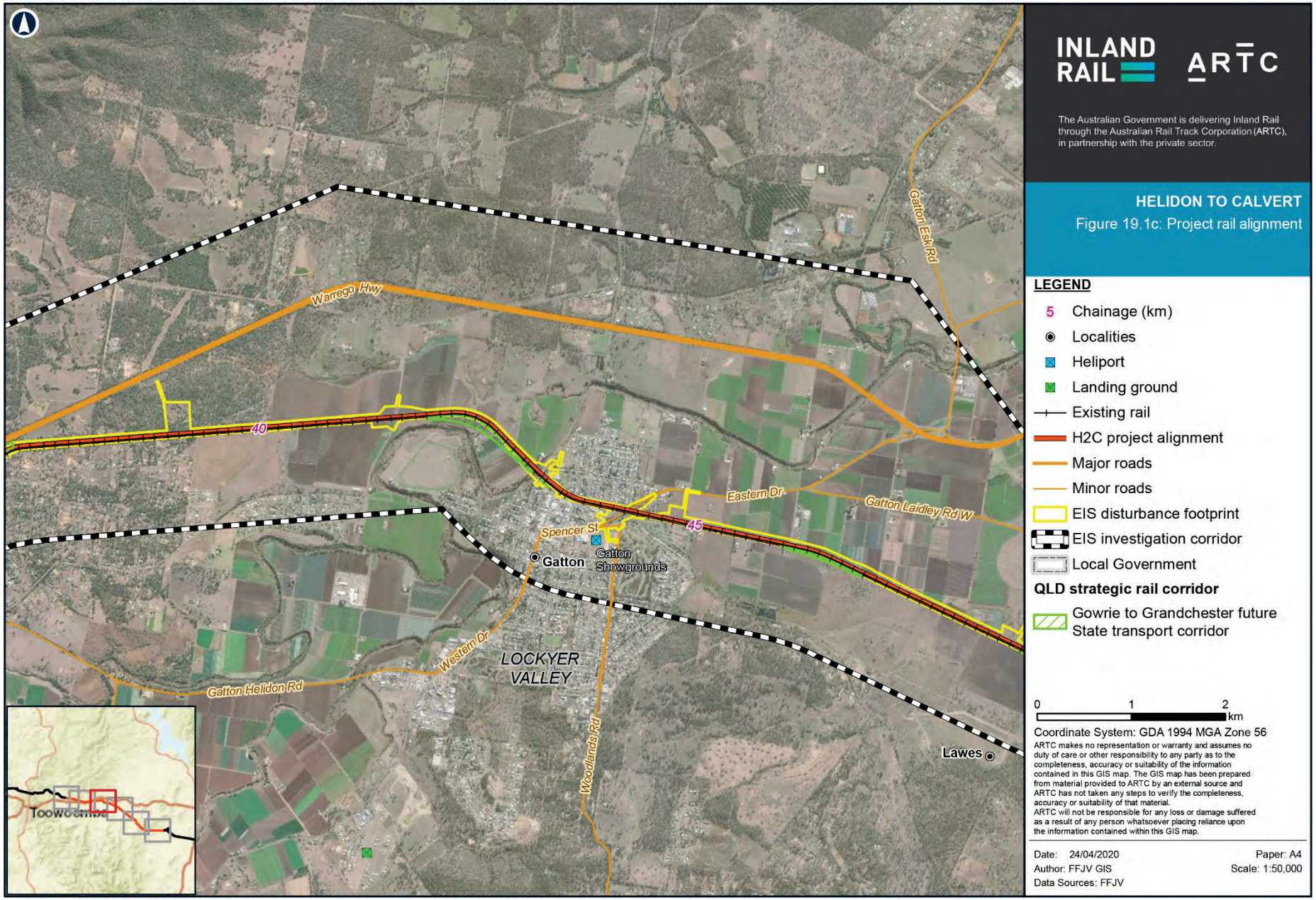
Coordinate System: GDA 1994 MGA Zone 56

Date: 24/04/2020
Author: FFJV GIS
Data Sources: FFJV

Paper: A4
Scale: 1:50,000

Map by: CW / RB / DTH / GN / MF Z:\GIS\GIS_3300_H2C\Tasks\330-ITR-201907101026_95PC_Figures_and_Appendices\330-ITR-201907101026_Fig19.1_Alignment_DDv4.mxd Date: 24/04/2020 14:56

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.

HELIDON TO CALVERT

Figure 19.1c: Project rail alignment

LEGEND

- 5 Chainage (km)
- Localities
- Heliport
- Landing ground
- Existing rail
- H2C project alignment
- Major roads
- Minor roads
- EIS disturbance footprint
- EIS investigation corridor
- Local Government

QLD strategic rail corridor

- Gowrie to Grandchester future State transport corridor

0 1 2 km

Coordinate System: GDA 1994 MGA Zone 56

Date: 24/04/2020
Author: FFJV GIS
Data Sources: FFJV

Paper: A4
Scale: 1:50,000

Map by: CW / RB / DTH / GN / MF Z:\GIS\GIS_3300_H2C\Tasks\330-ITR-201907101026_95PC_Figures_and_Appendices\330-ITR-201907101026_Fig19.1_Alignment_DDv4.mxd Date: 24/04/2020 14:56

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.

HELIDON TO CALVERT

Figure 19.1d: Project rail alignment

LEGEND

- 5 Chainage (km)
- Localities
- Landing ground
- Existing rail
- H2C project alignment
- Major roads
- Minor roads
- EIS disturbance footprint
- EIS investigation corridor
- Local Government

QLD strategic rail corridor

- Gowrie to Grandchester future State transport corridor

0 1 2 km

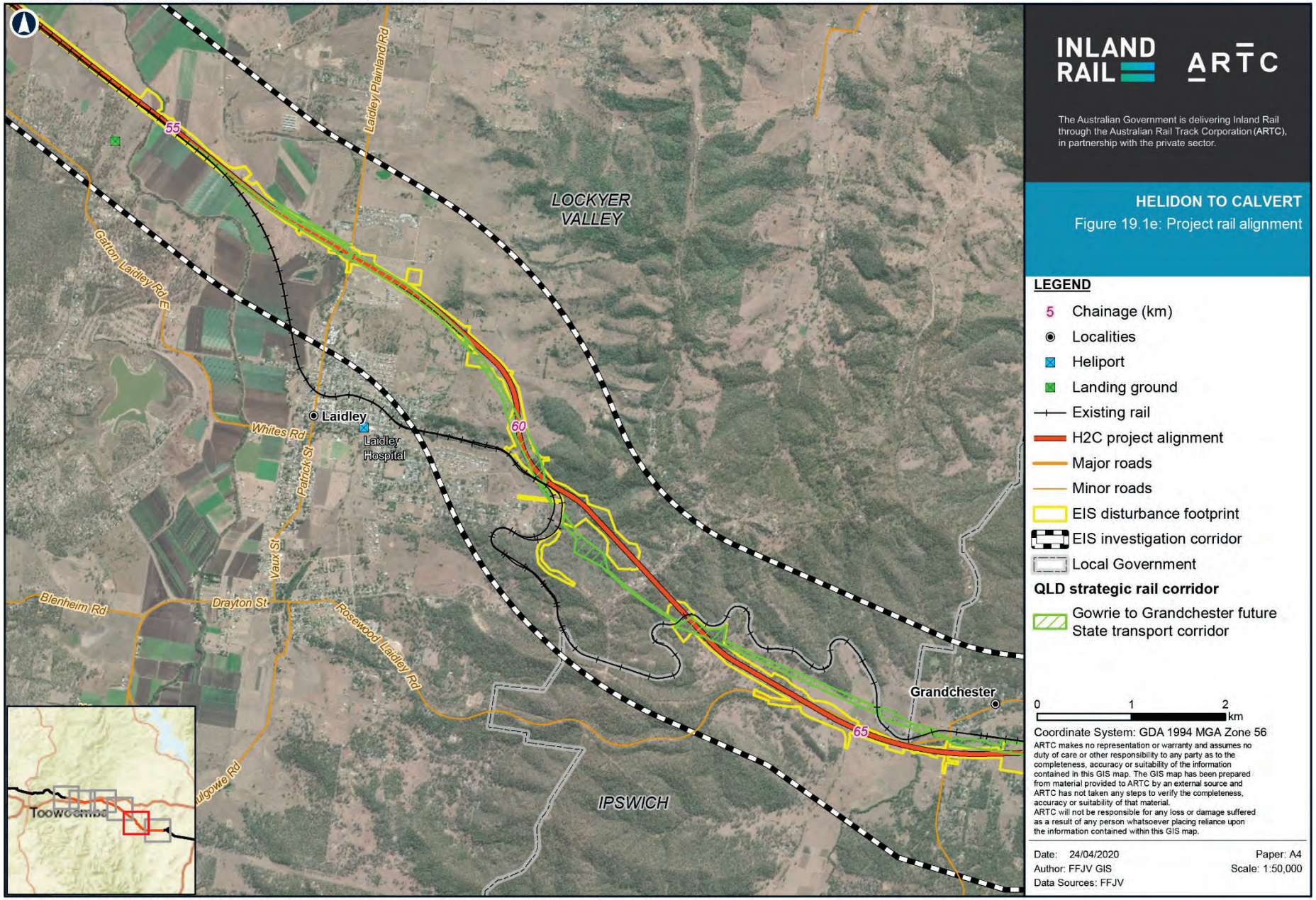
Coordinate System: GDA 1994 MGA Zone 56

Date: 24/04/2020
Author: FFJV GIS
Data Sources: FFJV

Paper: A4
Scale: 1:50,000

Map by: CW / RB / DTH / GN / MF Z:\GIS\GIS_3300_H2C\Tasks\330-ITR-201907101026_95PC_Figures_and_Appendices\330-ITR-201907101026_Fig19.1_Alignment_DDv4.mxd Date: 24/04/2020 14:56

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.

HELIDON TO CALVERT

Figure 19.1e: Project rail alignment

LEGEND

- 5 Chainage (km)
- Localities
- Heliport
- Landing ground
- Existing rail
- H2C project alignment
- Major roads
- Minor roads
- EIS disturbance footprint
- EIS investigation corridor
- Local Government

QLD strategic rail corridor

- Gowrie to Grandchester future State transport corridor

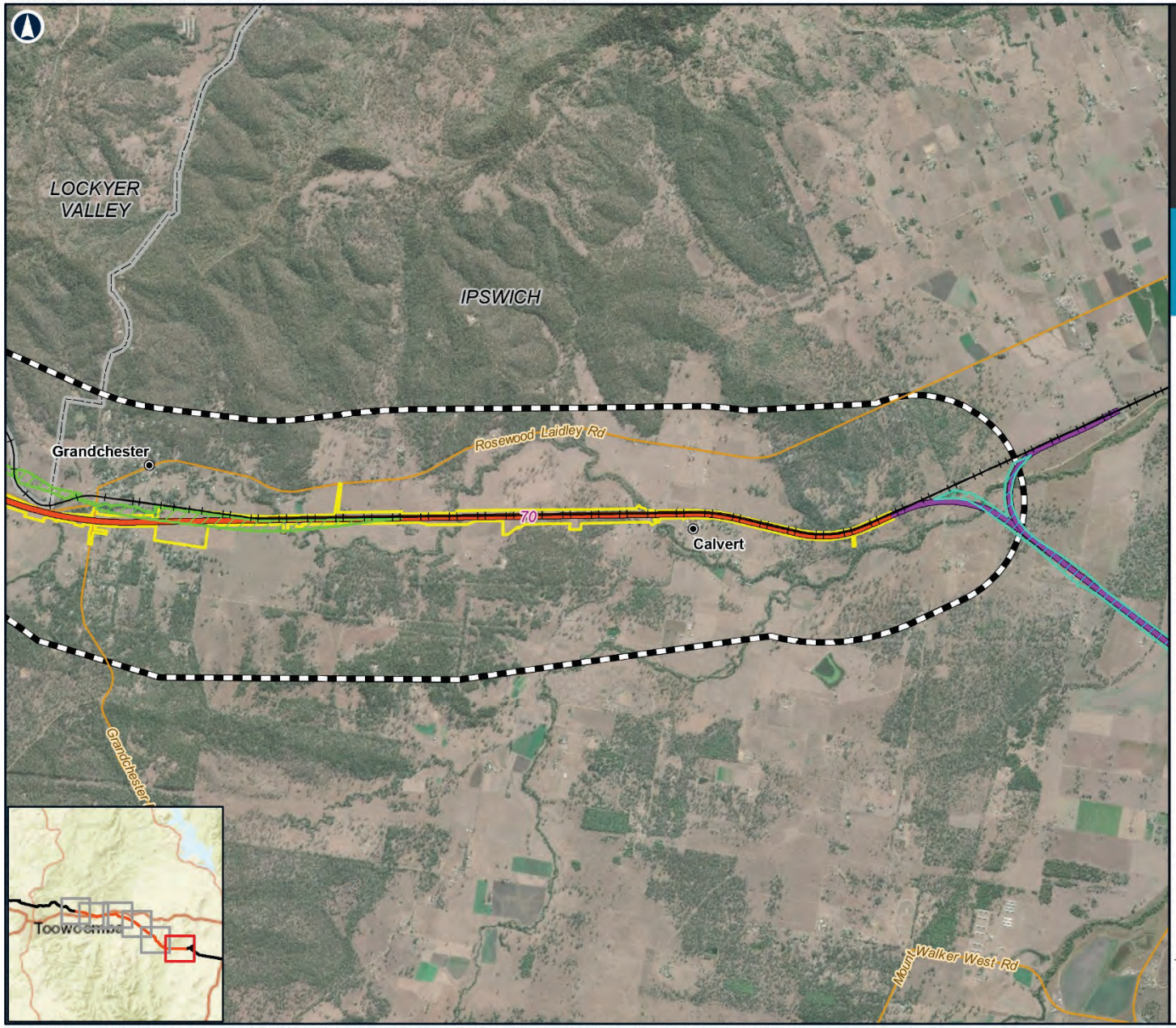
0 1 2 km

Coordinate System: GDA 1994 MGA Zone 56

Date: 24/04/2020 Paper: A4
Author: FFJV GIS Scale: 1:50,000
Data Sources: FFJV

Map by: CW / RB / DTH / GN / MF Z:\GIS\GIS_3300_H2C\Tasks\330-ITR-201907101026_95PC_Figures_and_Appendices\330-ITR-201907101026_Fig19.1_Alignment_DDv4.mxd Date: 24/04/2020 14:56

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.

HELIDON TO CALVERT

Figure 19.1f: Project rail alignment

LEGEND

- 5 Chainage (km)
- Localities
- Existing rail
- H2C project alignment
- C2K project alignment
- Major roads
- Minor roads
- EIS disturbance footprint
- EIS investigation corridor
- Local Government

QLD strategic rail corridor

- Gowrie to Grandchester future State transport corridor
- Southern Freight rail corridor

0 1 2 km

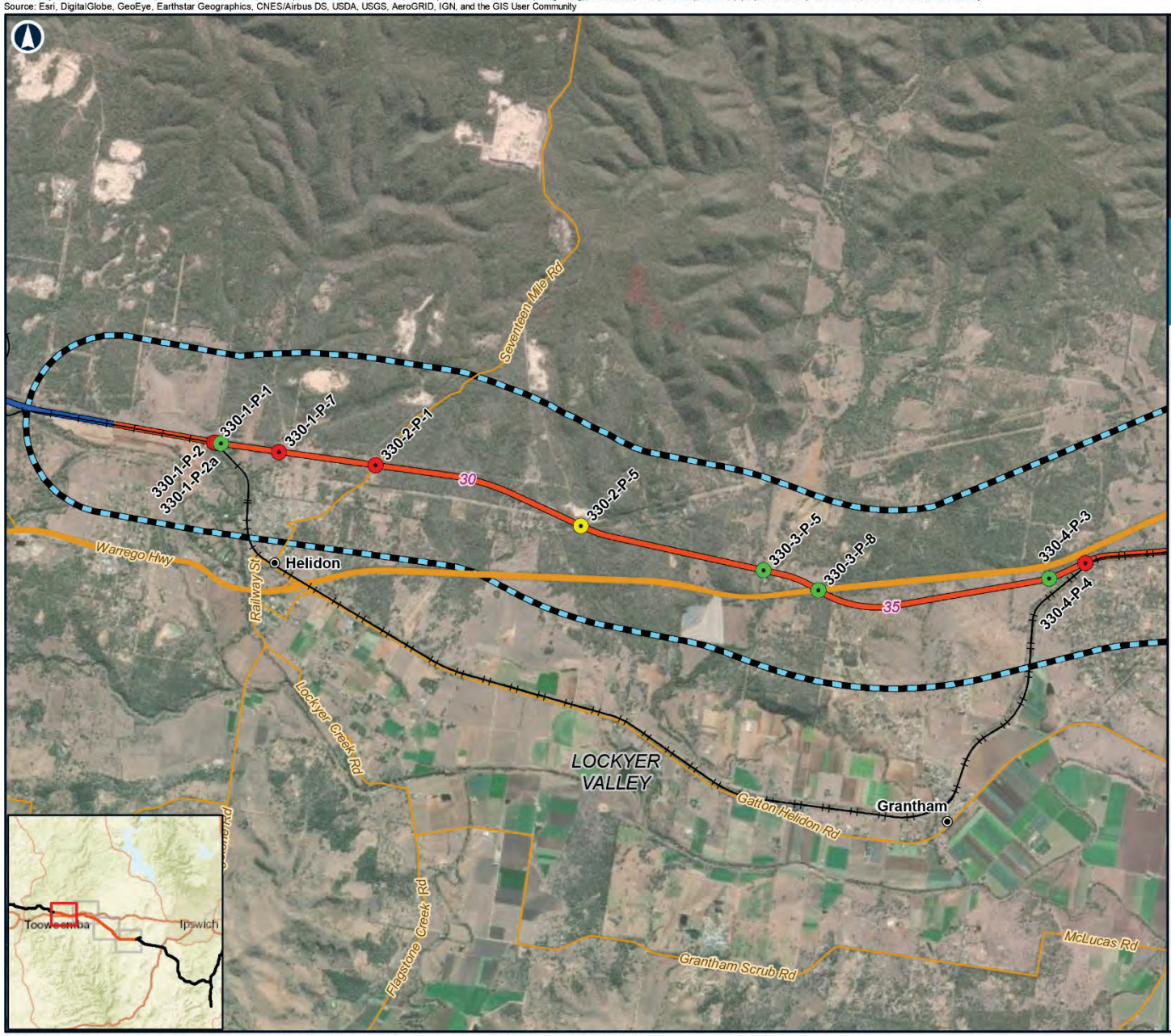
Coordinate System: GDA 1994 MGA Zone 56

Date: 24/04/2020
Author: FFJV GIS
Data Sources: FFJV

Paper: A4
Scale: 1:50,000

Map by: CW / RB / DTH / GN / MF Z:\GIS\GIS_3300_H2C\Tasks\330-ITR-201907101026_95PC_Figures_and_Appendices\330-ITR-201907101026_Fig19.1_Alignment_DDv4.mxd Date: 24/04/2020 14:56

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.

HELIDON TO CALVERT

Figure 19.2a:
Proposed public road-rail interface locations for the Project

LEGEND

Treatment

- Active Level Crossing
- At Grade Level Crossing
- Grade Separation
- No Crossing Provided
- 5 Chainage (km)
- Localities
- Existing rail
- G2H project alignment
- H2C project alignment
- Major roads
- Minor roads
- Transport study area
- Local Government Areas

0 1.5 3 km

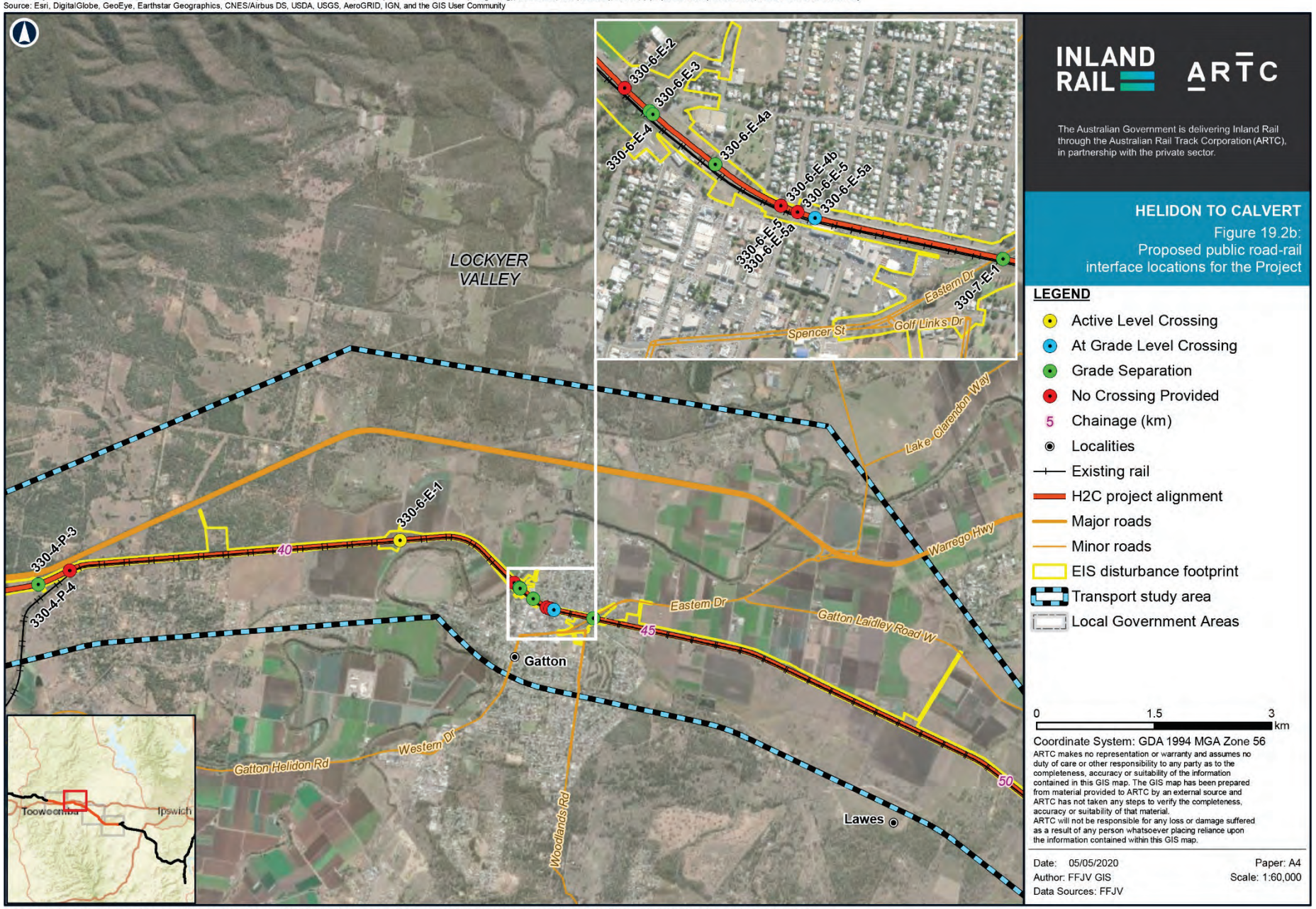
Coordinate System: GDA 1994 MGA Zone 56

Date: 05/05/2020
Author: FFJV GIS
Data Sources: FFJV

Paper: A4
Scale: 1:60,000

Map by: CW / RB / DTH / GN / FC Z:\GIS\GIS_3300_H2C\Tasks\330-ITR-201907101026_95PC_Figures_and_Appendices\330-ITR-201907101026_Fig19.2_ProposedRoadRailInterfaces_v2.mxd Date: 5/05/2020 10:19

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.

HELIDON TO CALVERT

Figure 19.2b:
Proposed public road-rail interface locations for the Project

LEGEND

- Active Level Crossing
- At Grade Level Crossing
- Grade Separation
- No Crossing Provided
- 5 Chainage (km)
- Localities
- Existing rail
- H2C project alignment
- Major roads
- Minor roads
- EIS disturbance footprint
- Transport study area
- Local Government Areas

0 1.5 3 km

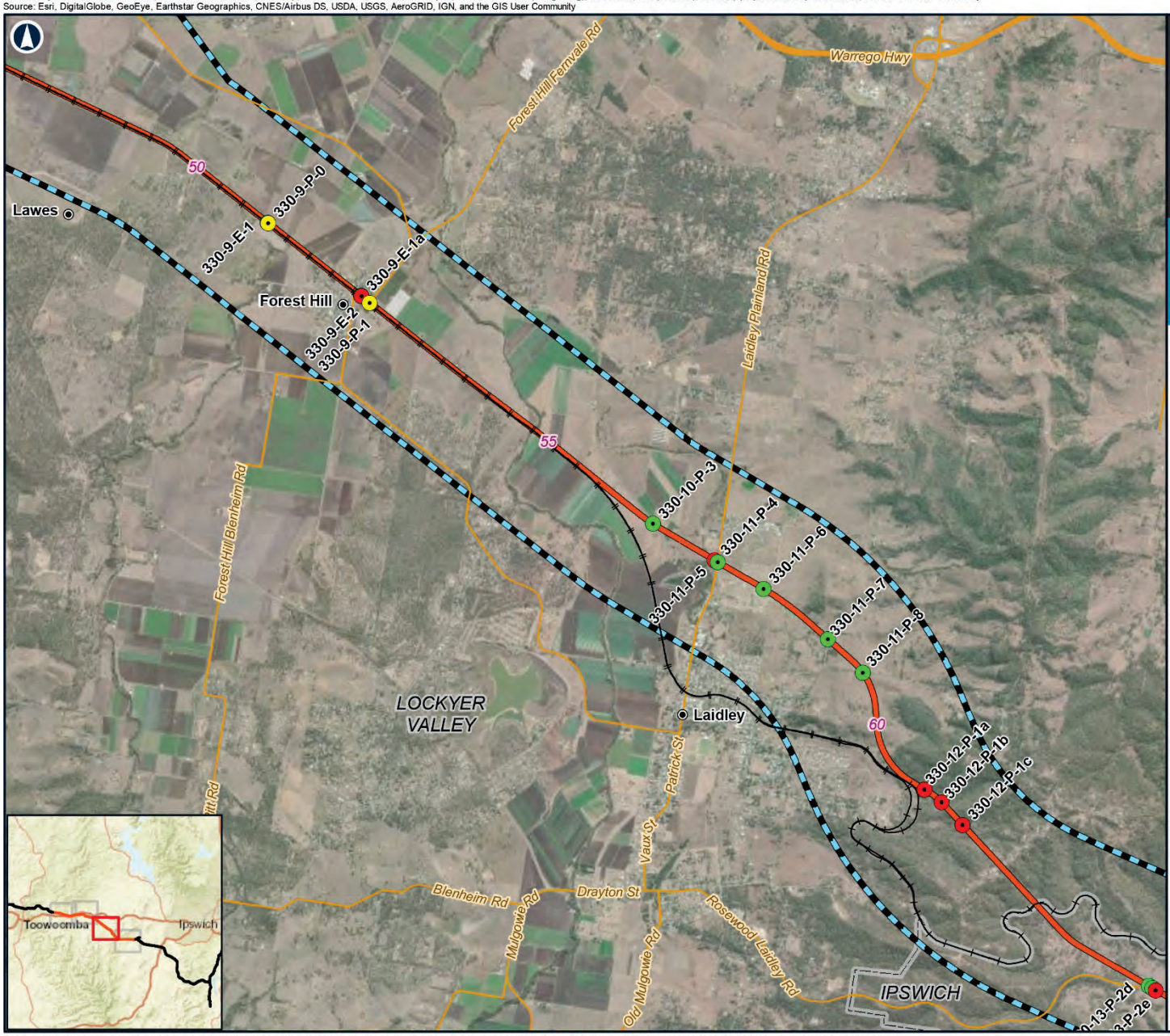
Coordinate System: GDA 1994 MGA Zone 56

Date: 05/05/2020
Author: FFJV GIS
Data Sources: FFJV

Paper: A4
Scale: 1:60,000

Map by: CW / RB / DTH / GN / FC Z:\GIS\GIS_3300_H2C\Tasks\330-ITR-201907101026_95PC_Figures_and_Appendices\330-ITR-201907101026_Fig19.2_ProposedRoadRailInterfaces_inset_v2.mxd Date: 5/05/2020 11:07

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.

HELIDON TO CALVERT

Figure 19.2c:
Proposed public road-rail interface locations for the Project

LEGEND

Treatment

- Active Level Crossing
- At Grade Level Crossing
- Grade Separation
- No Crossing Provided
- 5 Chainage (km)
- Localities
- Existing rail
- H2C project alignment
- Major roads
- Minor roads
- Transport study area
- Local Government Areas

0 1.5 3 km

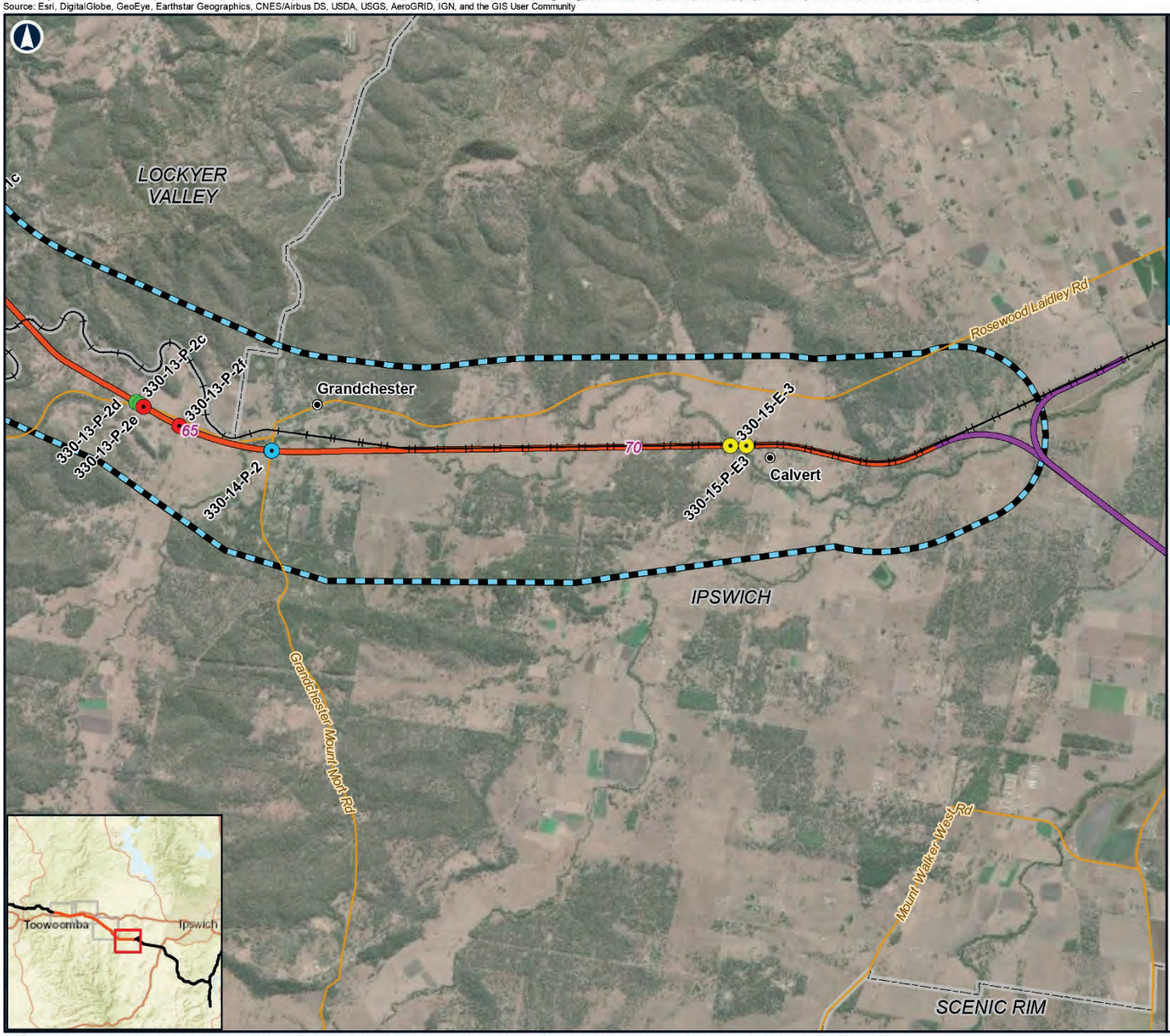
Coordinate System: GDA 1994 MGA Zone 56

Date: 05/05/2020
Author: FFJV GIS
Data Sources: FFJV

Paper: A4
Scale: 1:60,000

Map by: CW / RB / DTH / GN / FC Z:\GIS\GIS_3300_H2C\Tasks\330-ITR-201907101026_95PC_Figures_and_Appendices\330-ITR-201907101026_Fig19.2_ProposedRoadRailInterfaces_v2.mxd Date: 5/05/2020 10:19

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.

HELIDON TO CALVERT

Figure 19.2d:
Proposed public road-rail interface locations for the Project

LEGEND

Treatment

- Active Level Crossing
- At Grade Level Crossing
- Grade Separation
- No Crossing Provided
- 5 Chainage (km)
- Localities
- Existing rail
- H2C project alignment
- C2K project alignment
- Minor roads
- Transport study area
- Local Government Areas

0 1.5 3 km

Coordinate System: GDA 1994 MGA Zone 56

Date: 05/05/2020
Author: FFJV GIS
Data Sources: FFJV

Paper: A4
Scale: 1:60,000

Map by: CW / RB / DTH / GN / FC Z:\GIS\GIS_3300_H2C\Tasks\330-ITR-201907101026_95PC_Figures_and_Appendices\330-ITR-201907101026_Fig19.2_ProposedRoadRailInterfaces_v2.mxd Date: 5/05/2020 10:19

19.5.1 Existing land use

The existing land uses that occur along the Project alignment are shown in Chapter 8: Land use and tenure, with detailed land use maps provided.

Figures 8.4a–8.4i within Chapter 8: Land use and tenure shows that land use in proximity to the Project is predominantly grazing land, combined with other agricultural land uses including irrigated seasonal horticulture and cropping. Other land uses include residential, services, and other minimal use (consisting of areas of land that are largely unused, for example, residual native cover). The Project also traverses infrastructure, including highways, main roads, local roads, gas pipelines and other utilities. Of particular relevance to the traffic impact assessment is the Helidon Explosives Magazine Reserve located within the study area to the north-west of Helidon (shown in Figure 19.1a). The Helidon Explosives Magazine Reserve is a highly specialised land use with significant buffering requirements from incompatible land uses, with security risks associated with the queuing of vehicles transporting explosives.

The predominantly rural nature of these surrounding land uses indicates that the surrounding road network would generally consist of low traffic volumes, with potential seasonal variations during harvesting seasons. The Project alignment passes through residential and services areas through the towns of Gatton, Helidon, Forest Hill, Laidley and Grandchester. Traffic volumes on the surrounding network are likely higher through these areas.

19.5.2 Construction routes

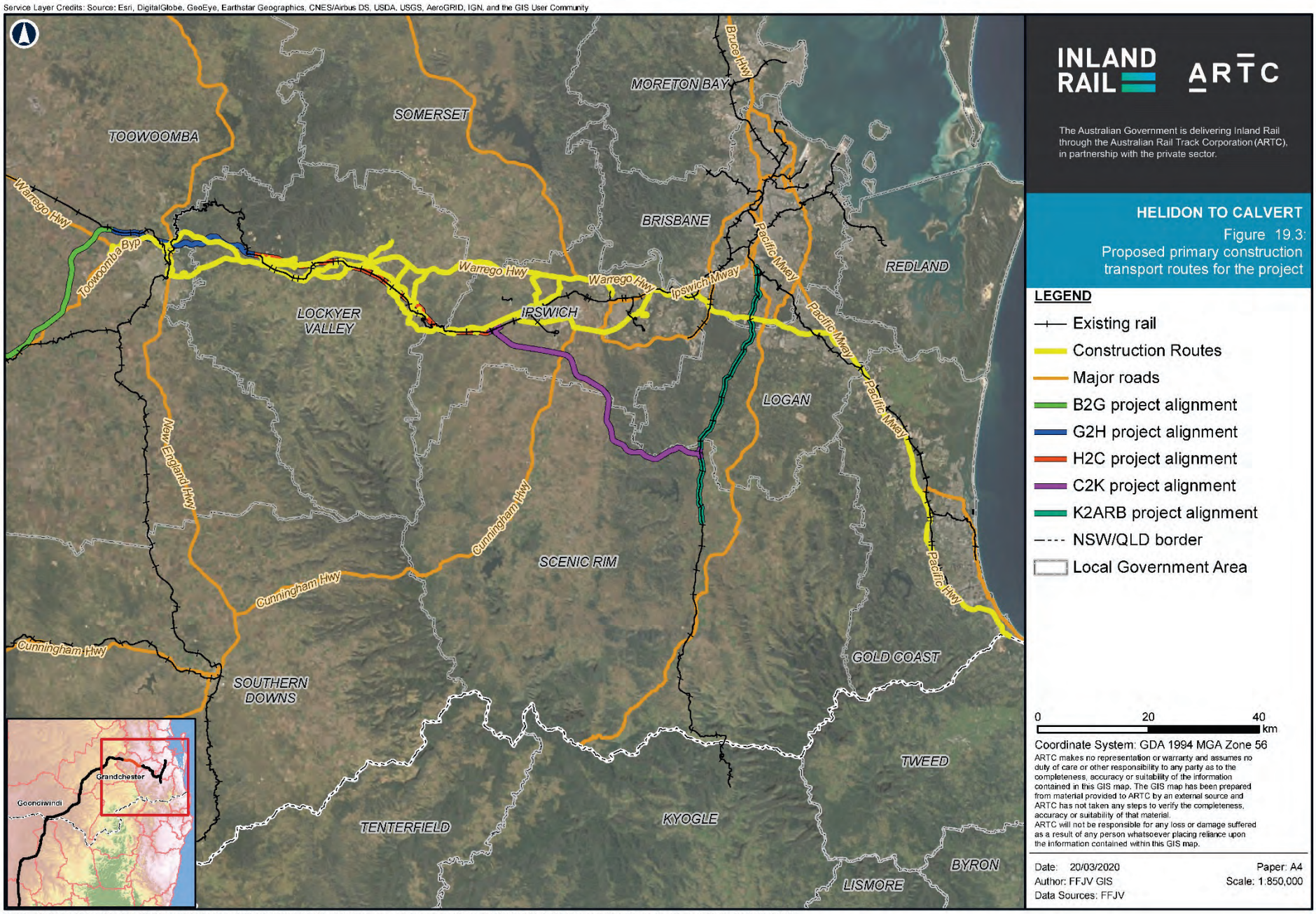
Primary transportation of materials, equipment and workforce for the construction of the Project will be via existing SCRs, local government roads and rail. Figure 19.3 illustrates the proposed primary construction transport routes that form part of the transport study area.

For the purpose of the traffic, transport and access impact 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.

The proposed primary construction routes are the transport routes the construction contractor may use. This chapter follows the construction methodology adopted for the Project constructability assessment whereby a supplier, local to the Project, has been assumed for all key materials.

However, the determination of the final construction and heavy vehicle (HV) routes will be subject to consultation between DTMR, the LGA and the construction contractor during the detailed design of the Project. This is consistent with Section 7.5 of the DTMR GTIA, which states that the TIA '*may be finalised when project contractors are appointed, and final traffic generation is clearer*'. Impacts associated with the construction of the Project are discussed in further detail in Section 19.9.2.

Further details on construction transport routes are included in Appendix U: Traffic Impact Assessment.


Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
TOOWOOMBA
SOMERSET
MORETON BAY
BRISBANE
REDLAND
LOCKYER VALLEY
IPSWICH
LOGAN
SCENIC RIM
GOLD COAST
SOUTHERN DOWNS
TENTERFIELD
KYOGLE
TWEED
BYRON
LISMORE
Warrego Hwy
Toowoomba Byp
Bruce Hwy
Pacific Mway
Ipswich Mway
New England Hwy
Cunningham Hwy
Pacific Hwy
Grandchester
Goondiwindi
INLAND RAIL
ARTC
The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.
HELIDON TO CALVERT
Figure 19.3:
Proposed primary construction transport routes for the project
LEGEND
Existing rail
Construction Routes
Major roads
B2G project alignment
G2H project alignment
H2C project alignment
C2K project alignment
K2ARB project alignment
NSW/QLD border
Local Government Area
0
20
40
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: 1:850,000
Data Sources: FFJV
Map by: CW / RB / DTH / GN/ IW Z:\GIS\GIS_3300_H2C\Tasks\330-ITR-201907101026_95PC_Figures_and_Appendices\330-ITR-201907101026_Fig19.4_ProposedConstTranspoRoutes_v5.mxd Date: 19/06/2020 11:48

19.5.2.1 Workforce

A preliminary estimate of the construction workforce required for the Project's construction works (based on the current program) is shown in Figure 19.4. Workforce onsite for the Project is estimated to peak at 410 full-time equivalent (FTE) between weeks 56 and 57. The average number of FTE workforce onsite per year is planned to be approximately 190 personnel.

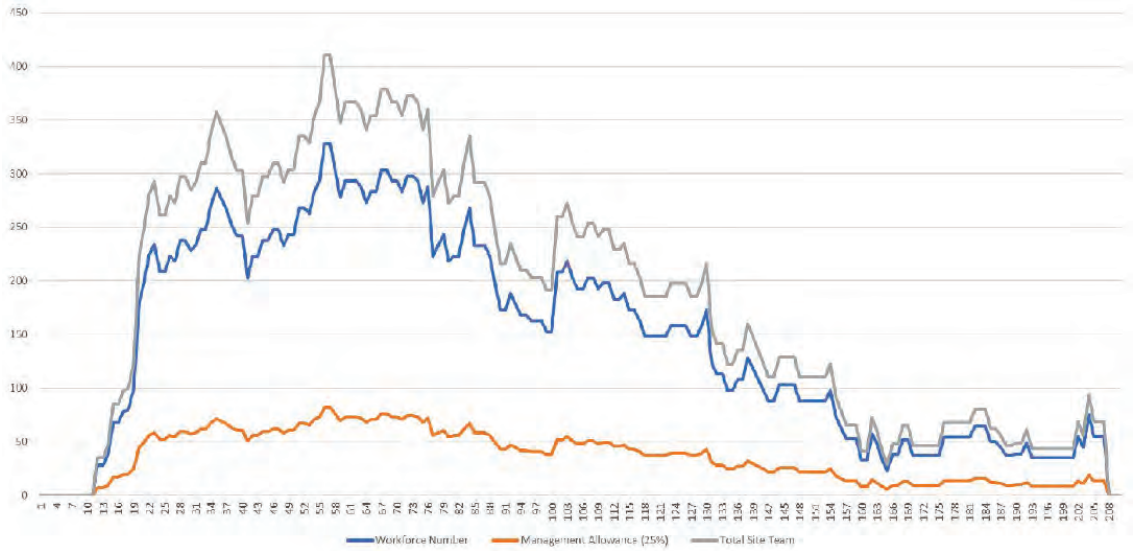


FIGURE 19.4: ESTIMATED PROJECT CONSTRUCTION SITE WORKFORCE

Given the close proximity of population centres (and available accommodation options), accommodation camps are not considered necessary for the Project.

19.5.2.2 Spoil disposal routes

The Project is anticipated to generate approximately 3,638,000 cubic metres (m^3) of cut material (other than rock) from tunnelling and rail works during construction. Approximately two-thirds of the excavated material will be reused within the Project as fill, leaving an excess of approximately 1,350,000 m^3 of spoil that will need to be managed.

A number of opportunities exist for the reuse of excess spoil. Table 19.3 provides the Project spoil management hierarchy and how spoil transport on the road network has been considered.

19.5.2.3 Pre-cast concrete routes

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

19.5.2.4 Quarry routes

Quarry routes for the Project alignment are currently based on existing operations located in Mount Marrow and Harlaxton. These are the closest quarries to the alignment that are expected to be able to provide the required ballast and capping. 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 using arterial roads and outside town centres (where possible).

TABLE 19.3: SPOIL MANAGEMENT HIERARCHY

Rank	Options	Example of options	Consideration in the Traffic, Transport and Access Chapter
1	Avoid and reduce spoil generation	Reduce the amount of spoil being generated through design and construction methodology	The quantity of spoil generated is proposed to be reduced by: ▸ Refining the horizontal and vertical design and alignments to minimise the quantity of offsite fill required ▸ Consideration of the shape and size of batters to encourage cut and fill balancing ▸ Completing an assessment of the availability, quality and volume of materials that are readily accessible and can be used within the Project ▸ Reuse topsoil where possible and identify ways to reuse materials normally considered unsuitable for use.
2	Reuse within the Project	Reuse in the Project to fill embankments for rail line and drainage Reuse of topsoil for rehabilitation onsite	Approximately 2,034,000 m^3 of cut material will be used as general fill and 255,000 m^3 as structural fill. The majority of the spoil is proposed to be reused as embankment fill and some for the rehabilitation of the disturbance footprint subject to being deemed suitable for reuse. Further details are in Chapter 21: Waste and resource management. It is proposed that the majority of this material be transported within the Project alignment along Rail Maintenance Access Road (RMAR). Some of this material is proposed to be transported via the external road network between Helidon and Grandchester.
3	Reuse on other development projects	Reuse as an embankment fill for other Inland Rail projects C2K and G2H or other development projects	Spoil excess of approximately 1,349,000 m^3 and will be transported via the road network from laydown areas along the alignment to final reuse locations.
4	Reuse for land restoration if above is not viable	Reuse for land reclamation or rehabilitation works for quarries	Not considered in the chapter.
5	Reuse for landfill management if reuse on other development project is not viable	Reuse as a daily cover for the landfills	Not considered in the chapter.
6	Treat	Treatment of any identified acid sulfate soils or contaminated soil or geotechnically unsuitable material to render it suitable for other applications	Not considered in the chapter.
7	Dispose offsite as construction waste	Disposal of excess spoil as waste at an approved facility, licensed to receive the material	Not considered in the chapter.

19.5.2.5 Ready-mix concrete routes

Two locations have been identified as potential concrete batch plant sites for the Project and are shown in Table 19.4. These locations are within the vicinity of the EIS investigation corridor. The tunnel portal west location is specifically to provide concrete products for tunnel construction and the potential site adjacent to the Warrego Highway provides good access to a central location of the alignment.

TABLE 19.4 : POTENTIAL CONCRETE BATCH PLANTS

ID	Adjoining road	Chainage	Description
H2C-LDN035.4	Warrego Highway	Ch 35.4 km	Good access to proposed site
H2C-LDN061.2	Dedicated access to tunnel site	Ch 61.2 km	Support tunnel construction works

For the purposes of this assessment, it has been assumed that existing concrete suppliers along the vicinity of the construction corridor will be used to provide the majority of ready-mix concrete. For the Project alignment, the closest existing concrete suppliers are in Toowoomba, Gatton and Laidley.

Concrete truck routes were based on the location of the concrete supplier and roads most likely to be used for the transportation of concrete. Distance and arterial routes (and out of town centres) have been assumed.

19.5.2.6 Consolidated sleeper routes

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 were then consolidated, where feasible, to minimise the number of roads potentially affected. This was achieved by selecting the same roads where possible in circumstances where the alternate route did not increase the route distance significantly.

19.5.2.7 Rail segment routes

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

19.5.2.8 Delivery of water

Water will be supplied to various points along the Project for activities including earthworks, trackwork and dust suppression.

19.5.2.9 Laydown areas

Laydown areas will be located approximately every 5 km (avoiding 1 per cent 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.

Several laydown areas have been highlighted through the alignment to support the following activities:

- Material laydown:
  - Situated next to the corridor to facilitate direct access to/from the laydown to the alignment
  - Laydown areas will act as a centralised point for material storage
  - Some laydowns will also consist of fuel storage areas and site office compounds
- Bridge laydown/work areas
  - Each bridge location along the alignment will have a dedicated laydown/work area
  - Larger areas have been provided for locations requiring the storage of additional materials
- Tunnel laydown/work areas.

19.5.3 Operational transport routes

Movement of the rail operation and maintenance workforce, and the transportation of maintenance materials, are expected to be the primary transport tasks during the operational stage of the Project. Maintenance vehicles will use the purpose build access tracks for inspections and work activities. It is expected that operational traffic will be irregular and only minor. No impacts to operational conditions of the surrounding road network are reasonably expected. Impacts associated with the operation of the Project are discussed in further detail in Section 19.9.3.

19.6 Methodology

Compliance assessment (quantitative) approach, as presented in Chapter 4: Assessment methodology was adopted to access potential traffic impacts and opportunities of the Project.

Desktop studies were undertaken to establish the baseline conditions for the transport infrastructure. The performance criteria outlined by the GTIA was used to evaluate expected traffic generation related to the construction and operation of the Project and assessing 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. As part of the desktop studies, the existing road, rail, port and airport 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. Project impacts will therefore be road and rail network-based.

A summary of the transport tasks by mode are presented in Table 19.5.

TABLE 19.5: SUMMARY OF TRANSPORT TASKS BY MODE

Project phase	Road	Rail	Port and airport	Active transport
Construction	Transport of construction material, plant and equipment. Impact of temporary road closures and realignments on surrounding road network and road–rail interface locations Impact of rail crossings on vehicle queues along SCRs and local council roads, and nearby intersections.	Transport of construction material (i.e. sleepers, rail and ballast)	No impact expected	No impact expected
Operation	Rail maintenance workforce movements	Operations and maintenance	No impact expected	No impact expected
	Impact of temporary 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 along State-controlled and local council roads, and impacts on nearby intersections			

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

Figure 19.5 outlines the methodology adopted to identify background and Project-related traffic volumes. This methodology focused on establishing a background 'without development' traffic scenario and comparing this to the scenario including the Project generated traffic, i.e. the 'with development' scenario.

The process allowed for 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, potential mitigation and management measures were developed (as necessary).

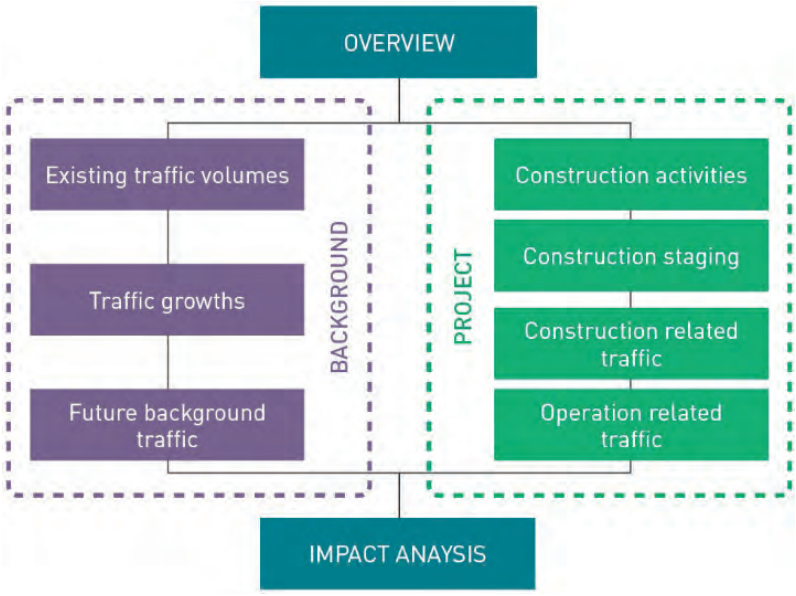


FIGURE 19.5: BACKGROUND AND PROJECT TRAFFIC VOLUMES

Key tasks for the traffic and transport assessment include:

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

19.6.1 Desktop review and data collection

Data and information inputs used to undertake the traffic and transport assessment included:

- Local government/State policies and strategies
- 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 reserves
- 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.

19.6.1.1 Background traffic volumes

The approach adopted to establish baseline conditions (obtaining background and Project traffic information) is outlined in this section. Further detail is in Appendix U: Traffic Impact Assessment.

- **Existing traffic volumes**

  Existing traffic volumes (link and intersections) were gathered from road controlling authorities. Traffic surveys were commissioned at key locations where traffic data was unavailable.

  Table 19.8 illustrates the approach used determine road segments where traffic surveys were required. The approach took into consideration the potential increase in traffic volumes due to the Project and the expected duration of construction works. 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* (1988) and relevant stakeholder consultation.

- **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 expected to be impacted by the Project. Evaluation of the traffic growth rates indicated an AADT growth rate of 2 per cent. This value was adopted in the analysis. In the absence of data to determine traffic growth rates, an AADT growth rate of 2 per cent was assumed (for SCRs and local government roads).

- **Future background traffic**

  Traffic growth rates were applied to existing traffic volumes to estimate future background traffic. Redistributed future background traffic from permanent Project road closures was accounted for by means of manual reassignment of traffic demands on reasonably assumed diversions.

19.6.1.2 Project traffic

Construction works

Traffic-intensive construction works include: delivery of quarry materials (ballast, capping materials, pre-cast concrete, ready-mix concrete, rail, consolidated sleepers, earthworks materials) and workforce. Additional ancillary movements will also be required for delivery of water, transportation/collection of plant, tools and other materials.

At this stage, no oversize vehicles are anticipated to be used for construction works. However, if the need arises for an oversize vehicle movement (excess mass or over-dimensional loads) or restricted access vehicle movements, DTMR and other relevant authorities will be notified, and permission will be obtained as required under the *Transport Operations (Road Use Management) Act 1995* (Qld).

The total trips by construction activity and year of construction for the Project have been summarised in Table 19.6.

TABLE 19.6: TOTAL TWO-WAY TRIPS BY ACTIVITY PER YEAR

Material	2021	2022	2023	2024	2025
Workers/plants and tool delivery	0	69,714	69,714	69,714	63,904
In-situ concrete	0	882	5,447	4,279	17
Pre-cast concrete	0	155	820	366	13
Quarry	0	0	16,422	17,399	7,954
Spoil	0	32,886	23,981	0	0
Sleepers	0	0	0	0	1,171
Water	0	12,204	14,039	3,587	1,227
Cut-to-fill	0	15,979	13,502	0	0

Table 19.7 provides the Austroads vehicle types by construction activity that have been adopted for the assessment.

TABLE 19.7: VEHICLES TYPES BY CONSTRUCTION ACTIVITY

Construction activity	Austroads vehicle class	
In-situ concrete	Class 4 3-axle rigid truck (22.5 tonne)	
Water	Class 4 3-axle rigid truck (22.5 tonne)	
Rail	Class 9 6-axle semitrailer (42.5 tonne)	
Sleepers	Class 9 6-axle semitrailer (42.5 tonne)	
Pre-cast concrete	Class 9 6-axle semitrailer (42.5 tonne)	
Quarry	Class 10 7-axle B-Double (55.5 tonne)	
Tunnel spoil	Class 10 7-axle B-Double (55.5 tonne)	
Spoil	Class 10 7-axle B-Double (55.5 tonne)	

Source: Guide to Traffic Impact Assessment (DTMR, 2018)

Construction staging

Staging relates to construction start and end dates of all construction-related activities within the envisaged construction period. Following detailed design, and subject to required post-EIS activities, it is anticipated that the construction phase will commence in 2021. With commencement in 2021, operations are expected to begin in 2026. The commencement of construction of the Project will also be subject to successful procurement of contractor. The start and end dates of construction were considered to determine the peak period for construction works for the Project.

Access and egress

Construction vehicle access would be via the existing road network and proposed access tracks. These access points will be chosen to provide adequate sight distance and a safe access/egress path. Further investigation of access locations will be undertaken during detailed design once the construction methodology is known. In particular, the proposed access points off the Warrego Highway will be investigated in further detail and approved by DTMR prior to the construction phase.

All construction access points will be designed in accordance with Australian Standards to ensure they operate in a safe and efficient manner. Where possible, access will be provided from secondary roads to minimise potential disruption to the nearby arterial road network.

Where the proposed rail line is in close proximity to arterial roads with limited alternative access routes, specific traffic management will be put in place reflecting prevailing conditions. Where possible, access will be along the rail corridor from a nearby secondary road. Encroachment of construction works into existing road reserves will be avoided.

A RMAR is required for maintenance of critical infrastructure (e.g. turnouts), and to provide access for emergency recovery. Formation level access has been proposed for all turnout locations, and, where reasonably practical, for the full extent of crossing loops. Operational maintenance activities will use the existing road network to travel to the rail corridor.

Once in the rail corridor, the RMAR incorporated into the design of the Project will be used in preference to the existing road network for project maintenance activities.

Construction-related traffic

The number of trips generated by each construction activity was estimated for light vehicles and heavy trips based on expected workforce movements, material quantities and indicative construction schedules. The traffic loads/trips were assigned to the corresponding transport route for each construction activity. This allowed peak construction traffic to be estimated for each construction route and for separate road sections.

Further details on the construction relate traffic generation, distribution and assignment is in Appendix U: Traffic Impact Assessment.

Operational traffic

Rail operations and maintenance workforce movements, and the delivery of materials, are expected to be the key transport tasks during Project operation. It is anticipated that operational traffic will be insignificant due to low maintenance van movements to/from depots, and transportation of maintenance material within the rail corridor.

Seasonal variation

Based on agricultural land uses of the transport study area, traffic volumes on the road network are likely to vary seasonally, with increases during harvesting season. During harvesting season, heavy vehicles usage on the local and State roads would be expected to increase as trucks transport produce and farm equipment (tractors and harvesters) move between properties. Farming machinery is generally much larger and slower than other vehicles using the roads and would be expected to result in localised delays.

Cumulative impacts

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

Further detail is in Chapter 22: Cumulative impacts and Appendix U: Traffic Impact Assessment.

Traffic data

To identify additional information requirements (Project-specific traffic surveys), a gap analysis of received data and available information was undertaken. The approach used to determine if traffic surveys are required included:

- Assign road details to each road segment within the transport study area (number of lanes, posted speed limit, road surface)
- Identify the duration each road segment will be used for construction transport. Durations were estimated with nominated assumed periods (i.e. short: <6 months; moderate 6–12 months; long: >12 months).
- The selection criteria adopted for selection for traffic survey locations is in Table 19.8.

TABLE 19.8: 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 (where the data was suitable for the EIS) did not require traffic surveys. The methodology used to select intersections for traffic surveys included:

- Undertake a 5 per cent comparison analysis for road segments to:
  - identify where the Project traffic may equal, 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, traffic surveys were undertaken based on the selection criteria presented in Table 19.8.
- Road links envisaged to be impacted by construction routes, and did not have current baseline traffic information, adopting the following process:
  - Road segments classification and flow rates were based on:
    - Urban Local Road: Volumes derived by assuming Level of Service (LOS) A with associated AADT of 2000 vehicles (consistent with Austroads requirements)
    - Urban Collector Road: Volumes derived by assuming LOS B with associated AADT of 3800 vehicles (consistent with Austroads requirements)
    - Urban Arterial Road: Volumes derived by assuming LOS B with K-value of 0.12 associated AADT of 2000 vehicles (consistent with Austroads requirements)
    - 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 (consistent with Austroads requirements)
    - Rural Arterial Road: Volumes derived by assuming LOS A with K-value of 0.15 with associated AADT of 1600 vehicles (consistent with Austroads requirements)
  - Peak hour flow rates were converted to average daily traffic volumes
  - A 5 per cent comparison analysis to identify road segments where peak period Project traffic exceeds the background traffic by 5 per cent or greater. Compile a table to summarise the outcomes of the 5 per cent comparison: 0–5 per cent (low increase); 5–10 per cent (moderate increase); > 10 per cent (high increase).

19.6.2 Traffic impact assessment

The operational performance of the road network has been assessed to develop an understanding on the potential traffic impacts from the Project. The process is shown as Figure 19.6 and is consistent with the DTMR GTIA. The process was applied to both the SCR and the local government road network. The process does not apply to private roads.

The adopted transport study area provides suitable boundaries to assess a reasonable extent of potential Project impact—on both existing users and infrastructure as well as network intersections and links.

The GTIA approach for determining impact types is in Table 19.9.

TABLE 19.9: EXTENT OF TRANSPORT STUDY AREA BY IMPACT TYPE

Impact type	Transport study area
Road safety	All intersections where the Project 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 Project 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 access/lay down areas on limited access roads in the DTMR networks.
Intersection delay	All intersections where the Project 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 Project 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 Project 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 Project 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).

Source: Guide to Traffic Impact Assessment (DTMR, 2018)

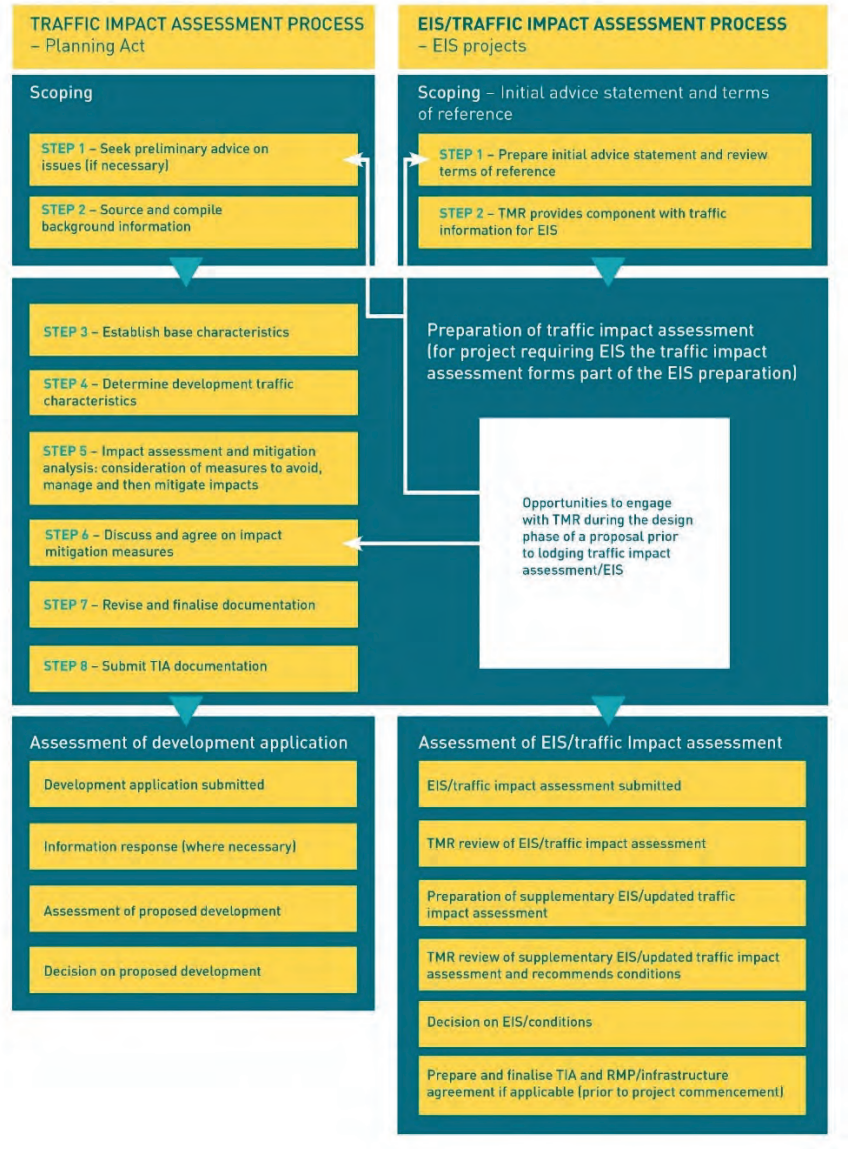


FIGURE 19.6: TRAFFIC IMPACT ASSESSMENT PROCESS

Source: Guide to Traffic Impact Assessment (DTMR, 2018)

The performance criteria for assessment of traffic and transport impact is outlined in Table 19.10. The LOS criteria is as defined in the *Austroads Guide to Traffic Management: Part 3 Traffic Studies and Analysis Methods* (Austroads, 2017a).

TABLE 19.10: PERFORMANCE CRITERIA

Assessment type	Performance criteria
Traffic impact assessment	Construction and operational traffic generated by the Project 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 Project equals or exceeds 5 per cent of the existing SARs on the road section.

Source: Austroads, 2017a

The impact assessment year is the year at which the impacts of the development are assessed, which vary given the effects of development are often different to both infrastructure and users. The impact assessment years were adopted from the GTIA and are summarised in Table 19.11.

TABLE 19.11: IMPACT ASSESSMENT YEARS

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

Source: *Guide to Traffic Impact Assessment* (DTMR, 2017a)

The impact assessment and mitigation process outlined in the *Guideline to Traffic Impact Assessment* was adopted to determine appropriate mitigation measures on potential road impacts. The mitigation framework is in Figure 19.7.

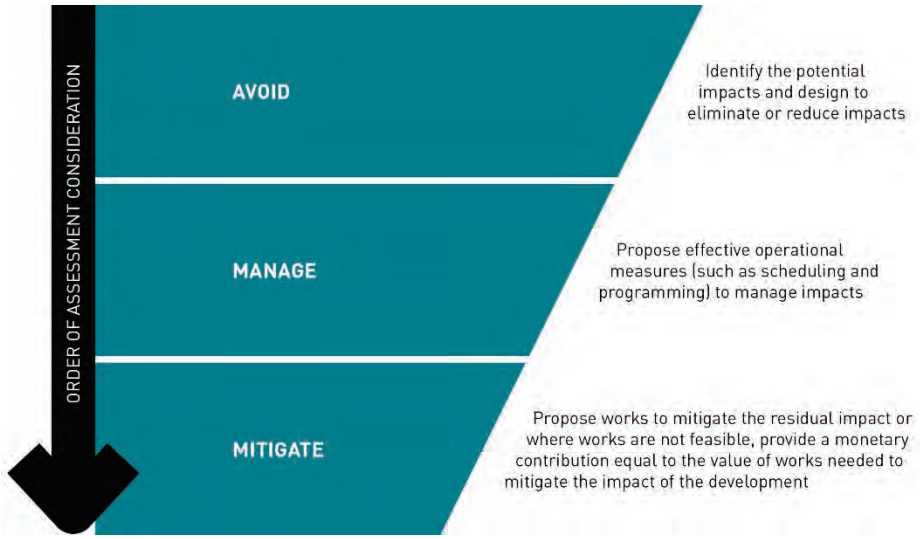


FIGURE 19.7: MITIGATION FRAMEWORK

Source: Guide to Traffic Impact Assessment (DTMR, 2017a)

19.6.3 Rail crossing impact assessment

Level crossings can introduce risk as they represent 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 extreme cases, death.

The rail crossing impact assessment focuses 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. There are currently 14 road–rail interfaces within the transport study area (construction)—with a total of seven active level crossings proposed for the Project (operations) proposed.

A safety-based risk assessment was undertaken for all 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, with measures informed by key actions and areas of focus of the *Queensland Level Crossing Safety Strategy (2012–2021)* (DTMR, 2012).

Mitigation measures have been developed with the objective of minimising risks So Far As Is Reasonably Practicable (SFAIRP). This included the application of ALCAM. In addition, threshold and ALCAM assessment will be undertaken by ARTC prior to construction to determine the appropriate protection type for the proposed crossings.

19.6.4 Rail network impact assessment

For brownfield sections proposed to be constructed within the existing West Moreton Rail system corridor, it is expected this can be undertaken with minimal impact to existing operations. Connections and tie-ins to the existing rail network will be undertaken (where possible) during possessions planned for routine maintenance periods.

The operational performance of the existing rail network in therefore not expected to be significantly impacted from Project construction works.

19.6.5 Ports and airports (other modes and intermodal terminals)

The transport of materials, workforce and equipment will primarily use road and rail transport networks.

While Inland Rail proposes to use the existing freight line from Acacia Ridge to the Port of Brisbane, the Helidon to Calvert project is located over 60 km from the Port. As the Project is not located within close proximity, impacts on the safety or efficient operation of any strategic ports.

The Project is not located within close proximity to strategic airports or aviation facilities. The closest facility is the Royal Australian Air Force (RAAF) Base Amberley, more than 14 km to the east of the Project.

The projected impact from the development on ports and airports is not considered to be significant during construction and operation. For this reason, it is not included in the traffic, transport and access assessment.

19.6.6 Stakeholder consultation

Consultation with potentially impacted stakeholders were held throughout the traffic, transport and access assessment. The stakeholder engagement process included correspondence and meetings that addressed: proposed assessment process; potentially impacted assets; adopted manuals and procedures; assumptions (such as traffic growth rates, assumed base volumes); and proposed mitigation measures. Key stakeholders consulted included:

- DTMR
- Roads and Maritime Services (NSW)
- ICC
- LVRC
- Toowoomba Regional Council (TRC)
- QR
- Queensland Emergency Services
- Local education facilities. 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 Appendix C: Consultation Report, as well as Project-specific alternatives and optioneering described in Chapter 2: Project rationale.

19.7 Description of the existing transport conditions

19.7.1 Existing rail facilities

The preferred alignment is generally consistent with the alignment of the Gowrie to Grandchester future State transport corridor protected under the TPC Act.

19.7.1.1 Existing road–rail interfaces

There are currently 14 existing operational level rail crossings within the transport study area that would be impacted. Table 19.12 outlines the existing road–rail interfaces along the proposed rail corridor, together with the proposed treatments.

TABLE 19.12: EXISTING ROAD–RAIL INTERFACES (PUBLIC FORMED ROADS ONLY)

Interface ID	Road name	Proposed treatment
Department of Transport and Main Roads		
330-7-E-1	Eastern Drive	Grade separation—road over
330-9-E-2	Hunt Street	No road crossing provided—relocated to Glenore Grove Road
Lockyer Valley Regional Council		
330-6-E-1	Jamiesons Road	Active level crossing
330-6-E-2	Burgess Road	No crossing provided—consolidate
330-6-E-3	Off Beavan Street	Grade separation—rail over
330-6-E-4	Old College Road	Grade separation—rail over
330-6-E-4a	Pedestrian interface	Grade separation—pedestrian over (Gatton Station)
330-6-E-4b	Pedestrian interface	No crossing provided—consolidate (Gaul Street)
330-6-E-5	Gaul Street	No road crossing provided—consolidate
330-6-E-5a	Pedestrian Interface	At-grade pedestrian level crossing active control (Gaul Street)
330-9-E-1	Dodt Road	Active level crossing
330-9-E-1a	Pedestrian Interface	At-grade level crossing active control (Hunt Street)
Ipswich City Council		
330-15-E-3	Neumann Road	Active level crossing
330-15-E-4	Calvert Station Road	Active level crossing

19.7.2 Road network

Several SCRs and local government roads are encompassed in the transport study area that serve as main transport routes for the Project. Roads that are expected to be used as construction routes were classified in accordance with Austroads requirements. 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 will be used by the operational traffic but will account for low-volume traffic with no impact on existing operations.

19.7.2.1 State-controlled roads

Five SCRs have been identified that interface with the transport study area. These roads are summarised in Table 19.13.

TABLE 19.13: STATE-CONTROLLED ROADS INTERSECTING THE PROJECT RAIL CORRIDOR

Interface ID	Road name
State controlled roads: Department of Transport and Main Roads	
330-3-P-8	Warrego Highway
330-7-E-1	Eastern Drive
330-9-E-2/330-9-P-1	Hunt Street and Glenore Grove Road
330-11-P-5	Laidley Plainland Road
330-13-P-2d	Rosewood Laidley Road

SCRs proposed to be used as the primary routes for the transport construction materials, equipment and workforce during construction of the Project are included in Table 19.14 and shown in Figure 19.1.

TABLE 19.14: STATE-CONTROLLED ROADS: PROJECT PRIMARY CONSTRUCTION ROUTES

Road name	Road ID—potential road section
State controlled roads: Department of Transport and Main Roads	
Cunningham Highway	17B—between River Road 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 Ipswich Rosewood Road
Forest Hill Fernvale Road	412—between Gatton Laidley Road and Warrego Highway
Gatton Esk Road	4144—between Warrego Highway and Lake Clarendon Way
Gatton Helidon Road	314—between William Street and Gatton Clifton Road
	314—between Gatton Clifton Road and Railway Street
	314—between Railway Street and Hickey Street
	314—between Hickey Street and Gatton Laidley Road W
	314—between Gatton Laidley Road W and Warrego Highway
	314—between Warrego Highway and William Street
Gatton Laidley Road	312—between Laidley Plainland Road and Whiteway Road
	312—between Whiteway Road and Railway Street
	312—between Railway Street and Hall Road
	312—between Hall Road and Forest Hill Fernvale Road
Gatton Laidley Road West	312—between Forest Hill Fernvale Road and Gatton Helidon Road
Haigslea Amberley Road	3041—between Karrabin Rosewood and Warrego Highway
Ipswich Motorway	17A—between Cunningham Highway and Logan Motorway
Ipswich Rosewood Road	304—between Cunningham Highway and Haigslea Amberley Road
	304—between Haigslea Amberley Road and Rosewood Warrill View Road
	304—between Rosewood Warrill View Road and Karrabin Rosewood Road
Karrabin Rosewood Road	3002—between Rosewood Marburg Road and Haigslea Amberley Road
Laidley Plainland Road	311—between Warrego Highway and Old Laidley Forest Hill Road
	311—between Old Laidley Forest Hill Road and Railway Street
	311—between Railway Street and Whites Road
Logan Motorway (managed by Transurban)	Between Ipswich Motorway and Pacific Motorway
New England Highway	22A—between Griffiths Street and Munro Street
	22A—between North Street and James Street
Pacific Motorway	Between Logan Motorway and NSW/QLD Border

Road name	Road ID—potential road section
Pine Mountain Road	302—between Warrego Highway and Lowry Street
River Road	309—between Warrego Highway and Cunningham Highway
Rosewood Laidley Road	308—between Whites Road and Mulgowie Road
	308—between Mulgowie Road and Crown Street
	308—between Crown Street and Rosewood Marburg Road
Toowoomba Second Range Crossing (Warrego Highway, managed by Nexus)	Between Toowoomba Connection Road and New England Highway
	Between New England Highway and Toowoomba Connection Road
Toowoomba Connection Road (formerly Warrego Highway)	315—between Toowoomba Second Range Crossing and O'Mara's Road
	315—between Toowoomba Athol Road and New England Highway
	315—between New England Highway and James Street
	315—between James Street and Tourist Road
	315—between Tourist Road and Roches Road
	315—between Roches Road and Murphys Creek Road
	315—between Murphys Creek Road and Toowoomba Second Range Crossing
Warrego Highway	18A—between Toowoomba Second Range Crossing and Gatton Helidon Road
	18A—between Gatton Helidon Road and Gatton Esk Road
	18A—between Gatton Esk Road and Laidley Plainland Road
	18A—between Laidley Plainland Road and Haigslea Amberley Road
	18A—between Haigslea Amberley Road and Brisbane Valley Highway
	18A—between Brisbane Valley Highway and Mount Crosby Road
	18A—between Mount Crosby Road and Cunningham Highway

19.7.2.2 Local government roads

There are several local government roads have been identified that directly intersect the proposed rail corridor. These roads fall within the jurisdiction of the two LGAs of LVRC and ICC. A summary of existing local government roads intersection the proposed Project rail corridor are in Table 19.15.

TABLE 19.15: LOCAL GOVERNMENT ROADS: INTERSECTING PROJECT RAIL CORRIDOR

Interface ID	Road name
Lockyer Valley Regional Council	
330-1-P-1	Airforce Road
330-1-P-2	Warrigal Road
330-1-P-2a	Airforce Road
330-1-P-7	Wrights Road
330-2-P-1	Seventeen Mile Road
330-2-P-5	Connors Road
330-3-P-5	Sandy Creek Road
330-4-P-3	Philps Road
330-4-P-4	Brooks Road
330-6-E-1	Jamiesons Road
330-6-E-2	Burgess Road
330-6-E-3	Off Beavan Street
330-6-E-4	Old College Road
330-6-E-4a	Pedestrian Interface
330-6-E-4b	Pedestrian Interface
330-6-E-5	Gaul Street
330-6-E-5a	Pedestrian Interface
330-9-P-0	Pedestrian Interface
330-9-E-1	Dodt Road
330-9-E-1a	Pedestrian Interface
330-10-P-3	Old Laidley Forest Hill Road
330-11-P-4	Old Laidley Forest Hill Road
330-11-P-6	Francis Road
330-11-P-7	Luck Road
330-11-P-8	Paroz Road
330-11-P-9	Unnamed Road
330-12-P-1a	Railway Street
330-12-P-1b	Kessling Drive
330-12-P-1c	Kessling Drive
Ipswich City Council	
330-13-P-2c	Unnamed Road
330-13-P-2f	Doonans Road
330-14-P-2	Grand Chester Mount Mort Road
330-14-P-2a	Pedestrian Interface
330-15-E-3	Neumann Road
330-15-E-4	Calvert Station Road

There are a number of local government roads that are proposed to be used to transport construction materials, equipment and workforce during construction of the Project. Key local roads expected to be used for Project construction routes are in Table 19.16. These fall within the jurisdiction of the three LGAs of ICC, LVRC and TRC.

TABLE 19.16: LOCAL GOVERNMENT ROADS: PROJECT CONSTRUCTION ROUTES

Road name	Potential road section
Ipswich City Council	
Calvert Station Road	Between Rosewood Laidley Road and Gipps Street
Fairbank Place	Full extent
Grandchester Mount Mort Road	Between Rosewood Laidley Road and School Road
Haigslea Malabar Road	Between Warrego Highway and Mount Marrow Quarry Road
Hiddenvale Road	Between Gipps Street and Neumann Road
Mount Marrow Quarry Road	Between Haigslea Malabar Road and Mount Marrow Quarry
	Between Thagoona Haigslea Road and Mount Marrow Quarry
Neumann Road	Full extent
Newhill Drive	Full extent
Noblevale Way	Full extent
Rafters Road	Between School Road and Railway Line
Redbank Plains Road	Between Cunningham Highway and Newhill Drive
Rob Roy Way	Full extent
School Road	Between Grandchester Mount Mort Road and Rafters Road
Thagoona Haigslea Road	Between Karrabin Rosewood Road and Schumanns Road
	Between Schumanns Road and Mount Marrow Quarry Road
Lockyer Valley Regional Council	
Airforce Road	Between Airforce Road and Railway Line
Arthur Street	Between Bowen Street and Station Street
	Between Station Street and Mary McKillop Street
	Between Mary McKillop Street and Georges Street
Boundary Road	Between Laidley Plainland Road and Francis Road
Bowtells Road	Full extent
Boxmoor Street	Between Victor Street and Philps Road
Burgess Road	Between Old Toowoomba Road and Smithfield Road
Connors Road	Between Seventeen Mile Road and Sandy Creek Road
	Between Airforce Road and Wrights Road
Crescent Street	Between William Street and East Street
Crown Street	Full extent
George Street	Between Seventeen Mile Road and Arthur Street
	Between Arthur Street and Lawlers Road
Hall Road	Full extent
Hickey Street	Between Old College Road and Buaraba Street
Laidley Street	Between Station Street and Seventeen Mile Road
	Between Seventeen Mile Road and George Street
Lake Clarendon Way	Between Gatton Esk Road and Main Green Swamp Road
Lawlers Road	Between Victor Street and George Street
	Between George Street and Warrego Highway

Road name	Potential road section
Main Green Swamp Road	Between Lake Clarendon Way and Lake Clarendon
Mary McKillop Street	Between Turner Street and Arthur Street
Old College Road	Between East Street and Gatton Laidley Road
Old Laidley Forest Hill Road	Between Forest Hill Fernvale and Laidley Plainland
Old Toowoomba Road	Between Gatton Helidon Road and Burgess Road
Paroz Road	Between Summer Street and 200 East of Summer Street
Philipps Road	Between Boxmoor Street and Warrego Highway
Outer Ring Road Extension (new road)	Between Gatton Laidley Road West and Railway Line
Railway Road	Between Gatton Laidley Road and Greyfriars Road
Railway Street	Between Kessling Drive and Summer Street
	Between Summer Street and Laidley Plainland Road
Saleyard Road	Between Tenthill Creek Road and Warrego Highway
Sandy Creek Road	Between Connors Road and Warrego Highway
	Between Warrego Highway and Bowtells Road
Seventeen Mile Road	Between Airforce Road and Laidley Street
Station Street	Between Arthur Street and Laidley Street
Summer Street	Between Paroz Street and Railway Street
Tenthill Creek Road	Between Warrego Highway and Saleyard Road
Turner Street	Between Warrego Highway and Mary McKillop Street
Victor Street	Between William Street and Boxmoor Street
Western Drive	Between Warrego Highway and Tenthill Creek Road
William Street	Between Hickey Street and Cochrane Street
	Between Bowen Street and Laidley Street
	Between Gatton Helidon Street and Victor Street
Wrights Road	Between Connors Road and Andersons Road
Toowoomba Regional Council	
Dent Street	Between Margaret Street and Herries Street
Griffiths Street	Between Mort Street and New England Highway
Herries Street	Between Dent Street and Water Street North
Larcombe Street	Between North Street and Railway Line
Mort Street	Between Hermitage Road and North Street
Munro Street	Between New England Highway and Harlaxton Quarry
North Street	Between Mort Street and New England Highway
O'Mara's Road	Between Toowoomba Connection Road and Witmack Road
Water Street North	Between Herries Street and Toowoomba Connection Road
Witmack Road	Between O'Mara's Road and Witmack Industry Park

19.7.3 Public transport networks

The existing public transport routes within Queensland that are likely to be impacted by construction traffic and/or proposed and existing road–rail crossings have been identified. Routes (sourced from TransLink) that may be impacted are in Table 19.17.

Any services that are not expected to be impacted by the construction or operation of the Project are not included in the summary below.

TABLE 19.17: IMPACTED PUBLIC TRANSPORT SERVICES

Services	Weekday frequency	Impacted roads	Road–rail interface
Queensland public transport routes			
1	11/day	North Street	-
2	10/day	New England Highway	-
4	11/day	Toowoomba Connection Road (formerly Warrego Highway)	-
5	10/day	Hume Street	-
300	4/day	New England Highway	-
301	5/day	New England Highway	-
314	3/day	New England Highway	-
315	3/day	New England Highway	-
539	11/day	Ipswich Rosewood Road Rosewood Laidley Road Gatton Helidon Road Forest Hill Fernvale Road Gatton Helidon Road Crescent Street William Street Turner Street	330-9-P-1 Glenore Grove Road (Forest Hill Fernvale)
515	3/hr on peak 2/hr off peak	Ipswich Rosewood Road Cunningham Highway Pine Mountain Road	-
514	1/hr	Pine Mountain Road	-
500	2/hr 1/hr off peak	River Road	-
529	3/day	Warrego Highway Pine Mountain Road	-
901	2/hr on peak 1/hr off peak	Toowoomba Connection Road (formerly Warrego Highway) Herries Street New England Highway Griffiths Street	-
902	1/hr	Toowoomba Connection Road (formerly Warrego Highway) Herries Street New England Highway	-
905	1/hr on peak 1/2hrs off peak	Toowoomba Connection Road (formerly Warrego Highway) New England Highway	-
906	1/hr	Toowoomba Connection Road (formerly Warrego Highway) New England Highway	-
907	2/hr on peak 1/hr off peak	Toowoomba Connection Road (formerly Warrego Highway) Herries Street	-
950	1/hr	New England Highway	-
Kan-go	1/hr	New England Highway Herries Street	-
Route 3	2/day	New England Highway Herries Street	-
Route KGT	1/hr	New England Highway Toowoomba Connection Road (formerly Warrego Highway)	-

There are up to 22 existing Queensland public transport services with routes potentially impacted by Project construction traffic and/or road–rail interfaces. Impacts to existing public transport services are not anticipated. The exception is Route 539, which currently travels across the existing Hunt Street level crossing (330-9-E-2). It is proposed that this crossing is relocated to the east, and that a level crossing is provided at Glenore Grove Road (330-9-P-1). This relocation will allow for the bus route to effectively cross the rail line without material detour delays; however, the route may be adversely affected due to higher (and more frequent) wait times at the crossing when it is closed.

It is envisaged that the existing Hunt Street level crossing remain operational during the construction phase of the project, thereby allowing the bus route to cross the rail line during this period.

19.7.4 School bus routes

Existing school bus routes that may be impacted by construction traffic and/or road–rail interfaces has been reviewed. Identified routes (sourced from Queensland Government) that may be impacted are in Table 19.18.

TABLE 19.18: IMPACTED SCHOOL BUS ROUTES

Services	Weekday frequency	Impacted roads	Road–rail interface
Queensland School Bus Routes			
Route 90	1 AM, 1 PM	Munro Street	
Route 94A Route 94P	1 AM, 1 PM	Griffiths Street	
P1751 AM and PM Iredale Postmans Ridge to Helidon State School	1 AM, 1 PM	Warrego Highway	-
P1451 AM and PM Forest Hill Area	1 AM, 1 PM	Gatton Laidley Road Forest Hill Fernvale Road Old Laidley Forest Hill Road	330-9-P-1 Glenore Grove Road
P1551 Am and PM Plainland Area, Laidley District SS	1 AM, 1 PM	Laidley Plainland Road	-
P1508 AM and PM Laidley Area, Laidley District SS	1 AM, 1 PM	Laidley Plainland Road Gatton Laidley Road	-
S787 AM and PM Laidley Range Area, Laidley SHS	1 AM, 1 PM	Railway Street Summer Street Paroz Street	-
S849 AM–PM Townson, Townson Area	1 AM, 1 PM	Laidley Plainland Road Gatton Laidley Road	-
S848 AM and PM Grandchester, Laidley SHS	1 AM, 1 PM	Rosewood Laidley Road School Road	330-14-P-2 Grandchester Mount Mort Road
P552 AM and PM Mount Mort Area, Grandchester SS	1 AM, 1 PM	School Road	-
S187 AM and PM Calvert, Ashwell Area, Ashwell SS and Rosewood SHS	1 AM, 1 PM	Rosewood Laidley Road Calvert Station Road	330-15-E-4 Calvert Station Road
S175 AM–PM Rosevale, Mt Walker Areas, Rosewood SHS	1 AM, 1 PM	Rosewood Laidley Road Ipswich Rosewood Road	-
S743 AM and PM Lower Mt Walker Area, Rosewood SHS	1 AM, 1 PM	Rosewood Laidley Road Ipswich Rosewood Road	-
S646 AM and PM Mt Forbes Area, Rosewood SHS	1 AM, 1 PM	Rosewood Laidley Road Ipswich Rosewood Road	-
IP1503 AM and PM Hatton Vale /Marburg Area to Ipswich Special Schools	1 AM, 1 PM	Warrego Highway	-
IP1502 AM and PM Hatton Vale, Lowood, Fernvale, Ironbark Area to Ipswich Special Schools	1 AM, 1 PM	Warrego Highway	-
P623 AM and PM Summerholm Area, Hatton Vale SS	1 AM, 1 PM	Warrego Highway	-

Services	Weekday frequency	Impacted roads	Road–rail interface
P1732 AM and PM Hatton Vale Area, Hatton Vale SS	1 AM, 1 PM	Warrego Highway	-
IP1701 SWD AM run—Boonah to Ipswich	1 AM, 1 PM	Cunningham Highway	-
P1388 AM and PM Kholo Area, Brassall State School	1 AM, 1 PM	Pine Mountain Road	-
5210	1/day	Ipswich Motorway	-
5212	1/day	Warrego Highway Redbank Plains Road	-
5217	1/day	Cunningham Highway	-
5218	1/day	Cunningham Highway	-
5226	1/day	Redbank Plains Road	-
6210	1/day	River Road	-
6215	1/day	Cunningham Highway	-
6219	1/day	Pine Mountain Road Downs Street	-
6226	1/day	Redbank Plains Road	-
6247	1/day	Pine Mountain Road Downs Street	-

The increase in construction traffic volume could potentially impact existing school bus routes. However, given the low frequency of school bus movements (one to two per route per week day), it is expected that school bus services would not be substantially impacted from an operational and service reliability perspective. Only three of the 31 existing school bus routes along construction routes and/or road–rail interfaces are likely to be impacted by delays at active level crossings, these include:

- Forest Hill area: P1451—two services per day:
  - Impacted roads: Gatton Laidley Road; Forest Hill Fernvale Road; Old Laidley Forest Road
  - Crossing: Glenore Grove Road
- Grandchester, Laidley area: S848—two services per day:
  - Impacted roads: Rosewood Laidley Road; School Road
  - Crossing: Grandchester Mount Mort Road
- Calvert, Ashwell Rosewood area: S187—two services per day:
  - Impacted roads: Rosewood Laidley Rd; Calvert Station Road
  - Crossing: Calvert Station Road.

Consultation with relevant local council authorities and TransLink will be undertaken prior to the construction stage of the Project. This will be undertaken once construction routes have been finalised to ensure that all potentially impacted public transport routes have been appropriately considered and suitable management measures are implemented.

19.7.5 Long-distance coach services

Existing long-distance coach services that are likely to be impacted by construction traffic and/or road–rail interfaces has been reviewed. Identified routes (sourced from Queensland Government) that may be impacted are in Table 19.19.

TABLE 19.19: IMPACTED LONG-DISTANCE COACH SERVICES

Services	Weekday frequency	Impacted roads	Road–rail interface
Queensland routes			
Brisbane City to Grafton	-	Pacific Motorway	-
Brisbane City to Mount Isa	1/day 7 days/Week	Ipswich Motorway Cunningham Highway Warrego Highway Toowoomba Connection Road Laidley Plainland Road Gatton Helidon Road William Street New England Highway Station Street	-
Brisbane City to Charleville	1/day 7 days/Week	Ipswich Motorway Cunningham Highway Warrego Highway Toowoomba Connection Road Laidley Plainland Road Gatton Helidon Road William Street New England Highway Station Street	-

Given the low frequency of long-distance coach services (one per day) it is expected that long distance buses would not be impacted as a result of the Project.

19.7.6 Stock routes

The Queensland Stock Route Network provides pastoralists with a means of moving stock around Queensland'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* (Qld). There is only one stock route identified that is impacted by the potential construction routes. This stock route is located along Ipswich Rosewood Road (outside the Project EIS Investigation Corridor, but within the adopted transport study area).

The Stock Route ID is 'Armstrong Park' located in the LGA of ICC. The nearest public road crossing is Ipswich Rosewood Road. It should be noted that the Armstrong Park stock route is currently classified as being a minor and unused.

Appropriate management measures will be implemented when construction traffic is travelling within vicinity of this area.

19.7.7 Seasonal variation

The impact of seasonal variation was taken into account as part of the analysis and assessment, with a focus on road–rail interfaces. The 95th percentile results were conservatively adopted to allow for potential additional vehicle queue and delay which may occur from higher traffic volumes and slower moving vehicles. To account for fluctuations and peaks in flow throughout the year, the LOS analysis was based on the 30th highest hour traffic volumes.

19.7.8 Strategic tourist routes

Primary construction routes that are expected to be used along existing strategic tourist routes were taken into account as part of this assessment. Primary construction routes that form part of existing tourist routes include:

- Adventure Way, along Warrego Highway and Toowoomba Connection Road
- Warrego Way, along Warrego Highway and Toowoomba Connection Road
- Pacific Coast Way, along Pacific Highway.

The increase in construction traffic, in particular, heavy vehicles, has the potential to impact strategic touring routes. Potential impacts have been considered in the traffic link analysis.

19.7.9 Active transport

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

DTMR

- Cunningham Highway
- Gatton Helidon Road
- Gatton Laidley Road
- Laidley Plainland Road
- New England Highway
- Pine Mountain Road
- Rosewood Laidley Road
- Toowoomba Connection Road
- Warrego Highway.

TRC

- Herries Street
- Dent Street
- Station Street
- North Street
- Mort Street.

LVRC

- Hickey Street
- Railway Street
- Tenthill Creek Road
- Unnamed Road
- William Street.

ICC

- Redbank Plains Road.

Suitable consultation with central cycling organisations will be conducted as required during detailed design of the Project in order to ensure specific needs are considered and addressed during the construction of the Project.

19.7.10 Crash history analysis

A review of DTMR's five-year crash data (between 2012 and 2017) was undertaken to assess the proposed construction traffic routes. The analysis is in Table 19.20.

TABLE 19.20: CRASH HISTORY

Road name	Length (km)	Background volume (AADT)	Peak construction volume (ADT)	Total 5-year crashes
State controlled roads: Department of Transport and Main Roads				
Cunningham Highway	17.1	20,110-42,167	1-2	103
Forest Hill Fernvale Road; Gatton Esk Road				No crashes
Gatton Helidon Road	20.8	5,060-12,278	2-61	11
Gatton Laidley Road	15	2,373	14-78	11
Gatton Laidley Road West				No crashes
Haigslea Amberley Road	3.4	4,944	106	8
Ipswich Motorway	8.2	108,841	53	93
Ipswich Rosewood Road	12.7	3,104-7,711	1	2
Karrabin Rosewood Road	8.2	4,036	123	12
Laidley Plainland Road	8.6	5,236-6,396	113-255	5
Logan Motorway	30.2	108,841	53	207
New England Highway	1.7	13,706-17,535	28	72
Pacific Motorway	66	157,018	53	910
Pine Mountain Road	3.2	4,000	222	5
River Road	1	6,873	2	5
Rosewood Laidley Road	23.6	1,801-3,118	123-213	23
Toowoomba Second Range Crossing (Warrego Highway, managed by Nexus)				
Warrego Highway/Toowoomba Second Range Crossing				
Toowoomba Regional Council				
Dent Street	0.4	3,829	131	1
Griffiths Street	1.4	5,930	28	6
Herries Street; Larcombe Street				No crashes
Mort Street	1.5	6,052	28	2
Munro Street				No crashes
North Street	0.8	9,135	6	2
O'Mara's Road; Water Street North				No crashes
Witmack Street	0.6	3,390	0	1

Road name	Length (km)	Background volume (AADT)	Peak construction volume (ADT)	Total 5-year crashes
Lockyer Valley Regional Council				
Airforce Road; Arthur Street; Boundary Road; Bowtells Road; Boxmoor Street; Burgess Road; Connors Road				No crashes
Crescent Street	0.4	2,490	8	1
Crown Street; George Street; Hall Road; Hickey Street; Laidley Street; Lake Clarendon Way				No crashes
Lawlers Road	8	541	115-216	1
Main Green Swamp Road; Mary McKillop Street				No crashes
Old College Road	1.4	800	4	2
Old Laidley Forest Hill Road	5.5	1,469	33	6
Old Toowoomba Road	4.9	4,000	15	1
Paroz Road; Philipps Road; Outer Ring Road Extension (new road); Railway Road				No crashes
Railway Street	3.1	16	101-118	1
Saleyard Road	0.4	4,000	7	1
Sandy Creek Road; Seventeen Mile Road; Station Street; Summer Street; Tenthill Creek Road; Turner Street; Victor Street; Western Drive				No crashes
William Street	0.7	4,000–4,075	13–128	3
Wrights Road				No crashes
Ipswich City Council				
Calvert Station Road; Fairbank Place; Grandchester Mort Road; Haigslea Malabar Road; Hiddenvale Road				No crashes
Mount Marrow Quarry Road	1			
Neumann Road; Newhill Drive; Noblevale Way; Rafters Road				No crashes
Redbank Plains Road	5			
Rob Roy Way; School Road; Thagoona Haigslea Road				No crashes

Source: DTMR, 2017a

Table note:
ADT—Average Daily Traffic Volumes.
Only roads that have experienced crashes in the last five years have been included in this table.

19.8 Potential impacts

19.8.1 Construction

Key construction works will consist of the delivery of quarry materials (ballast, capping materials) pre-cast 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 and 6.30 am to 1.00 pm on Saturday. Construction hours may occur outside these hours where works comply with the requirements of the Draft Outline EMP (refer Chapter 23: Draft Outline Environmental Management Plan). The haulage activity of construction equipment and material is anticipated to occur seven days a week.

During the peak of construction of the Project, workforce traffic has the potential to contribute to overall traffic in the area. This may include increased demand for parking spaces in temporary compounds and laydown areas. The increased numbers of workers commuting to the Project may also increase peak-hour congestion on commonly used roads.

19.8.1.1 Rail network

There are currently 14 existing road–rail interfaces within the Project rail corridor, which may potentially be impacted during the proposed construction works. Table 19.12 shows the existing road–rail interfaces along the Project alignment.

19.8.1.2 Road network

Construction materials are expected to be delivered to laydown areas along the temporary construction disturbance footprint. These delivery points have accessibility and safe manoeuvrability for transport and off-loading of vehicles. The delivery points are also centralised. Figure 19.3 illustrates the construction routes.

Table 19.21 provides intersections potentially impacted during Project construction works.

TABLE 19.21: INTERSECTIONS WITH POTENTIAL IMPACTS

Owner	Intersections with potential impacts
DTMR	Gatton Laidley Road/Hall Road
	Karrabin Rosewood Road/Thagoona Haigslea Road
	New England Highway/Munro Street
	Toowoomba Connection Road/Water Street
LVRC	Arthur Street/Mary Mackillop Street
	Arthur Street/Station Street
	Boxmoor Street/Philps Road
	Laidley Street/Seventeen Mile Road
	Laidley Street/Station Street
	Turner Street Mary Mackillop Street

19.8.1.3 Active transport

To identify existing on-road cycleways that may coincide with expected construction routes, a review of the PCNP has been undertaken. The PCNP is a guide for cycleway planning and presents core active transport routes. As outlined in Section 19.7.9, there are several cycling paths within the PCNP that coincide with proposed construction traffic routes.

The expected construction routes traverse through areas of moderate- to high-pedestrian activity, particularly through the city centres of Toowoomba, Gatton, Helidon, Laidley and North Ipswich. Increased heavy vehicle movements through these locations may adversely impact pedestrian movements. Specific pedestrian management measures will, therefore, be implemented. These measures will be subject to site planning and reflect the nature of the proposed works, with specific consideration to the existing active transport network.

19.8.2 Operation

Impacts to the road network during the operation of the Project are expected to be negligible. This is due to the low volumes of operational traffic expected. Traffic is expected to be limited to a small maintenance crew, primarily using the road maintenance access roads, at expected intervals of approximately once per month.

19.8.2.1 Rail network

Both existing and proposed level crossings (Section 19.7.1) are likely to be impacted by the operation of the Project. The results of the impact assessment are presented in Section 19.9.3.1.

Upgrades to existing active levels crossings will be undertaken at: Jamiesons Road, Dodt Road, Neumann Road, and Calvert Station Road.

The proposed Project public road–rail interface locations and proposed treatments are presented in Table 19.22 with the treatment for the existing public road–rail interface detailed in Section 19.7.1. Consistent with the QLCSS, the proposed treatments and level of protection at road–rail interfaces are based on the ALCAM assessment outcomes, considering factors such as future road traffic numbers, vehicle types, train numbers, speeds and sighting distances. The ALCAM assessment is carried out separate to the EIS and any updated and/or required modifications to road–rail interfaces will be incorporated through an updated TIA during detailed design (post-EIS).

TABLE 19.22: PROPOSED PUBLIC ROAD–RAIL INTERFACE AND PROPOSED TREATMENT

Interface ID	Road name	Proposed treatment
DTMR		
330-3-P-8	Warrego Highway	Grade separation—rail over
330-9-P-1	Glenore Grove Road	Active road level crossing
330-11-P-5	Laidley Plainland Road	Grade separation—rail over
330-13-P-2d	Rosewood Laidley Road	Grade separation—rail over
330-13-P-2e	Rosewood Laidley Road	No crossing provided—road diversion/re-alignment
LVRC		
330-1-P-1	Airforce Road	No crossing provided—road diversion/re-alignment
330-1-P-2	Warrigal Road	No crossing provided—road diversion/re-alignment
330-1-P-2a	Airforce Road[1]	Grade separation—road over
330-1-P-7	Wrights Road	No crossing provided—road diversion/re-alignment
330-2-P-1	Seventeen Mile Road	No crossing provided—consolidate
330-2-P-5	Connors Road	Active road level crossing
330-3-P-5	Sandy Creek Road	Grade separation—rail over
330-4-P-3	Philps Road	Grade separation—rail over
330-4-P-4	Brooks Road	No crossing provided—road diversion/re-alignment
330-9-P-0	Pedestrian Interface	At-grade level crossing
330-10-P-3	Old Laidley Forest Hill Road	Grade separation—rail over
330-11-P-4	Old Laidley Forest Hill Road	No crossing provided—road diversion/re-alignment
330-11-P-6	Francis Road	Grade separation—rail over
330-11-P-7	Luck Road	Grade separation—rail over
330-11-P-8	Paroz Road	Grade separation—rail over
330-12-P-1a	Railway Street	No crossing provided—consolidate
330-12-P-1b	Kessling Drive	No crossing provided—consolidate
330-12-P-1c	Kessling Drive	No crossing provided—consolidate
ICC		
330-13-P-2c	Unnamed Road	Grade separation—rail over
330-13-P-2f	Doonans Road	No crossing provided—road diversion/re-alignment
330-14-P-2	Grand Chester Mount Mort Road	Active road level crossing
330-14-P-2a	Pedestrian Interface Grandchester Mount Mort Road	At-grade active pedestrian level crossing

Table note:

[1] Potential permanent and temporary impacts to Airforce Road have been considered for the Project as the road is used by haulage vehicles in transporting explosive goods to and from the Helidon Explosives Reserve. Grade separation is proposed at this road–rail interface point to alleviate any security risks associated with queued explosives vehicles at rail crossings and public risk of emergency situations involving explosives transport vehicles.

19.8.2.2 Road network

During the operational phase of the Project, it is anticipated that access to and from the rail corridor will be required to conduct routine inspection and maintenance tasks. It is assumed that the workforce during the operational stages will reside within surrounding towns along the Project alignment and be made up of local, resident employees.

Maintenance vehicles will use access tracks for most of the inspection and maintenance activities. These activities are likely to be infrequent and the related traffic volumes will be minimal. There are no expected impacts to operational conditions of the surrounding road network.

Detailed analysis of the road network is therefore not required.

19.8.2.3 Active transport

To identify existing on-road cycleways that may coincide with proposed construction routes, a review of the Queensland PCNP has been undertaken. There are five pedestrian interfaces with the Project alignment: Gatton Station, Gaul Street, Dodt Road, Hunt Street and Grandchester Mount Mort Road. For Gatton Station, the existing pedestrian footbridge crosses will be replaced. This will be a grade-separated crossing both QR lines and providing a link between the southern side and the northern side of Gatton.

It is proposed that each pedestrian crossings is designed to allow for accessibility for all users.

19.8.2.4 Emergency service vehicles

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 address potential impacts on emergency services access and emergency service response times.

19.9 Impact assessment

19.9.1 Traffic analysis

Project-related traffic will be generated during both construction and operational activities. It is anticipated that potential impacts would be during the construction phase. Throughout the operational phase, potential impacts from the Project are expected to be negligible given the minor and irregular number of vehicle movements.

19.9.1.1 Traffic growth rates

Traffic growth rates were based on available information obtained from road controlling authorities. An evaluation of the traffic growth rates indicated an annual average AADT growth rate of 2 per cent. This value was adopted for both SCRs and local government roads.

Further detail on traffic growth rates is presented in Appendix U: Traffic Impact Assessment.

19.9.1.2 Seasonal variation

Traffic volumes on the road network are expected to vary seasonally. The impact of seasonal variation was considered as part of the traffic analysis with a focus on localised delays. The impact of seasonality considered the following:

- Road–rail interface analysis: The 95th percentile output results from the modelling results, opposed to industry standard 85th percentile outputs. This is conservative as it accounts for additional vehicle queue and delay that may occur from higher traffic volumes and slower moving vehicles.
- The 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, 1998) accounts for the 30th highest hour traffic volumes of similar road types. This provides upper limit LOS thresholds, which account for fluctuations and peaks in traffic throughout the year.

19.9.2 Construction

Potential impacts of the Project construction traffic on the existing road network is examined in the following section. Three traffic analysis parameters were used, based on identified construction routes and public road–rail interfaces:

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

19.9.2.1 Traffic comparison on road links

A traffic comparison analysis was undertaken for the road sections where Project traffic will equal, or exceed, a
5 per cent increase and is shown in Table 19.23. Based on the GTIA, the percentage traffic impact is calculated by expressing the traffic generated by the Project (future design years) as a percentage of the background traffic.

Where low volumes of existing background traffic are present, the percentage increase in traffic may be elevated.

TABLE 19.23: 5 PER CENT TRAFFIC COMPARISON ANALYSIS ON ROAD LINKS

Road name	Road ID—road section	Comparison analysis
State controlled roads: Department of Transport and Main Roads		
Forest Hill Fernvale Road	412—between Gatton Laidley Road and Warrego Highway	14.2%
Gatton Helidon Road	314—between Gatton Laidley Road West and Warrego Highway	5.4%
Gatton Laidley Road	312—between Hall Road and Forest Hill Fernvale Road	6.5%
Karrabin Rosewood Road	3002—between Rosewood Marburg Road and Haigslea Amberley Road	6.3%
Laidley Plainland Road	311—between Warrego Highway and Old Laidley Forest Hill Road	8.9%
Laidley Plainland Road	311—between Old Laidley Forest Hill Road and Railway Street	6.5%
Rosewood Laidley Road	308—between Whites Road and Mulgowie Road	10.8%
Rosewood Laidley Road	308—between Mulgowie Road and Crown Street	6.4%
Rosewood Laidley Road	308—between Crown Street and Rosewood Marburg Road	10.2%
Ipswich City Council		
Calvert Station Road	Between Rosewood Laidley Road and Gipps Street	43.2%
Haigslea Malabar Road	Between Warrego Highway and Mount Marrow Quarry Road	65.7%
Hiddenvale Road	Between Gipps Street and Neumann Road	29.9%
Mount Marrow Quarry Road	Between Haigslea Malabar Road and Mount Marrow Quarry	65.7%
Mount Marrow Quarry Road	Between Thagoona Haigslea Road and Mount Marrow Quarry	32.4%
Neumann Road	Full extent	130.4%
Thagoona Haigslea Road	Between Karrabin Rosewood Road and Schumanns Road	35.2%
Thagoona Haigslea Road	Between Schumanns Road and Mount Marrow Quarry Road	35.2%
Lockyer Valley Regional Council		
Airforce Road	Between Airforce Road and Railway Line	42.0%
Arthur Street	Between Station Street and Mary McKillop Street	6.6%
Bowtells Road	Full extent	18.9%
Connors Road	Between Seventeen Mile Road and Sandy Creek Road	291.5%
Connors Road	Between Airforce Road and Wrights Road	181.0%
George Street	Between Seventeen Mile Road and Arthur Street	23.5%
George Street	Between Arthur Street and Lawlers Road	47.0%
Laidley Street	Between Station Street and Seventeen Mile Road	5.8%
Lawlers Road	Between Victor Street and George Street	28.8%
Lawlers Road	Between George Street and Warrego Highway	48.1%
Mary McKillop Street	Between Turner Street and Arthur Street	21.4%
Paroz Road	Between Summer Street and 200 East of Summer Street	26.1%
Outer Ring Road Extension (new road)	Between Gatton Laidley Road West and Railway Line	5.1%
Railway Street	Between Kessling Drive and Summer Street	723.2%
Railway Street	Between Summer Street and Laidley Plainland Road	1568.8%

Road name	Road ID—road section	Comparison analysis
Sandy Creek Road	Between Warrego Highway and Bowtells Road	13.6%
Seventeen Mile Road	Between Airforce Road and Laidley Street	105.8%
Station Street	Between Arthur Street and Laidley Street	5.8%
Summer Street	Between Paroz Street and Railway Street	20.8%
Wrights Road	Between Connors Road and Andersons Road	248.0%
Toowoomba Regional Council		
Dent Street	Between Margaret Street and Herries Street	5.2%
Mort Street	Between Hermitage Road and North Street	58.3%
Munro Street	Between New England Highway and Harlaxton Quarry	28.8%
Station Street	Between Margaret Street and Russel Street	26.1%
Water Street North	Between Herries Street and Warrego Highway	12.8%

19.9.2.2 Pavement impacts on road links

A desktop pavement impact assessment was undertaken on each potentially impacted DTMR SCR. This was based on existing background traffic data available for each relevant road section. The approach adopted included the following:

- Determine the number and types of vehicles that will be generated by the Project in both construction and operation
- Identify which sections of the road network where pavement assessment is most likely required for each year of implementation
- Convert the Project traffic volumes 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 section identified to be most likely impacted by the Project.

Table 19.24 lists the SCR segments that are likely to equal, or exceed 5 per cent, the standard axle repetitions (SAR) threshold.

TABLE 19.24: 5 PER CENT STANDARD AXLE REPETITIONS COMPARISON ANALYSIS ON SCR LINKS

Road name	Road ID—road section	Comparison analysis
Forest Hill Fernvale Road	412—between Gatton Laidley Road and Warrego Highway	109.0%
Gatton Esk Road	4144—between Warrego Highway and Lake Clarendon Way	10.1%
Gatton Helidon Road	314— between Hickey Street and Gatton Laidley Road	9.4%
Gatton Helidon Road	314—between Gatton Laidley Road W and Warrego Highway	25.1%
Gatton Laidley Road	312—between Laidley Plainland Road and Whiteway Road	58.8%
Gatton Laidley Road	312—between Whiteway Road and Railway Street	9.2%
Gatton Laidley Road	312—between Hall Road and Forest Hill Fernvale Road	58.0%
Karrabin Rosewood Road	3002—between Rosewood Marburg Road and Haigslea Amberley Road	31.3%
Laidley Plainland Road	311—between Warrego Highway and Old Laidley Forest Hill Road	146.9%
Laidley Plainland Road	311—between Old Laidley Forest Hill Road and Railway Street	183.9%
Laidley Plainland Road	311—between Railway Street and Whites Road	127.4%
New England Highway	22A—between Griffiths Street and Munro Street	9.7%
Rosewood Laidley Road	308—between Whites Road and Mulgowie Road	218.9%
Rosewood Laidley Road	308—between Mulgowie Road and Crown Street	95.7%
Rosewood Laidley Road	308—between Crown Street and Rosewood Marburg Road	100.7%
Toowoomba Second Range Crossing (Warrego Highway, managed by Nexus)	Between New England Highway and Toowoomba Connection Road	7.8%
Warrego Highway	18A—between Toowoomba Second Range Crossing and Gatton Helidon Road	20.5%
Warrego Highway	18A—between Gatton Helidon Road and Gatton Esk Road	20.5%
Warrego Highway	18A—between Gatton Esk Road and Laidley Plainland Road	13.9%

The pavement impact assessment indicates that several road sections are likely to exceed the 5 per cent SAR threshold, with several road segments exceeding this threshold by a significant margin. This analysis assumes fully loaded vehicles in each direction. This conservative approach limits underestimation of potential pavement impacts.

The analysis indicates that the SCR road segments would have minimal pavement impact given the duration of the construction works and pavement loading.

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

19.9.3 Operation

It is assumed that during the operational stages, the workforce will be sourced from the region and primarily reside within the local area. It is expected that minimal new trips will be generated (with workforce movements accounted for within existing traffic flow data). The dispersed nature of any unaccounted for new trips across the road network would have 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 will be infrequent. The related traffic volumes will therefore be minimal with no envisaged impact to operational conditions of the surrounding road networks.

19.9.3.1 Rail crossings

The operational performance of Project public level crossings was assessed. Potential impacts on performance during Project construction (diverted traffic created by road closures for example) and operations stages were both considered. The rail crossing impact assessment focuses on vehicle delay and queueing analysis at the public level crossing and at nearby (closely spaced) intersections.

The following scenarios were evaluated:

- Future Year 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) for 1,800 m trains.

Documents referenced to determine impacts on public level crossings included:

- *Guideline to Traffic Impact Assessment* (DTMR, 2017a)
- *Module 19: State Transport Network Functionality* (DILGP, n.d.)
- 'Railway crossing safety' component of the *Guide to Development in a Transport Environment: Rail* (DTMR, 2015b)
- *Level Crossing Policy* (ONRSR, 2019a)
- Guidance from the Transport for NSW *Technical Note—TN 002:16* and *Level Crossing Design ESD-03-1* (Transport for NSW, 2016).

The process used to evaluate level crossing impacts included:

- Identifying the expected traffic distribution on the road network as a result of the Project
- Identifying railway level crossings likely to be impacted on by Project-generated traffic
- The expected timeframe for the delivery of the Project including the commencement of construction, keys stages and operations
- Demonstrating how the Project-generated traffic will not worsen vehicular queuing issues (short stacking) over the impacted railway level crossings
- The maximum size and type of vehicle anticipated over the railway level crossings as a result of the Project during construction and operations
- Demonstrating there is sufficient clearance from the railway crossing to allow the maximum size of vehicle used 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 adopted approach complied with the requirements of *AS 1742-2014 Manual of uniform traffic control devices* (Standards Australia, 2014b) and relevant national road safety guidelines.

For the purpose of the analysis, it was assumed that there will be two trains per peak hour for both existing and with Project traffic scenarios. Train clearance times were calculated based on an adopted maximum design train speed of 115 km/h and a maximum train length of 1,800 m. This is a conservative approach.

The analyses indicated that, should the proposed level crossings be implemented, acceptable LOS with minimal impact to vehicle queueing and delay would be present. Findings on specific level crossings are in Table 19.25.

TABLE 19.25: RAIL CROSSING OPERATIONAL PERFORMANCE DURING AM AND PM PEAKS

			Year 2026 (1,800 m train length) With Project				Year 2036 (1,800 m train length) With Project			
Road–Rail Interface Location			Volume* (veh/h)	Queue (m)	Delay** (s)	LOS	Volume* (veh/h)	Queue (m)	Delay** (s)	LOS
340 2 P 5: Connors Road										
AM	Connors Road (E)	T	6	Negligible ***	13.5	A	8	6.5	13.5	A
	Connors Road (W)	T	4	Negligible ***	13.4	A	5	Negligible ***	13.5	A
PM	Connors Road (E)	T	5	Negligible ***	13.5	A	7	Negligible ***	13.5	A
	Connors Road (W)	T	7	Negligible ***	13.5	A	10	7.5	13.5	A
330 6 E 1: Jamiesons Road										
AM	Jamiesons Road (S)	T	108	45.3	3.7	A	131	56.0	3.8	A
	Jamiesons Road (N)	T	53	20.8	3.6	A	65	25.6	3.7	A
PM	Jamiesons Road (S)	T	82	34.1	3.7	A	100	42.0	3.8	A
	Jamiesons Road (N)	T	121	49.2	3.8	A	147	60.9	3.9	A
330 9 E 1: Dodt Road										
AM	Dodt Road (S)	T	1	Negligible** *	3.0	A	2	Negligible** *	3.0	A
	Dodt Road (N)	T	1	Negligible** *	3.0	A	2	Negligible** *	3.0	A
PM	Dodt Road (S)	T	1	Negligible** *	3.0	A	2	Negligible** *	3.0	A
	Dodt Road (N)	T	1	Negligible** *	3.0	A	2	Negligible** *	3.0	A
330 9 P 1: Glenore Grove Road**										
AM	Glenore Grove Road (N)	T	158	71.8	4.4	A	193	89.4	4.5	A
	Glenore Grove Road (S)	T	249	117.3	4.7	A	304	148.0	4.8	A
PM	Glenore Grove Road (N)	T	230	108.8	4.6	A	280	137.0	4.8	A
	Glenore Grove Road (S)	T	218	100.5	4.6	A	265	126.2	4.7	A
330 14 P 2: Grandchester Mount Mort Road										
AM	Grandchester Mount Mort Road (S)	T	46	23.0	5.2	A	56	28.2	5.2	A
	Grandchester Mount Mort Road (N)	T	42	21.0	5.2	A	52	25.7	5.2	A
PM	Grandchester Mount Mort Road (S)	T	50	23.6	5.2	A	60	28.9	5.2	A
	Grandchester Mount Mort Road (N)	T	57	26.7	5.2	A	69	32.7	5.2	A
330 15 E 4: Calvert Station Road										
AM	Calvert Station Road (S)	T	29	15.4	6.7	A	35	18.9	6.7	A
	Calvert Station Road (N)	T	13	7.0	6.6	A	16	8.6	6.6	A
PM	Calvert Station Road (S)	T	18	9.6	6.6	A	22	11.7	6.6	A
	Calvert Station Road (N)	T	30	16.1	6.7	A	37	19.7	6.7	A

Table notes:
Veh/hr = vehicles per hour.
* SIDRA modelled volumes may differ slightly from inputs due to rounding.
** This delay represents the average delay for all vehicles approaching the level crossing in an hour and is weighted against volume. The minimum delay to a single vehicle would be 0s, and the maximum delay a vehicle could experience is the full crossing time plus additional time for vehicles at the level crossing to clear.
*** Queue length less than one car length (6m).
****Traffic volumes from Hunt Street applied.

19.10 Mitigation

This section outlines the traffic mitigation measures included as part of the Project design and the mitigation measures proposed for the Project. 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.

19.10.1 Design considerations

The mitigation measures and controls presented in Table 19.26 have been factored into the design for the Project. These design considerations are proposed to minimise the traffic, transport and access impacts of the Project and therefore contribute to a lowering of the initial impact risk rating for each potential impact.

TABLE 19.26: INITIAL MITIGATION THROUGH DESIGN RESPONSES

Aspect	Initial design measures

Road safety	▸ Road safety audits will be undertaken on level crossings during detailed design in accordance with Austroads requirements to ensure the:
	  ▸ Level of protection is appropriate
	  ▸ Infrastructure is appropriate for the traffic conditions
	  ▸ Crossing is designed to provide suitable stacking and sight distance
	▸ 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 West Moreton System rail corridor and DTMR's Gowrie to Grandchester future State transport corridor (protected under the TPC), minimising the need to develop land that has not previously been subject to disturbance for transport infrastructure purposes. 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	▸ ALCAM assessments have been undertaken by ARTC to determine the appropriate protection type for the proposed road–rail interface. The resulting road–rail interface treatments have been selected and designed by:
	  ▸ Elimination, SFAIRP, by not providing a crossing (including road diversions and realignments.
	  ▸ Grade-separation in accordance with ARTC's policy and requirements
	  ▸ Level crossings: either passive level crossings with stop signs or active level crossings with flashing lights and boom barriers
	▸ The specific design treatment at each road-rail interface has been selected based on a combination of factors, which include:
	  ▸ Sighting distances
	  ▸ Road–rail geometry
	  ▸ Road and rail traffic volumes and speeds
	  ▸ Design vehicle types
	  ▸ Community and stakeholder feedback through consultation
	▸ Road–rail interfaces have been designed to eliminate or minimise safety risks SFAIRP
	▸ 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 RMAR 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.

19.10.2 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 19.27. These measures have been identified to be applied in the detailed design, pre-construction, construction and operational phases of the Project. The proposed mitigation measures address specific issues and opportunities, legislative requirements, accepted government plans, policy and practice:

- Table 19.27 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 19.28
- The Traffic Transport and Access Sub-plan of the draft Outline Environmental Management Plan (refer Chapter 23: Draft Outline Environmental Management Plan) provides further context and the framework for implementation of these proposed mitigation and management measures.

TABLE 19.27: 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, relevant local governments. Developed procedures will be communicated to the Project consultation team for inclusion within community consultation plans. Road safety audits (desk-top and to meet assets owner requirements) will be undertaken for all road designs in accordance with the Austroads guidelines. Level crossing treatments and suitability will be determined through the Inland Rail level-crossing risk tool which incorporates ALCAM (2016) to confirm the: ▸ Level of protection continues to be appropriate ▸ Infrastructure is appropriate for the traffic conditions ▸ 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 Construction Traffic Management Plan will be developed in consultation with DTMR, relevant local councils and emergency services. A Road Use Management Plan (RUMP) is to be prepared and implemented for the Project, in accordance with DTMR's *Guide to Traffic Impact Assessment* (GTIA) (DTMR, 2018). 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 due to the Project works.
	Intersections	Construction Traffic Management Plans, traffic control plans and temporary road works 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 NSW, 2018a) and *Australian Standard 1742.3 Manual of uniform traffic control devices—Traffic control for works on roads* (Standards Australia, 2014b). Traffic management plans will consider construction activity delivery timeframes which avoid peak hour travel conditions.
	Access	Ongoing consultation with local council/DTMR and asset owners will be undertaken to ensure proposed access arrangements are suitable. The 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, Construction Traffic Management Plans and traffic control plans developed during the detailed design phase will be reviewed and updated to ensure they remains effective and appropriate to the construction works, activities and staging.

Delivery phase	Aspect	Proposed mitigation measures
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. 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, 2013) in terms of transport safety.
	Road network and intersections	Construction Traffic Management Plans will be implemented and reviewed periodically for effectiveness by relevant stakeholders including Councils, DTMR, QPS, and emergency services. Ongoing consultation with relevant councils, DTMR, QPS, emergency services and affected landowners/occupiers to inform them of the Project's 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 Construction 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 routes will be determined as part of the traffic management plans, in the event of the primary route is blocked off by an emergency/accident. Construction Traffic Management Plans, Traffic control plans and temporary road works will 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 Guide to Traffic Management: Part 3 Traffic Studies and Analysis* (Austroads, 2017a). Public level crossings will be assessed through ALCAM (2016) to verify the: ▸ Level of control continues to be appropriate (for example: sighting distances) ▸ Infrastructure is appropriate for the traffic conditions (for example: stacking).
	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 off site. For local government roads, undertake a condition assessment prior to and at ongoing intervals during construction and at the conclusion of construction works in consultation with councils. 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).
Operation	Road network	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).

19.10.3 Impact assessment

Potential impacts to traffic associated with the Project are outlined in Table 19.28. These impacts have been subjected to a risk assessment as per the methodology outlined in the DTMR GTIA (2017a).

The initial risk assessment is undertaken on the basis that the design measures (or initial mitigation measures) have been incorporated into the project design (refer Table 19.26). Proposed mitigation measures in Table 19.27, 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 to assess the effectiveness of the mitigation measures. The resulting residual risk levels are shown in Table 19.28. In all instances, the residual risk levels were lower than the initial levels.

TABLE 19.28: PROJECT TRAFFIC, TRANSPORT AND ACCESS IMPACTS IMPACT ASSESSMENT

	Description of impact					
Value/ element	**Primary impacting process**	**Magnitude of impact**	**Likelihood of impact**	**Initial risk**	**Proposed additional mitigation measures**	**Residual risk**
Traffic impacts from construction works						
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**	▸ Fatigue management measures will 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 will be notified in advance prior to the movement of all hazardous/dangerous or oversize construction material and equipment ▸ Consideration will 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 will 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 Construction Traffic Management Plan ▸ Road closures (if required) to be performed by QPS escort (should it be required) with closure times limited to a maximum of 15 minutes ▸ All over size, over-mass (OSOM) and restricted access vehicles (RAV) will comply with the *Guideline for Excess Dimension Vehicles in Queensland,* Version 8 (DTMR, 2013d) in terms of transport safety.	**Low**
Road network	Safety	**Moderate** Traffic impacts along primary construction routes affecting traffic operations along key routes	**Probably** It is reasonable to assume that some traffic impacts along primary construction routes will occur over the construction period	**Moderate**	▸ Travel 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 for effectiveness by stakeholders ▸ Ongoing consultation with relevant local councils, DTMR, QPS, emergency services and affected landowners/occupiers to inform of the Project's 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 Construction Traffic Management Plan, including using 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.	**Low**

	Description of impact					
Value/ element	**Primary impacting process**	**Magnitude of impact**	**Likelihood of impact**	**Initial risk**	**Proposed additional mitigation measures**	**Residual risk**
Road–rail interface	Safety	**Extreme** Introduction of open level crossings on the road network may result in high severity crashes between traffic and trains	**Probably** 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 construction in accordance with the Austroads requirements. Level crossings will be reviewed to confirm the: ▸ Level of protection continues to be appropriate ▸ Infrastructure is appropriate for the traffic conditions.	
Intersection	Operational efficiency	**Moderate** Traffic impacts at the key intersections impacting operations. Adequacy of intersection configuration to cater for haulage vehicles	**Probable** It is reasonable to assume that some traffic impacts at key intersections will 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**
Pavement	Operational efficiency	**Moderate** Increased percentage of heavy vehicles along SCRs from Project construction traffic, resulting in pavement degradation	**Probably** It is reasonable to assume that some pavement degradation as a result of project construction traffic will occur over the construction period	**Moderate**	Mitigation measures may include: ▸ Undertaking visual assessments prior to, during and post construction works, 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 works.	**Low**
Access	Safety	**Moderate** Increased construction activity may result in the need for emergency vehicle access to the site.	**Probably** It is reasonable to assume that design changes will result in changes to site accesses	**Moderate**	The RMAR Strategy to be reviewed and updated to ensure it remains effective.	

	Description of impact					
Value/ element	**Primary impacting process**	**Magnitude of impact**	**Likelihood of impact**	**Initial risk**	**Proposed additional mitigation measures**	**Residual risk**
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**	▸ Fatigue management measures will 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 will be notified in advance prior to the movement of all hazardous/dangerous or oversize construction material and equipment ▸ Consideration will 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 will 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 Construction Traffic Management Plan ▸ 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 will comply with *Guideline for Excess Dimension Vehicles in Queensland, Version 8* (DTMR, 2013d) in terms of transport safety.	**Low**
Traffic impacts from operational activities						
Road network	Operational efficiency	**Moderate** Delay to through emergency service vehicles resulting from longer crossing closure times	**Probably** It is reasonable to assume that an emergency services vehicle will need to cross the Project during construction	**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
			Probably
			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 Austroads requirements. Level crossings will be reviewed to confirm the:
					  ▸ Level of protection continues to be appropriate
					  ▸ Infrastructure is appropriate for the traffic conditions.
					▸ In accordance with National and State Rail Safety Law requirements, public road crossings will be subject to an Interface Agreement with the relevant road manager in order to ensure that safety risk are identified and minimised SFAIRP during operations
						Low/ Moderate

19.11 Cumulative impacts

The traffic generation from other developments in the region at planning, design or construction stage was considered in the cumulative impact assessment. This assessment was undertaken to ensure that the combined impacts of the background projects were thoroughly considered, to enable stakeholders to make informed decisions. Projects that were considered in the cumulative impact assessment are included in Table 19.29.

TABLE 19.29: PROJECTS CONSIDERED IN CUMULATIVE ASSESSMENT

Project and Proponent	Location	Description	Project status	Construction dates	Impact significance
Gowrie to Helidon (ARTC)	Rail alignment from Gowrie to Helidon	26 km single-track, dual-gauge freight railway as part of the Inland Rail	Draft EIS being prepared by ARTC	2021–2026	Medium
Calvert to Kagaru (ARTC)	Rail alignment from Calvert to Kagaru	53 km single-track, dual-gauge freight railway as part of Inland Rail	Draft EIS being prepared by ARTC	2021–2026	Medium
Bromelton State Development Area (SDA) (Queensland Government)	Bromelton, QLD	Delivery of critical infrastructure within the Bromelton SDA will support future development and economic growth. This development includes a trunk water main and the Beaudesert Town Centre Bypass. This infrastructure provides opportunities to build on the momentum of current development activities by major landowners in the SDA	The current Bromelton SDA development scheme was approved by Governor in Council in December 2017	2016–2031	Low
Ipswich Motorway Upgrade Rocklea to Darra (Stage 1 and remaining sections) (Department of Transport and Main Roads)	Western Brisbane, QLD	Addressing of congestion and extensive delays in the Ipswich Motorway corridor by a range of road upgrades along 7 km of Ipswich Motorway between Rocklea and Darra	Project listed on Queensland Infrastructure Initiative List—EIS not yet initiated	2016/17–2020/21	Low
RAAF Base Amberley future works (Department of Defence)	RAAF Base Amberley	White paper dedicated future upgrades to RAAF Base Amberley at a cost of $1 billion	-	2016–2022	Medium
Gatton West Industrial Zone (GWIZ) (Lockyer Valley Regional Council)	3 km north-west of Gatton	Industrial development including a transport and logistics hub on the Warrego Highway	N/A	2019–2024	Low
InterlinkSQ (InterlinkSQ)	13 km west of Toowoomba	200 ha of new transport, logistics and business hubs. Located on the narrow-gauge, regional rail network and interstate network. Located at the junction of the Gore, Warrego and New England Highways	-	2017–2037	Low

TABLE 19.30: IMPACT SIGNIFICANCE

Impact significance	Consequence
Low	Negative impacts need to be managed by standard environmental management practices. Special approval conditions unlikely to be necessary. Monitoring to be part of general Project monitoring program.
Medium	Mitigation measures likely to be necessary and specific management practices to be applied. Specific approval conditions are likely. Targeted monitoring program required where appropriate.
High	Alternative actions will be considered and/or mitigation measures applied to demonstrate improvement. Specific approval conditions required. Targeted monitoring program necessary, where appropriate.

The following projects may have overlapping construction dates with the Project, with impacts dependent on the timing and location of the works of multiple projects at that time. These projects will have cumulative impacts on traffic volumes, congestion and potentially lead to delays during the construction period:

- G2H and C2K
- Bromelton State Development Area.

As part of the Project impact assessment of traffic and transport, a large range of mitigation measures have been proposed at local and state levels for construction and operation of the Project. To further mitigate potential cumulative impacts, the other assessable projects will also be required to implement similar mitigation measures.

19.12 Stakeholder consultation

Consultation has been undertaken with key stakeholders, including QR, DTMR and relevant local councils. The consultation works are ongoing.

Further details of the stakeholder consultation are in Chapter 5: Stakeholder engagement and Appendix C: Consultation Report.

19.13 Conclusions

The traffic, transport and access assessment has focused on the Project's potential impact on the existing road and rail transport infrastructure. Key findings include:

- Existing operational conditions:
  - The transport study area includes several SCRs and local government roads that are expected to serve as the main transport corridors for the Project. The traffic analysis found that:
    - 5 SCRs have been identified that will interface with the Project alignment, and up to 11 SCR road sections may have construction traffic exceed 5 per cent of existing background traffic
    - 34 local government roads (LVRC, IC and TRC) have been identified that may have construction traffic exceed 5 per cent of existing background traffic; however, the overall impact to many of these roads is expected to be minor as the high percentage of construction traffic is a function of low existing traffic volumes
    - 20 cycle routes are identified that may potentially be impacted by construction traffic; that most of these routes currently carry a high proportion of heavy vehicle movements
    - 22 existing public transport services may be impacted by construction traffic and/or proposed and existing road–rail crossings; given the low frequency of existing services, it is considered that there would be minimal impacts to the existing public transport services during construction works and operations
    - 30 existing school bus routes may potentially be impacted by construction traffic 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 (one–two per route week day), it is expected that there will be minimal impact to services as a result of the construction of the Project
    - 3 existing long-distance coach services may 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 transport study area will be impacted.

- Rail operational traffic and maintenance processes:
  - Construction of connections and tie-ins to the existing rail networks are planned to occur during routine maintenance and rail possession periods—impacts to the existing rail network are therefore not expected
  - Rail operational traffic volumes are likely to be negligible with no expected impact to operational conditions of the surrounding road network.
- Traffic impact assessment:
  - Project-related traffic comprises both construction and operational activities—it is anticipated that impacts would primarily occur during construction
  - Road sections predicted to generate construction related traffic volumes in excess of 10 per cent of the background traffic have been identified—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, it is not expected that the Project will generate the need to upgrade the road network for such a short duration of impact—with traffic and road use management strategies and targeted mitigation measures identified.
- Cumulative impact assessment:
  - Consideration has been given to the potential combined impacts of other major projects (at planning, design or construction stage) in the region. For the traffic analysis, only developments that have already submitted EIS documentation to the Coordinator-General have been considered, as well as other Inland Rail projects
  - C2H, C2K and Bromelton State Development Area projects may have overlapping construction dates with the Project, with impacts dependent on the timing and location of the proposed construction works. These projects have the potential for cumulative impacts on traffic volumes, congestion and potentially lead to delays during the construction period
  - A qualitative cumulative impact assessment and associated results are in Chapter 22: Cumulative impact assessment.
- Mitigation measures:
  - Traffic, transport and access mitigation measures have been included as part of the Project design to manage potential impacts. To further manage Project risks, a number of additional mitigation measures have been proposed. The additional mitigation measures will be implemented during future delivery phases of the Project. With additional mitigation measures in place, the residual risk level of potential impacts were found to reduce.

This assessment has found that the Project will maintain the safety and efficiency of all potentially affected transport modes. This includes the Project workforce and other transport system users. This assessment has also found that the condition of existing transport infrastructure (including pavements) will be maintained during Project construction works and operations.

The Project will be compatible with existing transport infrastructure, future transport corridors and the surrounding road network.