CHAPTER 26

Cumulative impacts

ALBURY TO ILLABO ENVIRONMENTAL IMPACT STATEMENT

ARTC | INLAND RAIL
An Australian Government Initiative

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26. Cumulative impacts

26.1 Summary

The potential for cumulative impacts resulting from the interaction of the proposal with other projects, either existing or proposed, in the surrounding area is considered low. During construction there could be cumulative impacts associated with biodiversity, non-Aboriginal, noise, traffic and amenity. Potential cumulative impacts on short-term accommodation due to the concurrent construction of the proposal and Illabo to Stockinbingal would be managed through the workforce accommodation strategy for the Inland Rail program of works. There are no predicted cumulative impacts during operation.

26.2 Approach

This chapter provides a summary of the cumulative impacts of the Albury to Illabo (A2I) section of the Inland Rail program (the proposal).

26.2.1 Secretary's environmental assessment requirements

The Secretary's Environmental Assessment Requirements (SEARs) related to cumulative impacts, and where in the environmental impact statement (EIS) these have been addressed, are detailed in Appendix A: Secretary's Environmental Assessment Requirements. For an EIS, cumulative impacts can be defined as the successive, incremental and combined effect of multiple impacts, which may in themselves be minor but could become significant when considered together.

The SEARs for the proposal requires (item 2.1(o)), '*an assessment of the cumulative impacts of the project taking into account other projects that have been approved but where construction has not commenced, projects that have commenced construction, and projects that have recently been completed*'.

26.3 Methodology

The assessment of potential cumulative impacts has been undertaken in accordance with the SEARs and considers the potential for impacts, taking into account other projects in the study area.

The following tasks were undertaken to assess the potential for cumulative impacts:

- identifying potentially relevant projects in the study area (either proposed or approved) based on information available in the public domain
- screening identified projects for their potential to interact with the proposal
- identifying and assessing (quantitatively or qualitatively) the significance of potential cumulative impacts.

The study area for the cumulative impact assessment varies for each environmental issue. The study area for each environmental issue took into consideration environmental values, recognised administrative boundaries and/or the physical or operational extent of the feature/facility being assessed for the corresponding impact assessment. For some environmental issues, such as traffic and air quality, there is potential for cumulative impacts to occur over a wide area, and a larger study area is considered appropriate.

Potentially relevant projects were identified based on a search of the following data sources in May 2022:

- Department of Planning and Environment's (DPE) Major Projects register
- NSW Independent Planning Commission project registers for the Albury City, Great Hume, Lockhart, Wagga Wagga City and Junee local government areas (LGAs)
- NSW Southern Regional Planning Panel planning register
- Transport for NSW (TfNSW) websites
- local council websites and development approval tracking databases.

The projects identified were screened in relation to their potential for cumulative impacts with the proposal, based on their nature, size and proximity to the proposal site. The construction and operation timeframes of other projects were also considered during screening.

The assessment also draws on the cumulative impact assessments undertaken by the specialist impact assessments that support the EIS (Technical Papers 1 to 14), and publicly available environmental impact assessments for other projects obtained via the Major Projects register.

Screening of potential cumulative impacts was undertaken by comparing the extent and duration of residual impacts, the potential to occur in the same place at the same time as that for the proposal and the potential to impact the same sensitive receiver. The significance of cumulative impacts was then assessed to the extent

possible, with consideration of the extent, magnitude and duration of the impact and the sensitivity of the environment. A combined cumulative impact assessment was undertaken by identifying where multiple impacts have the potential to occur at the same place and time for the same sensitive receiver (e.g. transport, noise and air quality impacts). The outcome of this assessment is discussed in Section 26.5.4.

26.4 Other projects in the study area

Projects in the study area considered to have the potential for cumulative impacts with the proposal are listed in Table 26-1 and are shown in Figure 26-1.

The Inland Rail Program has been split into environmental planning approval packages with discrete objectives based on geographical location and type of works proposed. The Inland Rail—Tottenham to Albury (T2A) and Inland Rail—Illabo to Stockinbingal (I2S) projects are the closest projects, geographically, to the proposal with potential for cumulative impacts.

TABLE 26-1 PROJECTS WITH THE POTENTIAL FOR CUMULATIVE IMPACTS WITH THE PROPOSAL

Project	Proponent	Description	Location with respect to the proposal site	Type	Status	LGA
A2I (utility adjustments)	ARTC	Utility adjustments that form part of early works associated with the proposal that are subject to separate approvals.	At enhancement sites	Utilities	Proposed[1]	Albury, Lockhart, Greater Hume and Junee
T2A (Victoria)	ARTC	A series of enhancement works to the existing rail corridor between the Victoria–NSW border at Albury and Melbourne. Stage 1 (Beveridge to Albury) consists of 12 sites.	About 16 km to the west of Murray River bridge	Rail infrastructure facilities	Stage 1—Approved Stage 2—On hold[1]	Whittlesea, Mitchell, Strathbogie, Benalla, Wangaratta, Wodonga
Thurgoona Link Road	Albury City Council	Construction of a new road that will provide connectivity to the Hume Freeway at Davey Road, plus an east–west link from Elizabeth Mitchell Drive to Kerr Road.	Adjacent to Billy Hughes bridge	Road infrastructure	Under construction	Albury
Nexus Industrial Precinct	Albury City Council	A 450-hectare (ha) site zoned to support large or heavy industrial development.	Adjacent to Billy Hughes bridge	Industrial development	Approved	Albury
Jindera Solar Farm	Jindera Solar Farm Pty Ltd	120 megawatt (MW) solar farm with energy storage and associated infrastructure.	About 10 km north-west of Table Top Yard clearances	Electricity generation—solar	Approved	Greater Hume
Glenellen Solar Farm	Glenellen Solar Farm Pty Ltd	200 MW solar farm with energy storage and associated infrastructure.	About 14 km north-west of Table Top Yard clearances	Electricity generation—solar	Proposed	Greater Hume
Walla Walla Solar Farm	FRV Services Australia Pty Ltd	A 300 MW solar farm and associated infrastructure.	About 6 km south-west of Culcairn Yard clearances	Electricity generation—solar	Approved	Greater Hume
Culcairn Solar Farm	Neoen Australia Pty Ltd	400 MW solar farm with energy storage	About 10 km south-west of	Electricity generation—solar	Approved	Greater Hume

Project	Proponent	Description	Location with respect to the proposal site	Type	Status	LGA
		and associated infrastructure.	Culcairn Yard clearances			
Uranquinty Solar Farm	Origin Energy	200 MW solar farm including battery storage and associated infrastructure.	About 14 km north-west of Uranquinty Yard clearances	Electricity generation—solar	Proposed[1]	Wagga Wagga
Sandy Creek Solar Farm	BayWa r.e. Projects Australia Pty Ltd	17 MW solar farm including connection to the existing 22 kilovolt (kV) line along the Olympic Highway, via a new switching station.	Directly north of Uranquinty Yard clearances	Electricity generation—solar	Proposed[1]	Wagga Wagga
Gregadoo Solar Farm	Gregadoo Solar Farm Pty Ltd	47 MW solar farm and associated infrastructure.	About 12 km east of Uranquinty Yard clearances	Electricity generation—solar	Approved	Wagga Wagga
Solar farm (five MW)—Uranquinty	BE Pro UQ Pty Ltd	A five MW solar farm and associated infrastructure.	About 1.5 km south east of Uranquinty Yard clearances	Electricity generation—solar	Proposed	Wagga Wagga
Solar farm (five MW)—Bomen	Wagga Wagga Solar Farm Nominee Pty Ltd	A five MW solar farm and associated infrastructure.	About 800 m south of Bomen Yard clearances	Electricity generation—solar	Proposed	Wagga Wagga
Wagga Wagga Special Activation Precinct (SAP)	NSW Government	The Wagga Wagga SAP covers an area of approximately 4,500 ha, including 300 ha already developed as part of the Bomen Industrial Precinct. The precinct will focus on advanced manufacturing, agribusiness, and freight and logistics.	Surrounding Bomen Yard clearances	Industrial and commercial development	Approved	Wagga Wagga
Riverina Intermodal Freight and Logistics Hub	City of Wagga Wagga Council	Construction of approximately 4.9 km rail siding off the Main South Line and the intermodal freight terminal.	About 1 km north of the Bomen Yard clearances	Rail and road infrastructure facilities	Under construction	Wagga Wagga
Olympic Highway intersection upgrades	Transport for NSW	Upgrade of the Olympic Highway intersections at Old Narrandera Road and Travers Street, Wagga Wagga	About 3 km to the west of Bomen Yard clearances. About 4 km north of Wagga Wagga Station and Yard clearances	Road infrastructure	Proposed	Wagga Wagga

Project	Proponent	Description	Location with respect to the proposal site	Type	Status	LGA
Project EnergyConnect (NSW—Eastern Section)	TransGrid	Development of a new transmission line (330 kV minimum) connecting Buronga Substation and Wagga Wagga Substation, and construction of the new Dinawan Substation (170 km west of Wagga Wagga).	About 7 km south of Wagga Wagga Station and Yard clearances About 3 km to the south west of Uranquinty Yard clearances.	Electricity transmission	Proposed	Wagga Wagga
HumeLink	Transgrid	Construction of a new 500kV transmission line, which will connect Wagga Wagga, Bannaby and Maragle.	About 14 km south of Wagga Wagga Station and Yard clearances About 18 km to the south west of Uranquinty Yard clearances.	Electricity transmission	Proposed[1]	Wagga Wagga
Junee Station upgrade	TfNSW	Upgrades to Junee Station to improve accessibility for those with a disability or limited mobility.	At Junee Station	Rail infrastructure facilities	Under construction	Junee
Junee to Griffith Line upgrade	TfNSW	Line upgrade work between Junee and Griffith to allow for increased train speeds to improve efficiency for freight carriers as part of the Fixing Country Rail program.	Adjacent to Junee Station	Rail infrastructure facilities	Under construction	Junee
Illabo Solar Farm	Tilt renewables	80 MW solar farm and associated onsite infrastructure, including a 132-kV substation and overhead transmission lines.	About 6 km south east of Junee to Illabo clearances	Electricity generation—solar	Proposed (on hold)	Junee
I2S (NSW)	ARTC	Construction and operation of new rail and associated facilities to accommodate double stack freight trains up to 1,800 m long.	Adjacent to Junee to Illabo clearance	Rail infrastructure facilities	Proposed[1]	Junee, Gundagai

Project	Proponent	Description	Location with respect to the proposal site	Type	Status	LGA
Grade separating road interfaces	Transport for NSW	Transport for NSW is currently in the early planning stages to grade separate road and rail interfaces at four locations where Inland Rail crosses the NSW road network. The nearest grade separation proposal is the Olympic Highway at Harris Gates proposal, located north of Illabo.	Intersects with the Junee to Illabo clearances	Road infrastructure	Proposed[1]	Junee

1. Environmental impact assessment, plan or equivalent impact assessment have not been released and/or was not publicly available at the time of this assessment.

Cumulative impacts are most common during the construction phase, with the highest impact on the local community and environment likely to occur during this phase of a project lifecycle. The construction period for these projects (based on information available in May 2022) is shown against the proposal construction program in Table 26-2. Projects that do not have published construction timeframe (as of May 2022) have not been included in Table 26-2. The potential for cumulative impacts to occur during operation has also been considered; however, the operational timelines have not been plotted, as these projects all have significant operational lifespans of greater than 25 years.

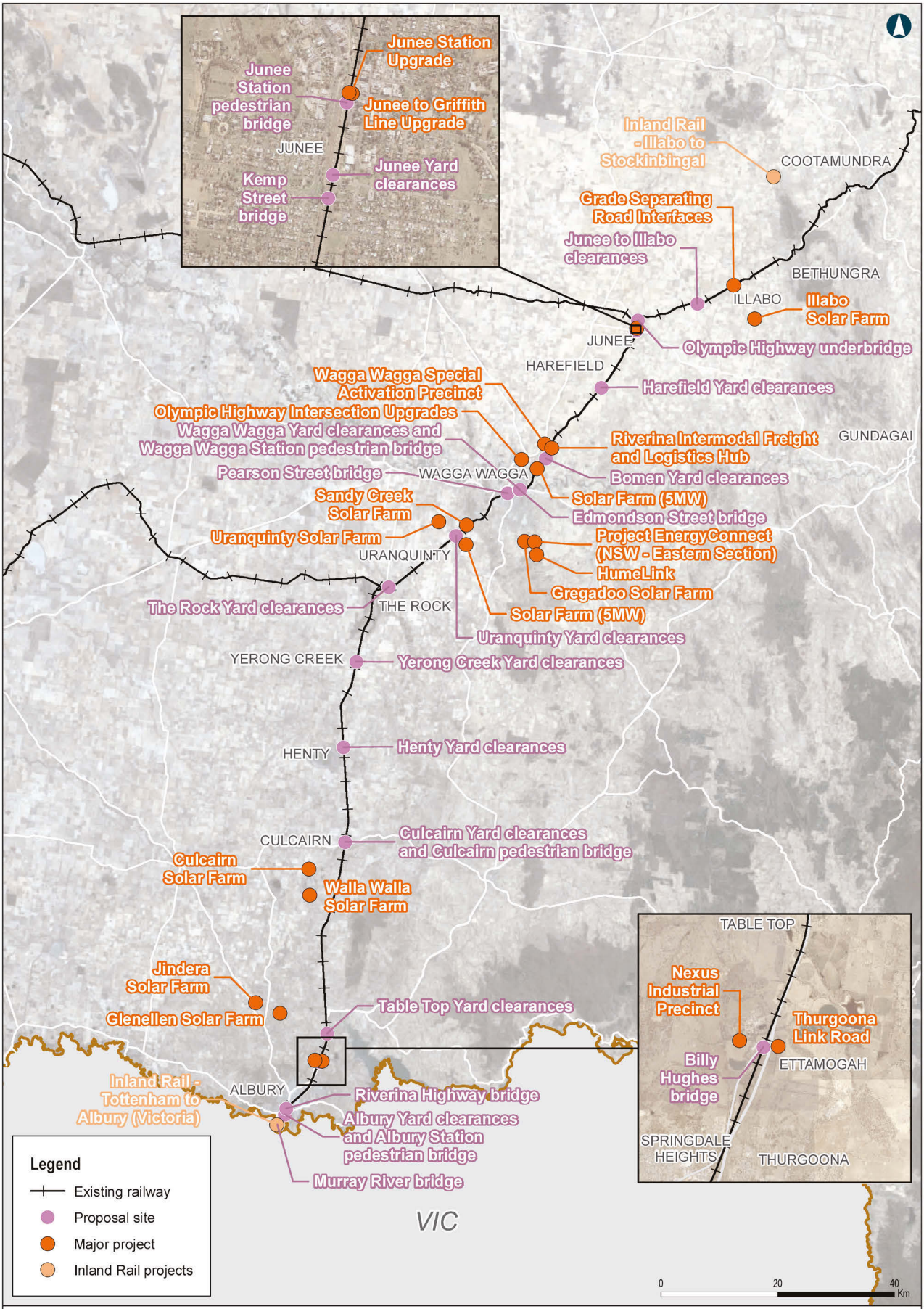

Figure 26-1 Major projects in the vicinity of the proposal

Data Sources: ARTC, NSWSS

Coordinate System: GDA 1994 MGA Zone 55
Scale: 1:850,000
Paper size: A3
Date: 24/05/2022

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TABLE 26-2 ANTICIPATED SCHEDULE OVERLAPPING WITH NEARBY PROJECTS

Project	Duration of construction																			
	2021				2022				2023				2024				2025			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
The proposal																				
Albury precinct																				
Greater Hume–Lockhart precinct																				
Wagga Wagga precinct																				
Junee precinct																				
Other projects																				
Inland Rail—Tottenham to Albury (Victoria)																				
Thurgoona Link Road																				
Nexus Industrial Precinct																				
Jindera Solar Farm																				
Glenellen Solar Farm																				
Walla Walla Solar Farm																				
Culcairn Solar Farm																				
Uranquinty Solar Farm																				
Wagga Wagga Special Activation Precinct																				
Olympic Highway intersection upgrades																				
Riverina Intermodal Freight and Logistics Hub																				
Project EnergyConnect (NSW–Eastern Section)																				
HumeLink																				
Junee Station Upgrade																				
Junee to Griffith Line Upgrade																				
Inland Rail–Illabo to Stockinbingal																				

26.5 Cumulative impact assessment

The cumulative impact assessment for the proposal is provided in the following sections. Table 26-3 provides a summary of potential cumulative impacts for each project listed in Section 26.4 and the relevant precinct for the proposal.

TABLE 26-3SUMMARY OF POTENTIAL CUMULATIVE IMPACTS FOR EACH PROJECT

Project	Types of cumulative impacts with the proposal	Relevant precincts
Inland Rail—Tottenham to Albury (Victoria)	▸ Transport and traffic ▸ Social ▸ Hazards ▸ Landscape and visual	▸ Albury
Thurgoona Link Road	▸ Social ▸ Noise and vibration ▸ Terrestrial flora and fauna ▸ Aquatic flora and fauna	▸ Albury
Nexus Industrial Precinct	▸ Non-Aboriginal heritage ▸ Noise and vibration ▸ Aquatic flora and fauna	▸ Albury
Jindera Solar Farm	▸ Terrestrial flora and fauna	▸ Albury
Glenellen Solar Farm	▸ Terrestrial flora and fauna	▸ Albury
Walla Walla Solar Farm	▸ Terrestrial flora and fauna	▸ Greater Hume–Lockhart
Culcairn Solar Farm	▸ Terrestrial flora and fauna	▸ Greater Hume–Lockhart
Sandy Creek Solar Farm	▸ Noise and vibration ▸ Landscape and visual	▸ Wagga Wagga
Gregadoo Solar Farm	▸ Terrestrial flora and fauna	▸ Wagga Wagga
Solar farm (five MW) – Uranquinty	▸ Terrestrial flora and fauna ▸ Transport and traffic	▸ Wagga Wagga
Solar farm (five MW) – Bomen	▸ Terrestrial flora and fauna ▸ Transport and traffic ▸ Landscape and visual	▸ Wagga Wagga
Wagga Wagga SAP	▸ Transport and traffic ▸ Non-Aboriginal heritage ▸ Social ▸ Noise and vibration ▸ Landscape and visual	▸ Wagga Wagga
Riverina Intermodal Freight and Logistics Hub	▸ Transport and traffic ▸ Noise and vibration	▸ Wagga Wagga
Olympic Highway intersection upgrades	▸ Transport and traffic ▸ Terrestrial flora and fauna ▸ Social	▸ Wagga Wagga
Project EnergyConnect (NSW—Eastern Section)	▸ Social ▸ Landscape and visual ▸ Air quality	▸ Wagga Wagga
HumeLink	▸ Social ▸ Terrestrial flora and fauna ▸ Transport and traffic	▸ Wagga Wagga
Junee Station Upgrade	▸ Noise and vibration ▸ Aquatic flora and fauna ▸ Hydrology, flooding and water quality	▸ Junee
Junee to Griffith Line Upgrade	▸ Aquatic flora and fauna ▸ Landscape and visual	▸ Junee
Illabo Solar Farm	▸ Terrestrial flora and fauna	▸ Junee

Project	Types of cumulative impacts with the proposal	Relevant precincts
Inland Rail—Illabo to Stockinbingal	▸ Transport and traffic ▸ Non-Aboriginal heritage ▸ Social ▸ Economic ▸ Noise and vibration ▸ Terrestrial flora and fauna ▸ Aquatic flora and fauna ▸ Landscape and visual ▸ Hazards	▸ Junee
Grade separating road interfaces	▸ Terrestrial flora and fauna ▸ Transport and traffic ▸ Landscape and visual	▸ Junee

26.5.1 Transport and traffic

Construction

Developments proposed in proximity of the proposal site have the potential to increase the number of construction vehicles on local roads.

The proposal would connect into two other Inland Rail projects (I2S and T2A), neither of which are approved at this stage. If construction of these projects occurs at the same time, the traffic generated from these projects would be distributed over the length of the alignments and be produced from similar construction activities to the proposal. The potential cumulative impacts are mainly expected to be around Albury on the Hume Highway and Illabo on the Olympic Highway. Cumulative impacts on traffic delays and queueing in the Albury and Illabo areas are expected to be minor due to the relatively low traffic generated by the proposal and the scheduled peak construction activities of the adjacent Inland Rail projects occurring at different times to the proposal.

The Olympic Highway level crossing (LX 603) is an existing activated crossing and as part of the proposal it would be modified to accommodate the realigned track associated with the Junee to Illabo clearances enhancement site. TfNSW is in the early planning stages of a grade separation project of the road and rail interface at LX 603. This project will investigate options for bridges, underpasses or side tracks at the road and rail interface. The grade separation project has not yet been approved so a potential construction timeframe is unknown. It is therefore difficult to predict if the construction period of the grade separation project and the proposal would overlap. ARTC would continue to consult with TfNSW to be aware of the final design solution of the grade separation project and proposed construction timeframe.

The end of construction of Project EnergyConnect (NSW—Eastern Section) would overlap with construction of the proposal in 2024. These concurrent construction periods would likely cause additional construction traffic on the Olympic Highway and the Sturt Highway. Based on the low traffic generation associated with the construction of the proposal and the capacity of the highways and arterial roads, the road network would be able to accommodate traffic movements for these projects.

The highest level of impacts during construction of the proposal result from the diversion of traffic within the Wagga Wagga urban area associated with the Edmondson Street bridge closure. As there are no projects scheduled to be constructed during the Edmondson Street bridge closure, it is not expected that there would be any cumulative impacts in this area.

The cumulative impacts of multiple projects are not predicted to cause additional delay, queuing, or other performance impacts beyond what has been assessed in Chapter 9: Transport and traffic.

Operation

The Inland Rail program has the potential to reduce the overall number of trucks along the north–south road corridors in the region by shifting freight movements from road-based transport to the rail corridor. The potential benefits that may accrue as a result of this modal shift include:

- fewer trucks on the road would reduce the impacts to road capacity and potentially delay the need for road capacity improvements
- fewer trucks on the road would reduce the impacts to the pavement on the roads and the overall maintenance costs required on these roads
- the reduction of long-haul truck movements on the road network has potential safety improvements for the local areas near the proposal but also the wider road network
- the reduction of long-haul truck movements reduces the likelihood of an incident due to driver fatigue.

There is not expected to be any significant impact to road network performance during operation of the proposal. It is not expected that the operation of the infrastructure projects located in the vicinity of the A2I section of the Inland Rail would generate any additional traffic movements on the surrounding road network. The proposed industrial and logistics developments located in the vicinity of the A2I section of the Inland Rail corridor are likely to generate daily light vehicle movements (staff movements) and freight-related heavy vehicle trips associated with each project. The staff movements generated by these developments are expected to be dispersed across the road network. The heavy vehicle trips generated by the industrial and logistics developments are expected to be primarily on highways.

It is expected that any shared operational access routes between the proposal and these renewable energy, industrial and logistics developments are likely to be arterial roads and highways. Based on the low traffic generation associated with the operation of the proposal, these arterial roads and highways would be appropriate to accommodate the additional traffic generated by the operation of the proposal.

26.5.2 Non-Aboriginal heritage

The non-Aboriginal heritage items impacted by the proposal represent approximately 70 years of railway heritage in NSW. They are associated with the establishment of the railway stations, the agricultural and commercial purposes of the railway network, and vehicle and pedestrian access over and within the railway precincts.

The majority of nearby projects would not impact any identified heritage items or values; however, several projects have the potential to cause impacts to both registered and unregistered heritage items. The projects with the potential to impact similar heritage values include the Inland Rail projects directly the north and south, Wagga Wagga SAP and Junee Station upgrade. The removal of two unregistered bridges and one section 170 heritage register bridge as part of the proposal would add to the low cumulative impact on non-Aboriginal heritage in the region but is not expected to affect the wider cultural value of the rail line.

There is potential for impact to the same heritage items at Bomen Yard clearances due to the Wagga Wagga SAP and Junee Yard clearances and pedestrian bridge due to the Junee Station upgrade. It is unknown what impact the Wagga Wagga SAP would have on Bomen Railway Station (SHR 01093); however, the proposal would have no impact on the Bomen Railway Station. The heritage impact of the Junee Station upgrade on the Junee Railway Station, Yard and Locomotive Depot (SHR 01173) is unknown. The project does overlap with the proposal; however, the majority of the works are concerned with the internal spaces of the station building and with the forecourt. There is the potential for cumulative impact to the Junee Station but this is likely to be minor.

26.5.3 Land use and property

During construction, the proposal would be predominantly contained within the operational corridor, with only a small amount of land required outside of the rail corridor. There would be temporary loss of a small amount of agricultural land primarily associated with the Billy Hughes bridge and Junee to Illabo clearances enhancement sites, and loss of open spaces in Junee. The proposal site would not be subject to construction for another project directly before, after or during construction of the proposal. As such, there are not expected to be receivers impacted by the proposal who would also be impacted by the other projects assessed.

No permanent land acquisition is required for the proposal. The proposal would result in a permanent reconfiguration of open space at the Kemp Street bridge enhancement site due road adjustments. The rail corridor would continue to be used for freight and passenger transport during operation of the proposal. Overall, the proposal would contribute a negligible amount to cumulative land use impacts from projects in the study area.

26.5.4 Social

Multiple projects undergoing construction concurrently and/or sequentially, including the Inland Rail projects T2A and I2S, Thurgoona Link Road, Wagga Wagga SAP, Project EnergyConnect, the Olympic Highway intersection upgrades and HumeLink, may lead to cumulative social impacts.

The potential positive cumulative social impacts expected to result from the construction and operation of the proposal and the above projects are as follows:

- positive flow-on economic effect on local industry and businesses, resulting in increased and prolonged local spending on recreational and lifestyle services and goods
- increased employment opportunities in the local area.

The key potential negative cumulative social impacts expected to occur during construction and operation of the proposal and the above projects are summarised below:

- increased cost of accommodation and other local goods during construction
- increased wages potentially affecting labour sourcing for smaller local employers particularly during construction
- detrimental wellbeing effects in Albury, Wagga Wagga and Junee during construction
- detrimental loss of non-Aboriginal cultural heritage along the rail corridor.

Construction fatigue can be felt by receivers affected by multiple or prolonged construction projects where sustained impacts are experienced. Combined cumulative impacts on transport, noise, air quality and visual amenity, particularly during construction, are considered low and would be dependent on construction scheduling. Impacts on health and wellbeing are likely to be most pronounced where the Inland Rail projects meet in Albury and to the north east of Illabo and at Uranquinty, Bomen in Wagga Wagga and Junee, where nearby residents may experience construction impacts over a more extended period. Works in Albury and near Illabo would be relatively short term and would be unlikely to contribute to feeling of construction fatigue.

The concurrent or closely aligned construction programs of the above projects may increase demand for labour in the local and regional economy, particularly for workers in the trade and construction industry. The low workforce migration in the local area suggest that an influx of non-local construction workers into the region for a prolonged period due to multiple construction programs could result in residents feeling a loss of community connection and values. Community identity and values in the regional study area, as identified in Technical Paper 4: Social, suggest openness to economic opportunities that could bring people from diverse cultures to live, work and settle in the council region. The delivery of multiple projects in the region is likely to have flow-on economic benefits to local industry and businesses in the form of increased and prolonged spending, particularly in surrounding service communities, to satisfy recreational and lifestyle demands.

Total demand on the workforce and accommodation from the proposal and I2S would have a cumulative impact, with potential additional pressure from other major projects that are nearby. At the same time, project accommodation and construction demands could also increase income for local businesses that provide accommodation. Current projections indicate that the I2S project would have demand for approximately 250 workers in February and March 2024, which, depending on the accommodation approach, may significantly constrain supply at a time of peak demand for the proposal. Increased demand associated with other projects in the area and seasonal workforces could result in potential accommodation shortages during construction. Consequently, it is likely there will be a cumulative effect on the already constrained local labour workforce and accommodation market, which could derive from an increase in the cost of accommodation and increased wages potentially affecting smaller local employers.

To manage demands from Inland Rail, a coordinated response to this cumulative demand from this proposal and I2S would be managed as a whole by ARTC. This could include approaches to minimise demand on the same accommodation resources, such as through scheduling.

Wagga Wagga and Albury are some of the most populated regional centres in the study area, with existing workforce migration, making them more resilient to population changes. In the case of Junee, there are three projects scheduled for construction before the proposal; this experience could build resilience and practice in community members as to how to interact with temporal workforces. Therefore, cumulative effects on connection and values are likely to be moderate. Mitigation to address potential cumulative impacts from the workforce and accommodation demands are identified in Chapter 13: Social.

26.5.5 Economic

Cumulative economic impacts have the potential to occur with other major infrastructure projects, such as Illabo to Stockinbingal and Project EnergyConnect (NSW—Eastern Section). Broader benefits of the Inland Rail program are outlined in Chapter 2: Strategic context and need.

The concurrent construction of interacting projects has the potential to increase the demand for labour in the local and regional economy, particularly for workers with trade and construction skills and knowledge. The demand for construction workers within a similar timeframe would lead to cumulative demands on construction labour, not only within the local and regional economy but also NSW and, potentially, nationally. Further benefits may be generated in the form of lowered mobilisation costs and transfer of labour experience and skills to projects that continue to occur after the end of the construction phase.

As discussed in Section 26.5.4, the expansion in construction activity and regional employment, with a subsequent increase in temporary and non-resident population, has the potential to increase demand for a range of local infrastructure and services, including housing, health care, childcare and education. Further, spending on consumer-orientated products by the construction workforce has the potential to benefit local retail businesses by increasing their trading levels.

Cumulative supply chain impacts are likely to be realised where construction timeframes occur concurrently and comparable material is required. Opportunities to supply these projects may include supply of fuels, equipment and quarried material. Where materials are sourced in the surrounding regions, increased local expenditure is likely to increase local and regional economic activity; however, should the demand for material surpass supply, resulting in a shortage of available material, input costs to the proposal may increase (due to increased prices of materials) driving up the total construction cost, negatively impacting on the economic return of the proposal.

26.5.6 Noise and vibration

Construction

Cumulative construction noise impacts have the potential to occur where projects that occur within a kilometre of each other have overlapping construction schedules and noisy activities occur simultaneously. Construction works for T2A, Thurgoona Link Road, Wagga Wagga SAP and Project EnergyConnect are scheduled to overlap with construction of the proposal. There is potential for cumulative noise impacts with these projects with the exception of T2A, which is located far enough from the enhancement sites within the Albury precinct to avoid cumulative impacts.

Cumulative noise impacts to receivers near Billy Hughes bridge, Uranquinty Yard clearances and Bomen Yard clearances during construction would depend entirely on construction methodology and detailed scheduling for these projects. Impacts due to I2S construction would depend on the final construction schedule for that project, specifically if works at the northern extent of this proposal would occur while works are underway on the southern extent of the I2S section of Inland Rail. In general, noise levels would equal the contribution of the loudest construction site; however, in worst case scenarios, the noise levels may be up to 3 dB louder than the maximum predicted impacts for either project. Further detail on the predicted cumulative noise impacts are in Technical Paper 6: Noise and vibration (non-rail).

Operation

The proposal directly links with the Inland Rail projects I2S, directly to the north, and T2A, to the south. The primary source of rail noise would be trains as they travel on the proposal alignment. Rail noise from the arrival and departure of the trains from the adjacent project sections would occur further from the proposal infrastructure. As such, adjacent rail operations are not expected to result in a cumulative increase in daily railway noise levels at the sensitive receivers within the proposal study area.

Operational road traffic noise impacts are not predicted. The proposal would not substantially change the distribution of traffic on the road network and, therefore, would not contribute to cumulative traffic noise impacts.

26.5.7 Biodiversity

Terrestrial flora and fauna

The most significant cumulative impact of multiple Inland Rail projects and other proposed developments is the continued loss of biodiversity in the region. Projects with sufficient planning approval information pertaining to the biodiversity impact assessment were considered for assessment of potential cumulative impacts in association with the proposal.

Clearing of native vegetation from these projects comprises approximately 1,640 ha, which includes a cumulative impact of up to 62 ha of the threatened ecological communities (TEC), White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland, which is listed as Critically Endangered under the BC Act.

The proposal would impact an additional 4.44 ha of mostly poor condition native vegetation, including 2.84 ha of impact to White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland. This is comprised of 0.50 ha of moderate condition vegetation and 2.34 ha of derived native grassland.

White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland has an estimated reduction in geographic distribution of 94 per cent. Accordingly, in the locality of the proposal, it is likely that cumulative impact on up to 62 ha of this TEC would be considered significant.

The proposal would contribute a small portion of the cumulative reduction of this TEC in the region with impact on vegetation in moderate and derived condition. The proposal would impact on isolated patches and patches with limited connectivity that are subject to grazing and high edge effects from cropping. It is not considered to be habitat that would be important for the long-term survival of the TEC. Additionally, the proposal is unlikely to significantly increase fragmentation of the community within the region.

These projects have the potential to contribute to the cumulative loss of habitat and would likely place further pressure on local threatened flora and fauna species and ecological communities. The cumulative impacts that are most likely to occur with these projects are the direct impacts on plant community types (PCTs) and threatened species habitat.

Operation of the proposal has the potential to add cumulatively to existing connectivity impacts and increase the risk of fauna mortality through wildlife-train collisions. Although the proposal is associated with an existing operational rail corridor, increased train movements and double-stacked trains may exacerbate existing connectivity impacts and increase the risk of fauna mortality through wildlife–train collisions.

Aquatic flora and fauna

Cumulative aquatic biodiversity impacts have the potential to occur where projects are located in close proximity around a watercourse crossed by the proposal. The projects identified included Thurgoona Link Road, Nexus Industrial Precinct, Junee Station upgrade and Junee to Griffith Line upgrade, and the Inland Rail project directly to the north (I2S).

Construction works, road operations and maintenance works have the potential to reduce water quality in the watercourses crossed by the projects through the mobilisation of sediments, litter and other contaminants via wind or stormwater runoff. These activities could subsequently impact aquatic biodiversity by increasing water turbidity, increasing nutrient quantities, and transporting contaminants through the food chain, resulting in dieback of aquatic vegetation, algal blooms and an overall increase in fish kills. As the impacts of the proposal would be highly localised and temporary, any cumulative impacts as result of the proposal would be negligible.

26.5.8 Landscape and visual

During construction there is the potential for additional construction activity to be seen in views to the proposal, where construction timeframes of other projects may overlap with this proposal. These projects are Thurgoona Link Road, Sandy Creek Solar Farm at Uranquinty, the Bomen Solar Farm, the Wagga Wagga SAP at Bomen and I2S at Illabo. There would potentially be views to construction activity seen together with this proposal from specific viewpoints; this would be temporary and dependent on construction schedules overlapping.

During operation, there is the potential for other projects in views of the proposal. These projects similar to above are the Thurgoona Link Road near the Billy Hughes bridge enhancement site; and the Wagga Wagga SAP at Bomen. These projects with the proposal may cumulatively result in a minor intensifying of the character of the road and rail infrastructure. The Sandy Creek Solar Farm would be seen together with the proposal at the Uranquinty Yard clearances enhancement site during operation of the proposal. While the form and scale of the Sandy Creek Solar Farm would be different to this proposal at Uranquinty, combined, the developments would alter the character of the areas to the north of Uranquinty, intensifying the infrastructure character of this area, resulting in a cumulative visual impact. North of Illabo, there would be cumulative landscape and visual impacts during operation of the grade separating road interface at the Olympic Highway at Harris Gates. The proposal would intersect with the Junee to Illabo clearances and an additional road bridge structure would be viewed together with this proposal.

Operation may also result in cumulative impacts with the Inland Rail projects, T2A at Albury and I2S at Illabo. While these projects are different stages of the same program, the combined experience of this proposal viewed sequentially across the landscape would combine to intensify the rail character of the existing broader Melbourne to Sydney rail corridor and presence of this corridor in the broader landscape. The increased length, height and frequency of trains would intensify the rail character of the rail corridor at a regional scale, forming a more visually prominent feature across this area of regional NSW and northern Victoria.

26.5.9 Hydrology, flooding and water quality

Cumulative impacts of the proposal and other projects in the region are not expected with respect to drainage, flooding, hydrology and surface water quality. There is potential for cumulative impacts at the Junee pedestrian bridge enhancement site where the proposed station upgrade project may occur at the same time as the enhancement works (pedestrian bridge and yard clearances).

Flooding

Cumulative construction impacts on flooding and geomorphology are expected to be short term. Potential impacts may include localised changes to flooding regimes due to obstacles to overland flow; and localised geomorphology impacts due to disturbance of watercourse bed and banks.

The proposal has been designed the ensure flooding levels are unchanged and the changes in the broader catchments would be negligible. The increase of impervious area as a result of the proposal would be minimal as works are primarily within the existing rail corridor. At the proposal interfaces with the Inland Rail I2S and T2A projects, there is limited interaction or overlap of flood behaviour and catchments. The interface with I2S at north east of Illabo occurs within a catchment of minor tributaries. For T2A, the works are at a distance to the proposal and separated by the Murray River. The works along on the Murray River for this proposal would not change flooding behaviour; as such, there is considered to be no cumulative flooding impacts during construction and operation.

The grade separation project at the existing Olympic Highway level crossing (LX 603) is in the early planning stages. The potential construction timeframe is unknown as well as the design solution. It is therefore difficult to predict if the construction period of the grade separation project and the proposal would overlap; however, operational cumulative impacts are not expected given the proposal would not have an impact during operation. ARTC would continue to consult with TfNSW to be aware of the final design solution of the grade separation project and proposed construction timeframe.

Water quality

The proposal is expected to have a minor contribution to cumulative surface water quality impacts with the implementation of mitigation measures during construction and operation. Projects that could lead to cumulative surface water impacts would be those with an immediate interface during construction and/or operation of the proposal. Other projects occurring in the broader study area would likely have a negligible increase in surface flows or runoff. Combined with the distance to downstream waterways and implementation of the proposed mitigation and management measures, the cumulative impact is expected to be negligible.

Overall, the proposal, when considered with other projects in the area, would have minor cumulative impacts on surface water quality associated with construction, and minor cumulative impacts associated with operation. Where any minor impacts occur, they are likely to be highly localised or temporary.

26.5.10 Air quality

The potential for air quality impacts as a result of the proposal are mainly associated with construction. The projects identified within 5 km of the proposal are considered to have greater potential to impact on air quality at the proposal site and therefore contribute to a cumulative impact.

Construction works for Thurgoona Link Road (near Billy Hughes bridge enhancement site), Wagga Wagga SAP (near Bomen Yard clearances enhancement site), Project EnergyConnect (near Uranquinty) and I2S north of Illabo are scheduled to overlap with construction of the proposal. Cumulative impact from dust generation may be experienced at sensitive receivers that are located near these projects and the proposal site in the Albury and Wagga Wagga precincts as well as at sensitive receivers near the interface of the proposal with I2S. Air quality impacts from the construction for the proposal are most likely from earthworks and demolition. Cumulative impacts would be subject to overlapping construction schedules and dust-generating activities. With appropriate management measures in place for each project, the cumulative impacts are expected to be low.

Operational emissions associated with using existing rail line would increase as a result of the proposal; however, the concentrations are still expected to be low and unlikely to contribute to cumulative impacts.

26.5.11 Waste and resource management

Construction waste management activities for the proposal would not have a significant impact on the environment or human health, provided recommended mitigation measures are implemented and construction wastes are managed in accordance with these measures. This includes the focus on the waste management hierarchy (avoid, reduce, re-use/recycle and dispose). Similarly, impacts of other identified projects in regard to construction waste are also considered negligible.

There is the potential for cumulative impacts in relation to capacity at waste management facilities within the study area. The majority of the landfill and transfer stations are operated by local councils for use by residents; however, the larger landfills and transfer stations are able to accept commercial waste. Many of the facilities in remote locations do not have large capacities and they may also have restrictions on throughput. Should the closer local (but generally smaller) facilities be unable to accept the waste quantities from all projects, then there may be a requirement to truck the waste further distances to larger regional facilities.

The other projects identified would also potentially be sending construction waste to facilities. Consultation would need to be undertaken with each local council to ensure there is sufficient capacity for waste disposal from the proposal. The generation of construction waste would be limited by avoidance and reuse programs, as far as practicable, and implementation of the waste mitigation measures provided in Chapter 23: Waste and resource management.

Construction of the Inland Rail projects would require similar types of resources associated with rail infrastructure, such as fill, ballast, sleepers and track for track works. These additive impacts would place more pressure on local suppliers, such as quarries. Existing track materials would be re-used for the projects, where practicable, to minimise material requirements and cumulative impacts.

There are no anticipated cumulative waste impacts associated with operation of the proposal and the identified projects.

26.5.12 Hazards

Operation of the proposal alongside any of those projects is unlikely to increase the hazards profile of any areas, as an existing operational rail corridor is being used. Collectively, the Inland Rail program would increase the frequency and size of trains travelling along the rail corridor, which would result in an increase in cumulative rail-related risks. The rail corridor would be designed and operated in accordance with ARTC's safety standards to avoid and minimise risks.

26.5.13 Greenhouse gases

The proposal and other Inland Rail projects when viewed as individual projects would contribute to GHG emissions during construction and operation; however, one of the key benefits of the Inland Rail program is a reduction in GHG emissions due to:

- reduced road freight, reducing road-based transport emissions
- reduced congestion, resulting in improved efficiency for other road users
- faster, straighter, flatter transport pathway, reducing energy required for transport
- increased fright capacity, increasing scales of efficiency
- faster transport times, reducing idle and unnecessary fuel consumption.

The Inland Rail program is expected to bring a net GHG emission improvement compared to not completing the Inland Rail program.

26.6 Summary

The potential for cumulative impacts between the proposal and other projects is considered to be low. Potential minor cumulative impacts have been identified for:

- Biodiversity—cumulative loss of native vegetation, associated habitats and habitat connectivity during construction and potential increase in risk of fauna mortality through train strike during operation. Potential cumulative water quality reduction, resulting in impacts to aquatic flora and fauna.
- Noise and vibration—potential for some impacted receivers in Bomen, Uranquinty and near Illabo to be affected by multiple projects where construction occurs at the same time or consecutively.
- Traffic and transport—potential for cumulative increases in construction vehicle movements where construction occurs at the same time, in particular on the Hume Highway near Albury and the Olympic Highway near Wagga Wagga.
- Socio-economic—potential for cumulative amenity impacts and construction fatigue and cumulative pressure on the workforce and accommodation, particularly in Junee and Wagga Wagga. Potential cumulative benefits would also arise through opportunities for business and workers associated with multiple projects.
- Waste and resource management—there may be insufficient capacity at smaller local facilities and construction waste may need to be transported to larger regional facilities.
- Hazards—a minor increase in the hazard risk profile during operation only as a result of increased train frequency and size operating between Melbourne and Sydney.

Potential cumulative impacts for the proposal would be managed in accordance with the mitigation measures compiled in Chapter 27: Approach to mitigation and management.

A coordinated response to cumulative impacts from this proposal and other Inland Rail projects would be managed collectively by ARTC. This would involve a range of coordination and scheduling measures to minimise the potential cumulative impacts to sensitive receivers and maximise employment opportunities in local communities.

26.6.1 Residual risk

Residual impacts are impacts of the proposal that may remain after implementation of the management and mitigation measures detailed in Chapter 27: Approach to mitigation and management. These are summarised inTable 26-4.

Further information on the approach to the environmental risk assessment, including descriptions of criteria and risk ratings, is provided in Appendix E: Environmental risk assessment.

TABLE 26-4 RESIDUAL RISK MANAGEMENT

Stage	Potential impact	Pre-mitigated rating	Mitigation measures[1]	Residual risk rating	Residual risk management[2]
Construction	Potential temporary construction cumulative impacts with other major projects	High	TT14, TT16, TT17, SI1, SI2, SI5, SI7, SI8	Low	N/A
Operation	Potential operational cumulative impacts with other major projects	Low	BD13, BD14	Low	N/A

1. As described in Chapter 27: Approach to mitigation and management
2. For residual impacts with a risk rating of medium or above.