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STATISTICAL REPORT

Rail

Trainline 12

August 2025

Bureau of Infrastructure and
Transport Research Economics

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Department of Infrastructure,
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Cover photograph: TasRail train, headed by TR Class locomotives, preparing to depart the Brighton Transport Hub in southern Tasmania. The Brighton Transport Hub is operated by TasRail and used for handling containers and logs. Photo courtesy of TasRail.

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Email: trainline.bitre@infrastructure.gov.au

Website: www.bitre.gov.au

Due to the complexity of all the tables in this report no table summary has been provided to any of them. If you need assistance with the structure of any of the tables, please email the Department of Infrastructure, Transport, Regional Development, Communications, Sport and the Arts at creative.design@infrastructure.gov.au.

At a glance

Outcomes

- Changes in intermodal tonnages across the interstate network in 2023–24 varied relative to the previous financial year. Between Acacia Ridge (Brisbane) and Islington Junction tonnages increased slightly. Between Chullora (Sydney) and Tottenham (Melbourne) and Tottenham and Crystal Brook, tonnages mostly declined but they increased between Cootamundra and Crystal Brook. These changes occurred in the context of Sydney–Perth traffic returning to its normal route via Broken Hill following a temporary re-routing of this traffic the previous financial year due to a flood related temporary line closure near Broken Hill. Conversely, tonnages between Cootamundra and Crystal Brook mostly grew. On the Tarcoola–Kalgoorlie sector, which is shared by Melbourne/Adelaide/Sydney–Perth trains, tonnages were unchanged for both directions of travel relative to the previous financial year. Between Kalgoorlie and Perth there was a slight increase in intermodal tonnages, for both directions of travel.
- In 2023–24, there were some significant increases and decreases in non-intermodal tonnages across the interstate network relative to the previous financial year. These changes tended to be region specific and were partly due to variations in grain traffic stemming from crop harvest sizes and the opening of new mines whose products are moved by rail.
- Iron ore export tonnages, almost all of which travels to port by rail, grew by approximately 1.25 per cent in 2023–24 compared to the previous financial year.
- In 2023–24, coal tonnages hauled by Aurizon increased by approximately 2.2 per cent compared to the previous financial year.
- In 2023–24, coal tonnages hauled by all operators on Aurizon's Central Queensland Coal Network increased by almost one per cent.
- Pacific National's reported net tonne kilometre non-coal freight task in 2024 decreased by almost 11 per cent, compared to the previous calendar year, while coal volumes hauled increased by approximately 11.5 per cent.
- In 2023–24, TasRail's total freight task, measured in net tonne kilometres increased by more than six per cent compared to the previous financial year.
- In 2024, there were more scheduled intermodal train services on the North–South and East–West corridors compared to the previous year. This was due to new Aurizon and QUBE services.
- Scheduled transit times for intermodal trains on both the North–South and East–West corridors tended to be slightly longer. This was partly due to the new services tending to have longer scheduled transit times.
- Total urban heavy rail patronage in 2023–24 was approximately 627 million passenger journeys, an increase of approximately 20.2 per cent from the previous financial year. Patronage grew in all cities, from 2.5 per cent in Adelaide, to almost 27 per cent in Sydney.
- Total light rail patronage for 2023–24 was approximately 226.4 million passenger journeys, an increase of almost nine per cent from the previous financial year. Each city with light rail services had growth, from 4.9 per cent in Melbourne, to 26 per cent in Sydney.
- Total non-urban rail patronage in 2023–24 was approximately 58.03 million passenger journeys, an increase of almost 22 per cent per cent compared to the previous financial year. All operators had patronage growth, except Queensland Rail and Transwa on its Australind service, which was suspended due to infrastructure upgrade works and replaced by road coach services.

- Sydney (Metro), Melbourne, and Adelaide urban heavy rail passenger service operators met or exceeded their punctuality targets in 2023–24, while Sydney (Sydney Trains), Brisbane, and Perth fell marginally short of their targets. Light rail service providers met or exceeded punctuality targets in Melbourne, Gold Coast, Canberra and Adelaide. Sydney fell marginally short. Data is not available for Newcastle.
- For non-urban passenger services, all operators failed to meet punctuality targets in 2023–24, except Transwa's Avonlink service.
- An analysis of Albury–Melbourne passenger train operations over a sample one-month period in 2024 showed, on average, services tended to complete their journeys in a time close to schedule at point-to-point speeds that were also close to schedule. Regarding arrival and departure times, Melbourne to Albury services tended to be more timely than Albury to Melbourne services.
- In 2023–24, there were 82 notified fatalities on Australian railways that the Office of the National Rail Safety Regulator regulates, a reduction of two compared to the previous financial year.
- BITRE estimates that in 2023–24, rail transport's greenhouse gas emissions in Australia grew by less than one per cent. Over the 10-year period until 2023–24, rail transport has been the source of approximately five per cent of total domestic transport emissions.

Infrastructure and assets

In 2024:

- Australia had an estimated 31,212 route-kilometres of operational heavy railways. Of these, approximately 11 per cent were electrified. Approximately 56 per cent of the network was standard gauge, with the remainder being narrow gauge (approximately 35.5 per cent), broad gauge (approximately eight per cent), and dual gauge (less than one per cent). All states and territories had operational heavy railways, to varying degrees and for various purposes.
- There was an estimated 338.4 route-kilometres of operational light rail/tramways, all standard gauge, in Melbourne, Sydney, Adelaide, Gold Coast, Canberra, and Newcastle.
- The Yanchep line extension and Morley–Ellenbrook urban heavy rail lines in Perth opened and Stage 1 of Parramatta light rail in Sydney opened.
- An estimated 131.5 route-kilometres of heavy and light railways were under construction.
- There was railway construction underway in Queensland, New South Wales, Victoria, Western Australia and the Australian Capital Territory.
- There was an estimated 18 mainline heavy rail infrastructure managers.
- An estimated 5,026 urban heavy rail cars (both electric and diesel, formed into multiple unit sets) were in service. Since July 2023, this includes more than 200 new High Capacity Metro Train (HCMT) cars in Melbourne, more than 100 new cars for Sydney Metro, and more than 20 new cars each in Perth and Adelaide.
- An estimated 632 operational light rail vehicles were in service.
- There was an estimated 1,098 non-urban cars and carriages (mostly formed electric multiple unit (EMU) and diesel multiple unit (DMU) sets, with the remainder being locomotive hauled), and 90 locomotives for non-urban passenger train haulage duties.

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Chapter 1
Introduction

Trainline is a compendium of statistics on Australia's rail industry. It provides data and an analysis of the industry.

This includes:

- Freight tonnages carried by rail transport, including on the interstate network and by some above-rail operators.
- Patronage. This includes on urban heavy and light rail networks, and non-urban heavy rail networks.
- Rail transport performance, including passenger rail transport timeliness, scheduled transit times for both passenger and freight rail transport services, and service frequency.
- Details of and changes to Australia's heavy and light rail infrastructure.
- Commodity specific flows, including iron ore, coal, and grain.
- The transportation of freight for export by rail from regional Australia to its ports.
- Rail transport's carbon emissions.
- Safety in rail transport.

Due to a change in BITRE's publication cycle of *Trainline*, some parts of this report have financial year data for both 2022–23 and 2023–24.

Chapter 2
Freight transport results

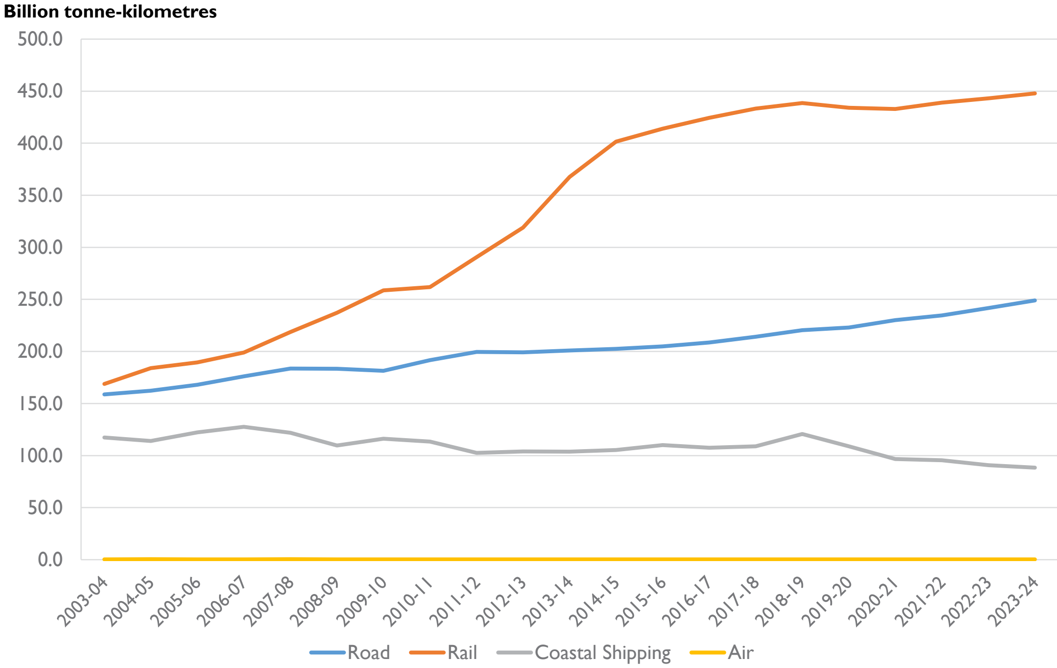
No current combined data source covers the entire Australian network. Individual data sources report part or aspects of the freight task only, such as by commodity or location. These sources include train operator and track/infrastructure manager data and some of this is not otherwise public information.

TasRail provides information on tonnages of some commodities that it transports, such as logs and minerals in its annual reports (TasRail 2024). ARTC reports aggregated Hunter Valley network quarterly coal tonnage throughput (ARTC n.d.). Aurizon publishes some information in its annual investors presentation (Aurizon 2024). Infrastructure managers provide traffic data and projections to their economic regulators, which may then publish that material[1]. BITRE's Freightline series also discuss freight flows by commodity (BITRE 2014 and BITRE 2014a, BITRE 2016, BITRE 2018, BITRE 2018a, BITRE 2018b). While explicit rail traffic data is not generally available for Pilbara railways or for east coast coal ports, the export iron ore and coal from those ports is generally moved to the ports by rail. Discussion and data sources for each of those ports can be found in Australia's Bulk Ports (BITRE 2013).

Freight transport by rail's role in the Australian economy has increased sharply this century; see Figure 1. Rail accounts for more than one-half of Australian freight transport activity (approximately 57 per cent in 2023–24), up from approximately 38 per cent in 2003–04. Rail freight transport's dominance is primarily founded on the transportation of iron ore, coal and other bulk products such as grain, primarily to ports for export.

1 Aurizon's economic regulator is the Queensland Competition Authority (https://www.qca.org.au/project/aurizon-network/); ARTC's is the ACCC (https://www.accc.gov.au/by-industry/rail-shipping-and-ports/interstate-rail-network-access-undertaking); Arc Infrastructure's is the Economic Regulation Authority [WA] (http://www.erawa.com.au/rail/rail-access).

Figure 1 Estimated Australian freight volumes by transport mode



Source: Figure produced using data from BITRE (2025), (Table 4.1c).

Rail and road transport compete strongly for short-haul and long-distance non-bulk freight, but as distances increase, rail transport's competitiveness increases. Rail's mode share of non-bulk freight is highest between the eastern states and Perth (the East–West Corridor)[2].

In November 2023, the Australasian Railway Association (ARA) and the Freight on Rail Group (FORG) released The Future of Freight Summary Report. According to the report, rail transport has 68 per cent market share of bulk freight transport in Australia, and 17 per cent market share of non-bulk freight transport (Australasian Railway Association/Freight On Rail Group 2023, p.6).

Table 1 Rail transport mode share

Freight corridor	Headhaul[3]	Backhaul	Comments in report
North coast line (intrastate Queensland)	53%	42%	Intense competition between road and rail transport. Rail dominates for distances over 1500 kilometres, while road dominates for distances of less than 1000 kilometres.
North–South corridor (Vic-NSW-Qld)	11%	7%	Road dominates the market share due to the shorter distances of key routes. Rail's modal share is strongest on the Melbourne–Brisbane route.
East–West corridor (Vic-SA-WA)	65%	77%	Rail dominates this corridor, especially between Melbourne, Sydney and Perth.

Source: Australasian Railway Association/Freight on Rail Group (2023), p.7.

2 BITRE 2009 (*Road and rail freight: competitors or complements?*) assesses the circumstances for rail and road competition, particularly in non-bulk freight. See, also, *Freightline 1* (BITRE 2014, and other issues in the series) for contextual material on rail and road freight.

3 Headhaul is one-way destination for a freight load. Backhaul is freight that is transported on an operator's return journey.

Traffic volumes reflect rail transport's competitiveness with other transport modes (particularly for intermodal traffic) and prevailing economic conditions. Variations in individual commodity flows arise from international demand for commodities as well as train operators winning or losing major contracts.

National rail freight task, tonnages

Freight type defined

Trainline uses specific definitions for bulk and non-bulk freight. In principle, 'bulk' freight involves large quantities of homogenous product that is conveyed in wagons. Non-bulk freight is generally any containerised or unitised freight either placed on container wagons, transported in an enclosed wagon, or transported on a wagon with a secure fastening capability. However, 'non-bulk' freight is not always containerised. Conversely bulk commodities sometimes travel in containers. In this report, 'bulk' refers to anything not considered 'intermodal', where 'intermodal' is generally considered to be containerised freight or freight carried in a louvre wagon. Steel may also be deemed intermodal, particularly on trains that carry both intermodal and steel products on intermodal designated trains.

Tonnages, by operator

Due to an ongoing data shortage from freight train ('above-rail') operators, Trainline is unable to report aggregated national above-rail tonnages[4]. There is some publicly-available data on rail freight activity that reports parts of the national freight task.

Aurizon reports its data to the Australian Stock Exchange (ASX) and on its website. That material forms the basis of the data shown in Tables 2–6, below. Table 2 below, shows, Aurizon's above-rail coal and other bulk freight hauled volumes. Table 3 shows the coal hauled in net tonne kilometres (NTK)[5]. Table 4 shows Aurizon's above-rail coal volumes hauled by system. Table 5 shows below-rail tonnages hauled on the Aurizon managed Central Queensland Coal Network (CQCN). It thus includes the tonnages of all above-rail operators (in addition to Aurizon) using the network.

Table 2 Aurizon above-rail volumes hauled (million tonnes)

Financial year	2019–20	2020–21	2021–22	2022–23	2023–24	Change FY 23 to 24
Coal						
CQCN	150.1	143.7	141.1	133.6	132.5	-0.82%
NSW and SEQ	63.8	58.4	52.9	51.4	56.5	+9.92%
Total	**213.9**	**202.1**	**194**	**185**	**189**	**+2.16%**
Bulk Volumes	48.1	51.2	50.8	68.2	66.6	-2.35%
Coal and Bulk Total	**262**	**253.3**	**244.8**	**253.2**	**255.6**	**+0.95%**

Note: CQCN = Central Queensland Coal Network, SEQ = South east Queensland.

Sources: Aurizon (2024), p.33; Previous editions of Trainline, citing Aurizon's public reporting.

4 BITRE has been unable to report above rail tonnages since 2015-16. For historical data from 2001–02 to 2015–16, see Trainline 9 at https://www.bitre.gov.au/sites/default/files/train_006.pdf.

5 NTK is a measure of how much freight is hauled multiplied by how far it is hauled. For example, one tonne of freight that travels 100 kilometres is 100 NTK (1(tonne)x100(kilometres)).

Table 6 is a new metric. In the 2022–23 financial year Aurizon recommenced intermodal operations. This included its Adelaide–Darwin services following Aurizon's acquisition of One Rail Australia in July 2022, and new Melbourne–Perth, Melbourne–Brisbane, and Sydney–Perth services.

Table 3 Aurizon above-rail coal NTKs hauled (billion tonne kilometres)

Financial year	2019–20	2020–21	2021–22	2022–23	2023–24	Change FY 23 to 24
CQCN	37.8	35.3	35.3	33	33.1	+0.30%
NSW and SEQ	12.2	11.3	9.9	9.2	10.3	+11.96%
Total	**50**	**46.6**	**45.2**	**42.2**	**43.4**	**+2.84%**

Note: Totals are subject to rounding.

Sources: Aurizon (2024), p.33; Previous editions of Trainline, citing Aurizon's public reporting.

Table 4 Aurizon above-rail coal hauled by system (million tonnes)

Financial year	2021–22	2022–23	2023–24	Change FY 23 to 24
CQCN				
Newlands	17.8	16.1	13.2	-18.01%
Goonyella	61.5	60.1	58.2	-3.16%
Blackwater	49.5	44.4	46.8	+5.41%
Moura	12.3	13.0	14.3	+10.00%
Total	**141.1**	**133.6**	**132.5**	**-0.82%**
NSW and SE Queensland				
West Moreton	2.7	2.1	3.5	+66.67%
Hunter Valley and Illawarra	50.2	49.3	53	+7.51%
Total	**52.9**	**51.4**	**56.5**	**+9.92%**
Grand total	**194.0**	**185.0**	**189**	**+2.16%**

Sources: Aurizon (2024), p.42; Previous editions of Trainline, citing Aurizon's public reporting.

Table 5 Aurizon network (below-rail) tonnages hauled (million tonnes)

Financial year	2019–20	2020–21	2021–22	2022–23	2023–24	Change FY 23 to 24
Tonnages	226.9	208.3	206.5	207.6	209.6	+0.96%

Sources: Aurizon (2024), p.46; Previous editions of Trainline, citing Aurizon's public reporting.

Table 6 Aurizon interstate containerised freight twenty-foot equivalent units

Financial year	2022–23	2023–24	Change FY 23 to 24
TEUs	96,930	158,802	+63.83%

Note: Does not include Queensland intrastate 'hook and pull' services that Aurizon provides for Linfox.

Aurizon notes it completed its ramp up of containerized services, which began in April 2023, in April 2024. See Aurizon (2024), p.12.

Sources: Aurizon (2024), p.33.

Aurizon notes in its 2024 results presentation it had begun a small scale trial of interstate land-bridging of imported motor vehicles through the Port of Darwin, which it claims provides a material time saving of seven days relative to direct sea transport from Shanghai to Melbourne (Aurizon 2024, p.13).

Pacific National publicly reports some details of its freight haulage operations through Offering Circulars, which it publishes on the Singapore Stock Exchange website. Table 7 and Table 8, below, show details of Pacific National's freight task, according to its Offering Circulars. According to the tables, when comparing 2023–24 to the previous financial year:

- Total NTKs hauled increased by .15 per cent,
  - The 'freight' component decreased by 10.85 per cent,
  - The coal component increased by 10.53 per cent;
- Total tonnages hauled increased by 5.35 per cent; and
- TEUs hauled decreased by 10.27 per cent.

Table 7 Pacific National total freight task

Financial year	Total NTKs (millions)	Total tonnes (millions)	TEUs (thousands)
2021–22	52,670.9	150.9	861.8
2022–23	47,520.1	138.2	781.2
2023–24	47,590.3	145.6	701.0

Source: Pacific National Finance (2025), p127.

Table 8 Pacific National 'freight' and 'coal' tasks (NTKs, millions)

Financial year	Freight	Coal	Total
2021–22	n/a	n/a	52,671
2022–23	23,077	24,443	47,520
2023–24	20,574	27,016	47,590

Note: These figures are the 'freight' and 'coal' components that form the total NTK figures in Table 7. 'Freight' encompasses interstate containerised freight (intermodal) and break-bulk freight (steel) services; regional freight rail services, including grain and hook and pull services for passenger trains; and various other bulk goods, including minerals concentrate and construction materials, excluding coal. 'Coal' is coal haulage.

Itemised figures for freight and coal in 2021–22 is not available.

Source: Pacific National Finance (2025), p.128.

TasRail reports its freight task in its annual report. Table 9, below, shows and compares TasRail's freight task for the 2022–23 and 2023–24 financial years, by freight type hauled.

Table 9 TasRail freight task (NTKs)

	2022–23	2023–24	Change (per cent)
Total	485,616,262	516,452,742	+6.35

Source: TasRail (2024), p.21.

According to TasRail's annual report, the growth in NTKs in 2023–24 occurred due to a growth in intermodal freight and '... a strong year by our mining customers.' (TasRail 2024, p.21).

Box 1 Further freight operator traffic data resources

No single data source covers the entire Australian network. Data sources are train operator data and rail infrastructure manager data. Much of this is not public information.

ARTC reports aggregated Hunter Valley network quarterly coal tonnage throughput (ARTC n.d.). Aurizon has information packs for each of its coal networks and where it hauls coal elsewhere (Aurizon 2024a).

Traffic data and projections can also be provided to the infrastructure managers' economic regulators, which may then publish that material. (See footnote 1).

While explicit rail traffic data is not available for the Pilbara iron ore network, the iron ore is generally moved to the ports by rail. Published iron ore export volumes through the Pilbara ports thus gives insight into iron ore tonnages being transported in the Pilbara network. (See Table 15). Discussion and data sources for each of those ports can be found in Australia's Bulk Ports (BITRE 2013).

BITRE's Freightline series also report freight flows by commodity (BITRE 2014, BITRE 2014a, BITRE 2016, BITRE 2018, BITRE 2018a, and BITRE 2018b).

Interstate network freight traffic

Table 10 and Table 11, below shows interstate gross freight tonnages by line segment based on below-rail (infrastructure manager) provided data. It only includes tonnages on the interstate network that ARTC and Arc Infrastructure each manage. The tables show intermodal and total gross tonnes by line segment, with line segments ordered from north to south and east to west. There are three factors to note when reviewing the tonnages:

- Where freight does not move along the entire length of a segment, it has been weighted by the proportion of the line segment travelled. Tonnages are calculated as gross. Empty wagons and locomotive weights are therefore included.
- All coal traffic is excluded. This is because that traffic is not in a form that is amenable to comparison with other commodities. In particular, while coal generally does not move on the interstate network, large coal volumes briefly traverse the network near Newcastle and in the New South Wales Southern Highlands. In those locations, coal tonnages are higher than all other commodities carried.
- ARTC's intermodal designated data only includes freight travelling on capital city to capital city trains, inclusive of regional/export traffic that is attached/detached to/from these trains en-route. SCT Logistics' Brisbane–Melbourne trains, which pick up and drop off freight at Barnawartha in northern Victoria, is an example. Tonnages for regional intermodal trains, such as QUBE's Bomen–Port Botany trains are captured in 'non-intermodal' tonnages. Non-intermodal tonnages can be calculated by subtracting the intermodal component from the total tonnages.

Table 10 Below-rail gross tonnes by line segment, North–South corridor

	Intermodal			Non-intermodal			Total		
Line segment	2021–22	2022–23	2023–24	2021–22	2022–23	2023–24	2021–22	2022–23	2023–24
	Million gross tonnes								
Acacia Ridge to Casino	2.30	2.13	2.15	0.02	0.03	0.03	2.33	2.16	2.18
Casino to Acacia Ridge	3.44	3.18	3.20	0.03	0.03	0.03	3.47	3.21	3.23
Acacia Ridge-Casino	5.74	5.30	5.35	0.05	0.06	0.06	5.79	5.36	5.41
Casino to Islington	2.33	2.15	2.18	0.18	0.22	0.22	2.51	2.37	2.40
Islington to Casino	3.46	3.18	3.21	0.21	0.24	0.23	3.67	3.43	3.45
Casino–Islington	5.79	5.33	5.39	0.39	0.46	0.45	6.18	5.79	5.84
Chullora to Sefton Park	5.13	5.12	4.65	12.75	13.58	12.79	17.88	18.70	17.44
Sefton Park to Chullora	6.56	5.74	5.53	14.46	15.07	14.59	21.02	20.81	20.13
Chullora–Sefton Park	11.69	10.86	10.18	27.21	28.65	27.39	38.90	39.50	37.57
Sefton Park to Macarthur	3.57	3.70	3.46	3.32	3.81	3.78	6.89	7.51	7.24
Macarthur to Sefton Park	4.03	3.64	3.26	8.14	8.41	8.12	12.17	12.05	11.38
Sefton Park–Macarthur	7.60	7.34	6.72	11.46	12.22	11.90	19.06	19.56	18.62
Macarthur to Tahmoor	3.62	3.75	3.66	4.84	5.31	4.96	8.46	9.06	8.62
Tahmoor to Macarthur	4.06	3.68	3.46	11.02	11.50	11.24	15.08	15.17	14.70
Macarthur–Tahmoor	7.68	7.42	7.11	15.86	16.81	16.20	23.54	24.23	23.32
Tahmoor to Moss Vale	3.62	3.75	3.63	5.91	6.13	5.67	9.53	9.88	9.30
Moss Vale to Tahmoor	4.06	3.68	3.46	13.54	13.92	13.60	17.60	17.60	17.06
Tahmoor–Moss Vale	7.68	7.42	7.09	19.45	20.06	19.27	27.13	27.48	26.36
Moss Vale to Marulan	3.67	3.80	3.73	7.01	7.17	6.59	10.68	10.98	10.32
Marulan to Moss vale	4.22	4.07	4.03	15.88	16.25	15.11	20.10	20.32	19.14
Moss Vale–Marulan	7.89	7.87	7.76	22.89	23.43	21.70	30.78	31.29	29.46
Marulan to Goulburn	3.67	3.80	3.73	4.82	4.83	4.26	8.49	8.63	7.99
Goulburn to Marulan	4.22	4.07	4.03	14.29	14.46	13.09	18.51	18.53	17.12
Marulan–Goulburn	7.89	7.87	7.76	19.11	19.30	17.35	27.00	27.16	25.11
Goulburn to Cootamundra	3.67	3.80	3.73	3.04	2.78	2.21	6.71	6.58	5.93
Cootamundra to Goulburn	4.22	4.07	4.03	7.67	7.21	6.02	11.89	11.28	10.05
Goulburn–Cootamundra	7.89	7.87	7.76	10.71	9.99	8.22	18.60	17.86	15.98
Cootamundra to Junee	2.89	3.27	3.23	3.54	3.80	2.93	6.42	7.07	6.16
Junee to Cootamundra	2.62	2.81	2.64	4.11	4.61	3.99	6.73	7.42	6.62
Cootamundra–Junee	5.50	6.08	5.87	7.65	8.41	6.91	13.15	14.49	12.79
Junee to Albury	2.89	3.27	3.23	3.71	3.59	3.52	6.60	6.86	6.76
Albury to Junee	2.62	2.81	2.64	4.01	3.48	3.40	6.63	6.29	6.04
Junee–Albury	5.50	6.08	5.88	7.72	7.07	6.92	13.23	13.15	12.80
Albury to Tottenham	2.96	3.32	3.31	3.17	3.09	2.69	6.13	6.41	6.00
Tottenham to Albury	2.61	2.80	2.64	1.39	1.39	1.21	4.00	4.19	3.84
Albury–Tottenham	5.57	6.12	5.95	4.56	4.48	3.90	10.14	10.60	9.85

Note: Totals are subject to rounding.

Source: Data provided by ARTC.

Table 11 Below-rail gross tonnes by line segment, East–West corridor

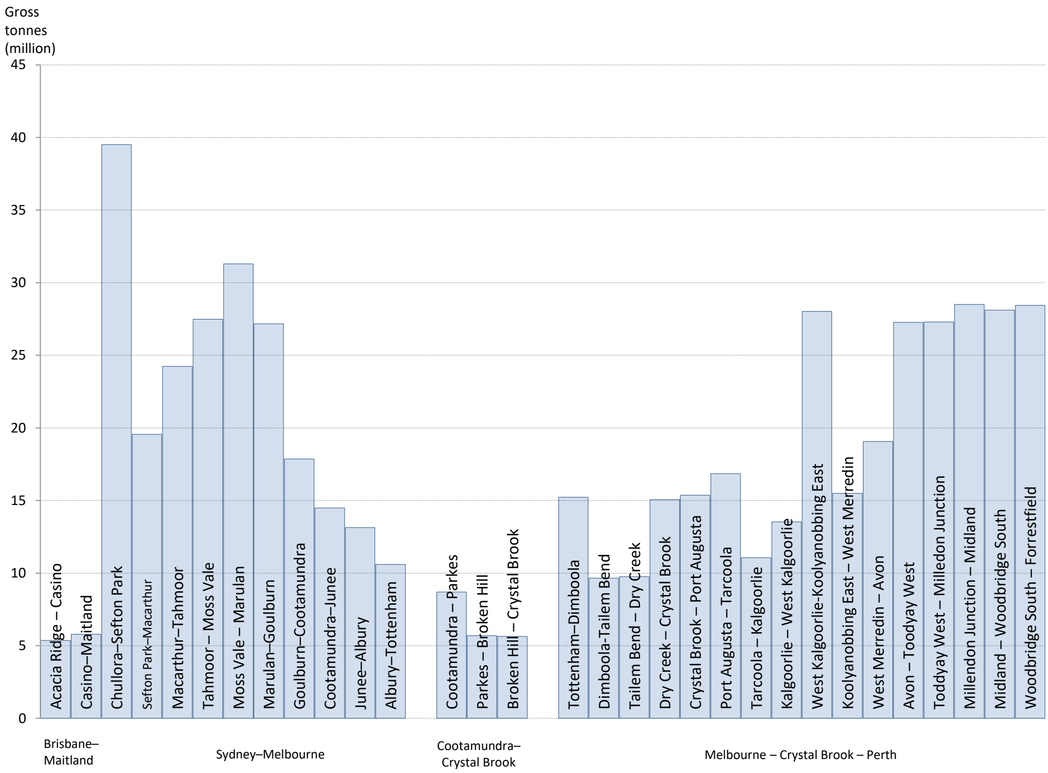
Line segment	Intermodal 2021–22	Intermodal 2022–23	Intermodal 2023–24	Non-intermodal 2021–22	Non-intermodal 2022–23	Non-intermodal 2023–24	Total 2021–22	Total 2022–23	Total 2023–24
	Million gross tonnes								
Cootamundra to Parkes	0.82	0.54	0.50	2.24	1.89	1.43	3.06	2.43	1.93
Parkes to Cootamundra	1.65	1.27	1.41	5.93	5.01	3.55	7.58	6.28	4.96
Cootamundra–Parkes	2.47	1.80	1.91	8.17	6.90	4.99	10.64	8.70	6.89
Parkes to Broken Hill	2.34	1.60	1.86	0.77	0.87	1.32	3.11	2.48	3.17
Broken Hill to Parkes	2.28	1.82	1.90	1.64	1.40	1.30	3.92	3.22	3.19
Parkes–Broken Hill	4.62	3.42	3.75	2.41	2.27	2.61	7.03	5.69	6.37
Broken Hill to Crystal Brook	2.24	1.58	1.84	1.21	1.45	2.50	3.45	3.03	4.34
Crystal Brook to Broken Hill	2.16	1.80	1.89	0.55	0.81	1.32	2.70	2.61	3.21
Broken Hill–Crystal Brook	4.40	3.38	3.72	1.76	2.27	3.82	6.16	5.64	7.55
Tottenham to Dimboola	4.54	5.32	5.02	2.46	2.25	2.76	7.01	7.57	7.78
Dimboola to Tottenham	3.64	4.08	3.72	3.61	3.58	4.84	7.25	7.66	8.56
Tottenham–Dimboola	8.18	9.40	8.75	6.08	5.83	7.60	14.26	15.23	16.35
Dimboola to Tailem Bend	3.80	4.27	3.99	1.38	1.38	1.45	5.17	5.65	5.44
Tailem Bend to Dimboola	3.06	3.44	3.08	0.55	0.58	0.65	3.61	4.01	3.73
Dimboola–Tailem Bend	6.86	7.71	7.07	1.93	1.95	2.10	8.79	9.66	9.17
Tailem Bend to Dry Creek	3.84	4.32	4.01	1.40	1.40	1.45	5.24	5.71	5.46
Dry Creek to Tailem Bend	3.10	3.47	3.10	0.55	0.57	0.61	3.65	4.05	3.70
Tailem Bend–Dry Creek	6.93	7.79	7.10	1.95	1.97	2.06	8.89	9.76	9.16
Dry Creek to Crystal Brook	5.40	6.02	5.88	1.38	1.24	1.21	6.78	7.26	7.09
Crystal Brook to Dry Creek	4.57	5.01	4.78	3.25	2.80	2.59	7.82	7.81	7.38
Dry Creek–Crystal Brook	9.97	11.03	10.66	4.64	4.04	3.80	14.60	15.07	14.47
Crystal Brook to Port Augusta	6.86	6.82	6.89	1.31	1.17	1.04	8.17	7.99	7.93
Port Augusta to Crystal Brook	5.97	6.06	5.83	1.73	1.32	0.60	7.69	7.38	6.43
Crystal Brook–Port Augusta	12.83	12.87	12.73	3.03	2.50	1.64	15.86	15.37	14.36
Port Augusta to Tarcoola	6.87	6.74	6.69	1.07	1.28	1.52	7.94	8.01	8.21
Tarcoola to Port Augusta	5.89	5.97	5.72	2.65	2.87	3.46	8.54	8.84	9.18
Port Augusta–Tarcoola	12.75	12.71	12.41	3.73	4.15	4.98	16.48	16.85	17.39
Tarcoola to Kalgoorlie	5.55	5.45	5.45	0.48	0.68	0.82	6.03	6.13	6.27
Kalgoorlie to Tarcoola	4.21	4.19	4.17	0.62	0.74	0.76	4.83	4.93	4.93
Tarcoola–Kalgoorlie	9.76	9.64	9.62	1.10	1.42	1.58	10.85	11.06	11.20
Kalgoorlie to West Kalgoorlie	5.69	5.69	5.87	1.64	1.67	1.48	7.33	7.36	7.35
West Kalgoorlie to Kalgoorlie	4.26	4.27	4.32	1.78	1.89	1.77	6.04	6.16	6.09
Kalgoorlie–West Kalgoorlie	9.95	9.97	10.19	3.41	3.55	3.24	13.36	13.52	13.43
West Kalgoorlie to Koolyanobbing East	5.69	5.69	5.82	4.56	4.66	4.52	10.25	10.35	10.34
Koolyanobbing East to West Kalgoorlie	4.21	4.22	4.27	14.03	13.46	13.27	18.24	17.68	17.54
West Kalgoorlie–Koolyanobbing East	9.89	9.92	10.09	18.59	18.11	17.79	28.48	28.03	27.88

Line segment	Intermodal			Non-intermodal			Total		
	2021–22	2022–23	2023–24	2021–22	2022–23	2023–24	2021–22	2022–23	2023–24
	Million gross tonnes								
Koolyanobbing East to West Merredin	5.64	5.65	5.81	2.18	2.46	2.37	7.82	8.11	8.18
West Merredin to Koolyanobbing East	4.21	4.22	4.28	2.86	3.17	3.15	7.07	7.39	7.43
Koolyanobbing East–West Merredin	9.84	9.88	10.09	5.04	5.61	5.53	14.88	15.49	15.62
West Merredin to Avon	5.65	5.66	5.81	3.92	5.27	4.58	9.57	10.93	10.39
Avon to West Merredin	4.21	4.22	4.28	3.34	3.92	3.75	7.55	8.14	8.03
West Merredin–Avon	9.85	9.88	10.09	7.27	9.18	8.33	17.12	19.06	18.42
Avon to Toodyay West	5.65	5.65	5.81	8.44	11.67	9.84	14.09	17.32	15.65
Toodyay West to Avon	4.20	4.22	4.28	4.61	5.73	5.29	8.81	9.95	9.57
Avon–Toodyay West	9.85	9.87	10.09	13.05	17.39	15.13	22.90	27.26	25.22
Toodyay West to Millendon Junction	5.65	5.65	5.81	8.45	11.69	10.23	14.10	17.34	16.04
Millendon Junction to Toodyay West	4.20	4.22	4.27	4.62	5.74	5.41	8.82	9.96	9.68
Toodyay West–Millendon Junction	9.85	9.87	10.09	13.07	17.43	15.63	22.92	27.30	25.72
Millendon Junction to Midland	5.65	5.65	5.81	9.07	12.60	10.97	14.72	18.25	16.78
Midland to Millendon Junction	4.20	4.22	4.26	4.82	6.03	5.62	9.02	10.25	9.88
Millendon Junction–Midland	9.85	9.87	10.07	13.89	18.63	16.59	23.74	28.50	26.66
Midland to Woodbridge South	5.64	5.65	5.80	8.95	12.40	10.77	14.59	18.05	16.57
Woodbridge South to Midland	4.20	4.22	4.27	4.66	5.84	5.43	8.86	10.06	9.70
Midland–Woodbridge South	9.84	9.87	10.07	13.62	18.24	16.20	23.46	28.11	26.27
Woodbridge South to Forrestfield	5.64	5.65	5.81	9.06	12.57	10.95	14.70	18.22	16.76
Forrestfield to Woodbridge South	4.20	4.22	4.27	4.77	6.00	5.60	8.97	10.22	9.87
Woodbridge South–Forrestfield	9.84	9.88	10.08	13.82	18.55	16.55	23.66	28.43	26.63

Note: Totals are subject to rounding.

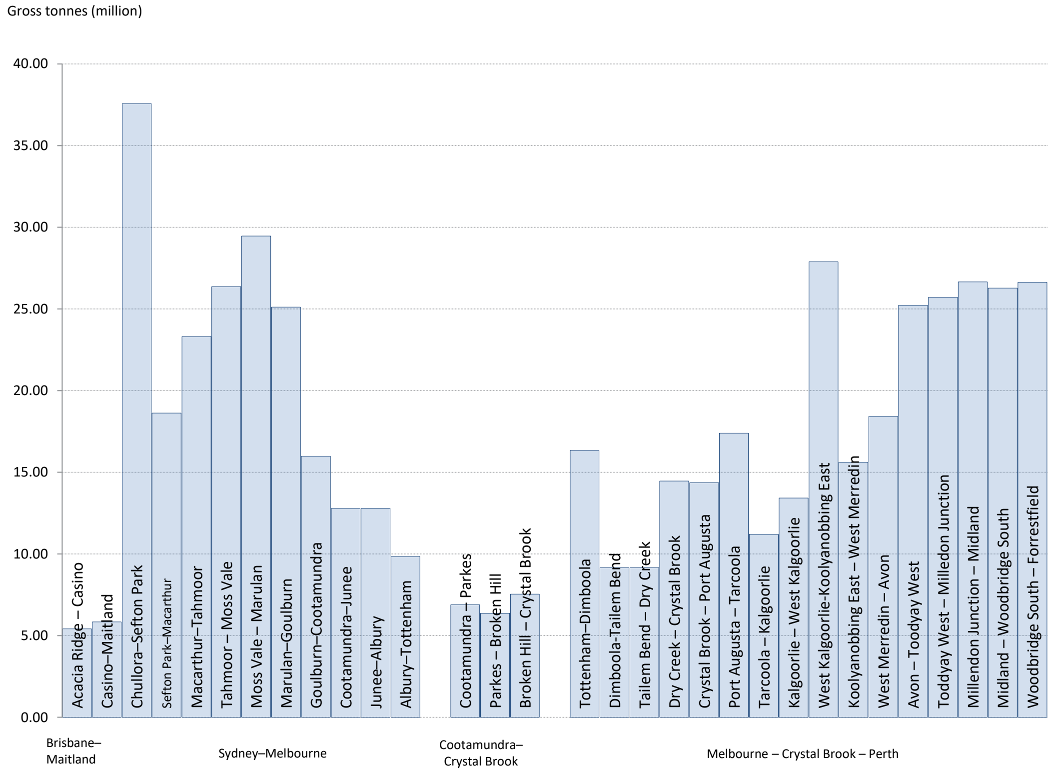
Source: Data provided by ARTC and Arc Infrastructure.

Figure 2 Total below-rail gross tonnes on the interstate network, by line segment, 2022–23



Sources: Data provided by ARTC and Arc Infrastructure.

Figure 3 Total below-rail gross tonnes on the interstate network, by line segment, 2023–24



Sources: Data provided by ARTC and Arc Infrastructure.

The following explains some variations in intermodal traffic across the interstate network, in addition to market factors:

- Changing intermodal train composition: ARTC-provided intermodal tonnages are calculated from train type designations (for example 'intermodal' or 'minerals') that trains use, not the actual products on each train. For example, some Pacific National and SCT Logistics intermodal designated trains also carry steel products[6]. As such, ARTC-reported intermodal volumes are the sum of volumes from all capital city to capital city intermodal designated trains, including those that carry steel.
- Temporary changes to routes taken for operational reasons: Intermodal and steel trains sometimes have to take alternative routes due to temporary track closures. An example was the closure of the East–West line near Broken Hill in October to December 2022 due to flooding, which saw all Sydney–Perth traffic diverted through Melbourne and Adelaide.
- Intermodal traffic on the North–South corridor between Sydney (Macarthur) and Cootamundra includes some diverging/converging traffic at Cootamundra from the East–West corridor (via Broken Hill)[7].

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6 Steel is moved along the East–West corridor between New South Wales (Newcastle and Port Kembla) and South Australia and Western Australia (Port Augusta, Whyalla and Perth). Steel trains also operate between Melbourne and Port Augusta and Perth. On the North–South corridor, there are also steel movements primarily between Port Kembla and the interstate capitals.

7 Until 2020 about half of Sydney to Perth trains travelled via Cootamundra West with the other half ravelling via Lithgow. All Perth to Sydney trains travelled via Cootamundra West. Now, almost all Sydney to Perth trains travel via Lithgow and all Perth to Sydney trains continue to travel via Cootamundra West.

- Some intermodal rail traffic originates/terminates at terminals in Parkes/Goobang for the East–West Corridor (via Broken Hill). SCT Logistics, for example, generally operate one Goobang–Crystal Brook train per week in each direction. Pacific National operates shuttle trains from/to Sydney and Parkes, where it is consolidated and double stacked on other Sydney–Perth trains. Westbound traffic tends to travel via Lithgow on the Sydney Trains and UGL Regional Linx networks and details of its tonnages is thus not captured, while eastbound traffic tends to travel via Cootamundra West, on the ARTC network, and details of its tonnages is captured.
- Higher intermodal traffic volumes west of Crystal Brook (relative to other sectors) reflect the convergence of Melbourne/Adelaide–Perth and Sydney/Parkes–Perth, and Adelaide–Darwin traffic.
- Intermodal flows fall west of Tarcoola; the junction with the Darwin line.
- Some interstate capital city to capital city intermodal trains pick up and drop off freight at regional locations en route (for example SCT Logistics' Logic Terminal at Barnawartha in Victoria and CRT's Ettamogah terminal in New South Wales).

As this edition of Trainline has two financial years' data, there is discussion, below, for 2022–23 and 2023–24 each.

2022–23 results

North–South corridor (intermodal)

- Tonnages for northbound traffic on all sectors from Cootamundra and Brisbane decreased, from four to 12 per cent.
- Tonnages for southbound traffic from Brisbane to Islington dropped by eight per cent.
- Tonnages for southbound traffic from Sefton Park (Sydney) to Cootamundra increased by four per cent. From Cootamundra to Tottenham, tonnages increased by 12–13 per cent.
- Northbound tonnages from Tottenham to Cootamundra grew by seven per cent.

According to advice from ARTC, the increases between Tottenham and Cootamundra were due to a diversion of Sydney–Perth traffic from the route via Broken Hill to the alternative route via Melbourne for extended periods due to flood related track closures near Broken Hill.

East–West corridor (intermodal)

- Tonnages decreased on all sectors between Cootamundra and Crystal Brook for both directions of travel, from 17 to 35 per cent (due to the diversion of Sydney–Perth traffic via Melbourne).
- On all sectors from Tottenham to Crystal Brook, tonnages increased for both directions of travel, from 12 to 17 per cent (due again to the diversion of Sydney–Perth traffic via Melbourne).
- Between Crystal Brook (where Sydney–Perth traffic normally converges with Melbourne/Adelaide–Perth traffic) and Perth, tonnages were largely unchanged for both directions of travel.

Other significant freight flows are as follows:

- Grain movements join the network from various branch and secondary lines, connecting agricultural hinterlands to the ports. Movements on the interstate network are heaviest close to Perth and in New South Wales. Grain movements occur in Victoria, from both receival sites in Victoria and southern New South Wales. Harvest sizes contribute to variations in the size of the freight task and these sizes can fluctuate significantly depending how much rainfall has occurred during a given season. Such variations flow through to the rail task.

- Minerals traffic in New South Wales, South Australia, and Western Australia.
- Aggregate, sand and limestone quarries in the New South Wales Southern Highlands between Macarthur and Goulburn.
- Intermodal freight on regional trains.

Fluctuations in other tonnages can vary significantly from year to year, particularly on sectors carrying grain traffic (due rainfall variations that directly affect grain harvest sizes). Notable changes in 2022–23 compared to the previous financial year were as follows:

North–South corridor (non-intermodal)

- Between Brisbane and Islington, tonnages increased on all sectors for both directions of travel, from between 17 to 31 per cent. Due to the relatively low amount of non-intermodal tonnages hauled, however, small changes translate to large percentage changes.
- Between Chullora (Sydney) and Goulburn, tonnages grew by an average of approximately five per cent, except Marulan to Goulburn, where tonnages were unchanged.
- Between Goulburn and Tottenham, tonnages were mostly down, by an average of approximately two percent, except Tottenham to Albury, where tonnages were steady.

East–West corridor (non-intermodal)

- Tonnages decreased for both directions of travel between Cootamundra and Parkes – 15 per cent Cootamundra to Parkes, and 16 per cent Parkes to Cootamundra. This, however, should be seen in the context of the previous two financial years, both of which saw significant growth due to grain harvest sizes. Tonnages in 2022–23 were still significantly higher than 2019–20.
- Parkes to Broken Hill tonnages grew by 14 percent, but fell by 15 per cent for the opposite direction of travel.
- Between Broken Hill and Crystal Brook tonnages grew significantly for both directions of travel – 20 per cent for Broken Hill to Crystal Brook and 49 per cent for Crystal Brook to Broken Hill. According to advice from ARTC, this is partly due to increased traffic from the new mines in that region.
- Between Tottenham and Dry Creek there was little variation in tonnages, except Tottenham to Dimboola where tonnages dropped by approximately nine per cent due to seasonality of the freight task.
- Tonnages decreased on both sectors between Dry Creek and Port Augusta for both directions of travel, at an average of approximately 14 per cent. Port Augusta to Crystal Brook had the greatest decrease, at 23 per cent. This decrease may be due to disruptions caused by flooding in western New South Wales.
- Between Port Augusta and Tarcoola tonnages increased by 19 per cent for Port Augusta to Tarcoola traffic and eight per cent for Tarcoola to Port Augusta traffic.
- While baseline numbers are relatively small, there were large increases on the Tarcoola–Kalgoorlie sector when expressed as percentages. These increases were 41 per cent for Tarcoola to Kalgoorlie and 21 per cent for Kalgoorlie to Tarcoola. According to advice from ARTC, this growth may be due to increased minerals traffic.
- On the Kalgoorlie–Perth sectors, three themes stand out.
  - Between Kalgoorlie and Koolyanobbing East, there was no significant variation in tonnages.
  - On the Koolyanobbing East–West Merredin sector, tonnages grew by 12.5 per cent for Koolyanobbing East to West Merredin and 10.5 per cent for West Merredin to Koolyanobbing East.

  - Between West Merredin and Perth, there were significant increases in all sectors for both directions of travel, ranging from approximately 17 per cent (Avon Yard to West Merredin) and approximately 39 per cent (Woodbridge South to Forrestfield). The average increase across all sectors for both directions of travel was approximately 31 per cent.

2023–24 results

North–South corridor (intermodal)

- Tonnages on all sectors in both directions of travel between Islington Junction and Acacia Ridge increased by one per cent.
- Between Chullora and Tottenham, tonnages decreased on all sectors in both directions of travel, except Albury to Tottenham, which was unchanged. Declines were from two per cent (Macarthur to Tahmoor) to 10 per cent (Macarthur to Sefton Park). These declines need to be seen, however, in the context of the previous financial years' tonnages, which increased due partly to the re-routing of some Sydney–Perth traffic through Melbourne and Adelaide due to flood related track closures near Broken Hill.

East –West corridor (intermodal)

- Between Cootamundra and Crystal Brook there were increases of 5–16 per cent, except Cootamundra to Parkes, where tonnages declined by seven per cent. This increase also needs to be seen in the context of re-routed traffic returning to the corridor via Broken Hill.
- Between Tottenham and Crystal Brook tonnages for both directions of travel declined by up to 6–11 per cent, also in the context of re-routed traffic returning to the Broken Hill route.
- Between Crystal Brook and Tarcoola, a corridor shared by Melbourne/Adelaide/Sydney–Perth trains and Adelaide–Darwin trains, tonnages for westbound traffic was largely unchanged, while eastbound tonnages declined by approximately four per cent.
- On the Tarcoola–Kalgoorlie sector, which is shared by Melbourne/Adelaide/Sydney–Perth trains, tonnages were unchanged for both directions of travel.
- Between Kalgoorlie and Perth, tonnages grew slightly on all sectors for both directions of travel – up to three per cent.

North–South corridor (non-intermodal)

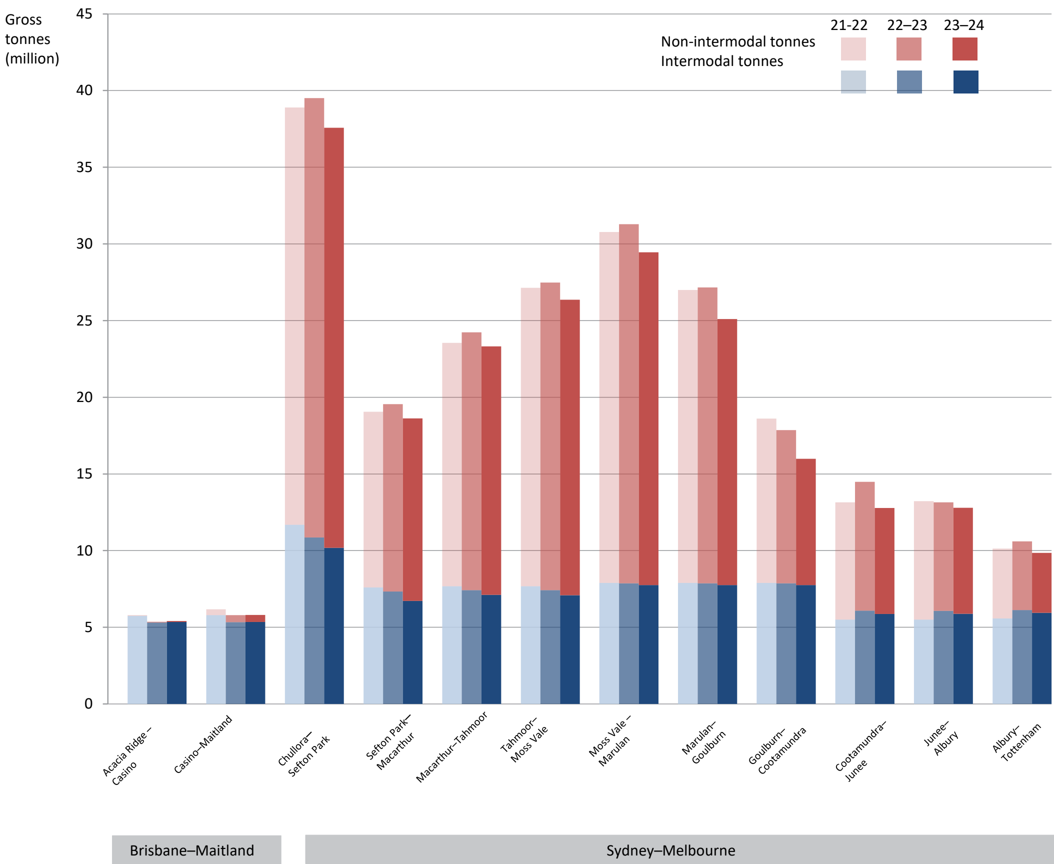
- Tonnages on the Acacia Ridge–Casino sector grew by almost five per cent, while they declined by approximately 2.5 per cent on the adjacent Casino–Islington sector. Like the previous financial year, small changes in tonnages hauled translate to large percentage changes due to the small baseline tonnages.
- On all sectors between Chullora and Cootamundra tonnages were down for both directions of travel, from less than one per cent (Sefton Park to Macarthur) to approximately 20.5 per cent (Goulburn to Cootamundra).
- All sectors between Cootamundra and Tottenham had declines, in both directions of travel, of approximately two per cent (Junee to Albury) and 23 per cent (Cootamundra to Junee).

East –West corridor (non-intermodal)

- Combined directions of travel tonnages on the Cootamundra–Parkes sector were down by almost 28 per cent, with similar declines for each direction of travel.
- Parkes to Broken Hill traffic grew by more than 50 per cent. This was partly due to increased mines traffic in that region.
- On the Broken Hill–Crystal Brook sector there was a combined direction of travel increase of almost 69 per cent, partly also due to increased traffic activity from mines. Growth was strong in both directions of travel.

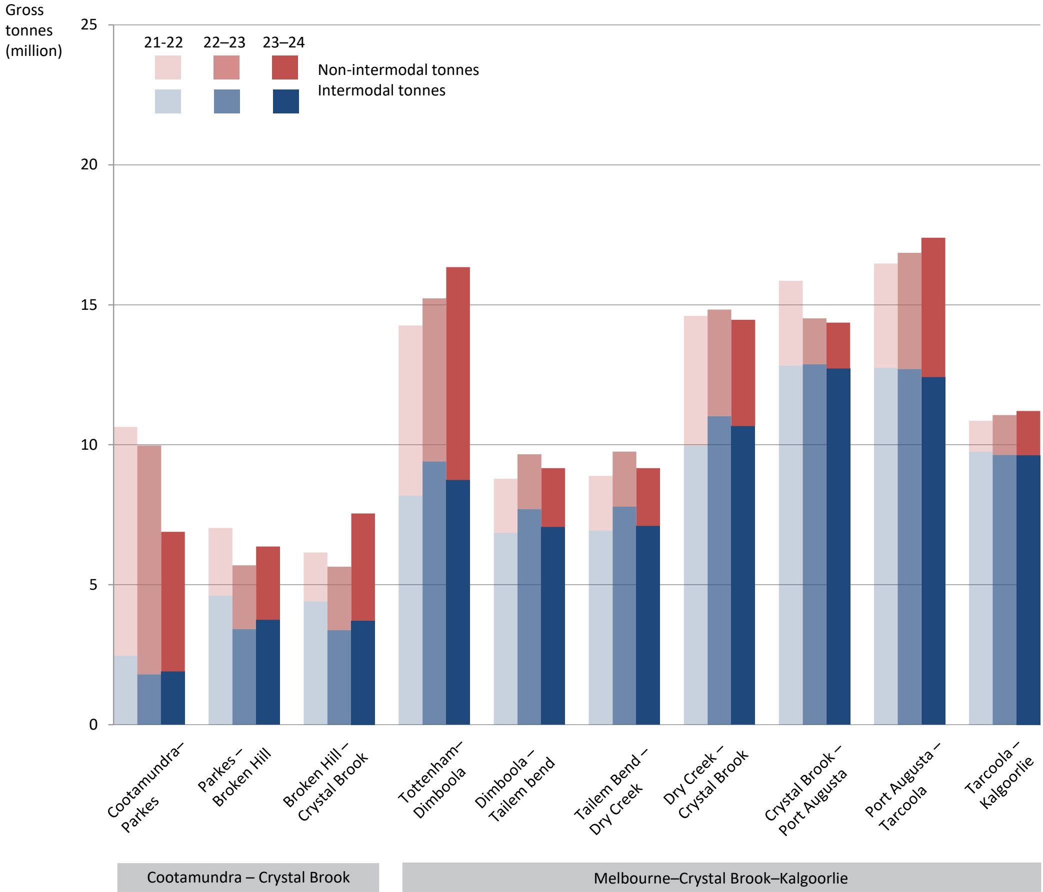
- On the Tottenham–Dimboola sector, tonnages grew by more than 30 per cent. Tottenham to Dimboola traffic grew by almost 23 per cent, while it grew by more than 35 per cent for the opposite direction of travel.
- Tonnages grew slightly on all sectors between Dimboola and Dry Creek, for both directions of travel. This ranged from four per cent (Tailem Bend to Dry Creek) to 12.3 per cent (Tailem Bend to Dimboola).
- Tonnages were down on all sectors between Dry Creek and Port Augusta, for both directions of travel. This ranged from 2.5 per cent (Dry Creek to Crystal Brook) to almost 55 per cent (Port Augusta to Crystal Brook).
- All sectors in both directions of travel between Port Augusta and Kalgoorlie saw growth, from almost three per cent (Kalgoorlie to Tarcoola) to almost 21 per cent (Tarcoola to Kalgoorlie).
- Between Kalgoorlie and Perth tonnages were down on all sectors, for both directions of travel. This ranged from less than one per cent (West Merredin to Koolyanobbing East) to 15.5 per cent (Avon to Toodyay West). Most of these declines were due to the smaller crop harvest than the previous financial year.

Figure 4 Gross tonnage on the North–South corridor, by line segment, 2021–22 to 2023–24



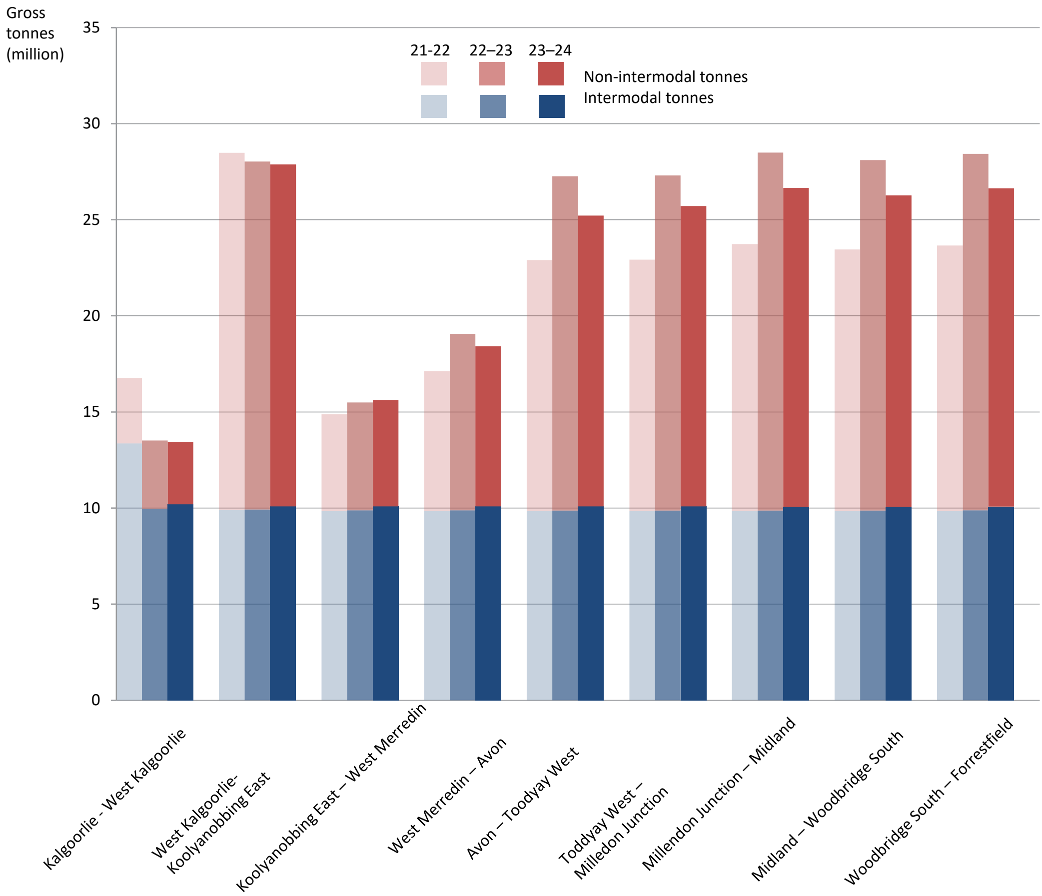
Source: Data provided by ARTC.

Figure 5 Gross tonnage on the East–West corridor, by line segment (ARTC component), 2021–22 to 2023–24



Source: Data provided by ARTC.

Figure 6 **Gross tonnage on the East–West corridor, by line segment (Arc Infrastructure component), 2021–22 to 2023–24**



Source: Data provided by Arc Infrastructure.

Figure 7 Pacific National intermodal train

Note: The image above shows Pacific National Brisbane to Adelaide intermodal service 6BA6 passing through Marulan in New South Wales in February 2024. Photo courtesy of Rodney Avery.

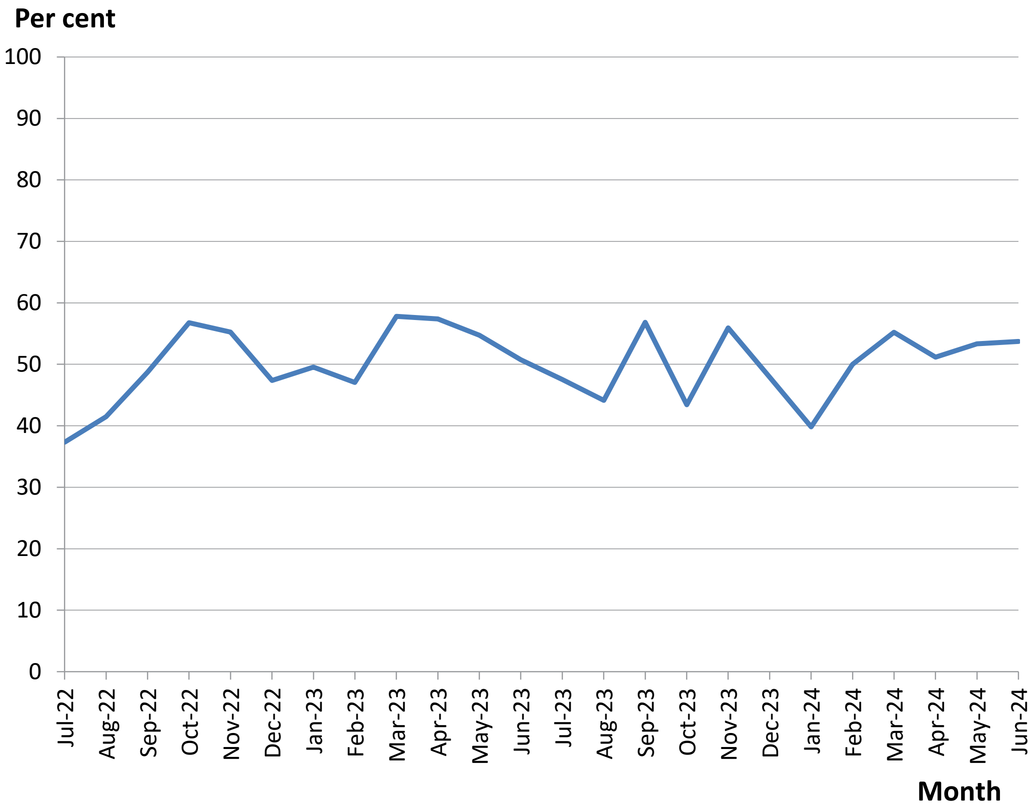
Intermodal freight train reliability on the interstate network

ARTC publishes performance indicators relating to service quality areas, including reliability. Detailed information regarding reliability by city pair is available on ARTC's website.

Train and track issues affect reliability. Problems for train operators include mechanical issues with rollingstock, delays at terminals, flow on problems from other operators' delays, and problems beyond operators' control such as trespass and vandalism. These problems can cause significant delays across the network and for trains entering the network. This requires infrastructure managers to allocate train paths without compromising their obligations to other operators.

Infrastructure issues also affect reliability. Track quality problems can result in (temporary) speed restrictions and track closures. Signalling failures also cause delays. Infrastructure maintenance and renewal, as well as weather conditions, are important aspects in infrastructure reliability.

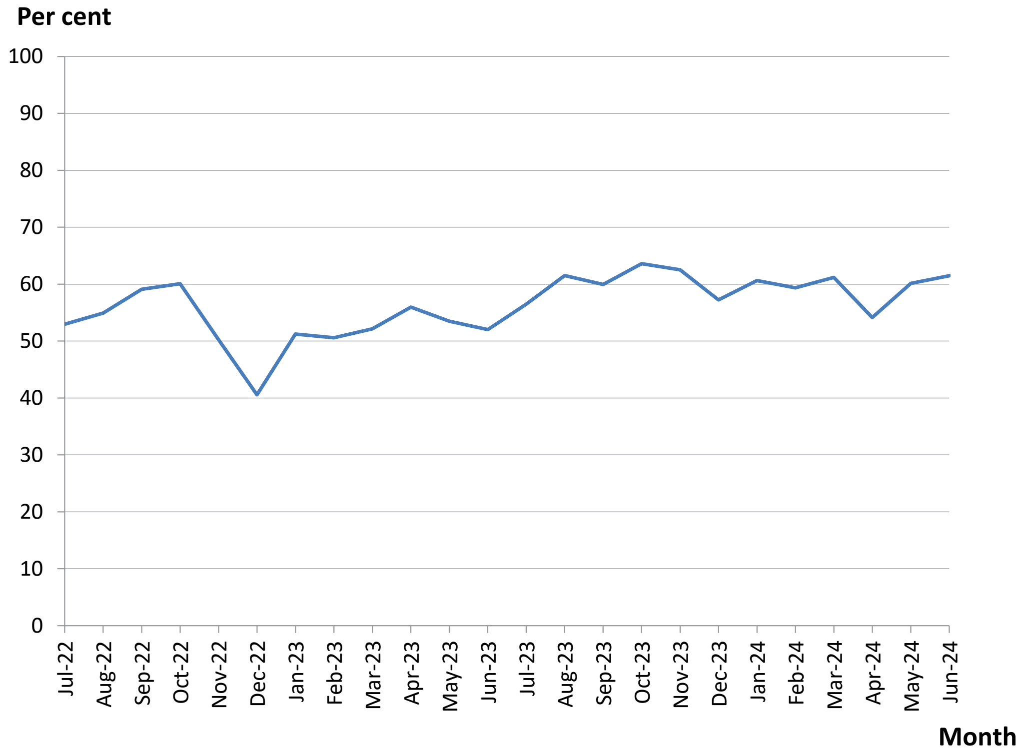
Figure 8 North–South corridor, percentage of intermodal trains exiting the network within 30 minutes of schedule



Source: Data provided by ARTC.

Between July 2022 and June 2024, approximately 50 per cent of intermodal trains exited the network within 30 minutes of schedule, on average. Reliability was lowest in July 2022, at approximately 37.5 per cent and highest in March 2023, at approximately 58 per cent.

Figure 9 East–West corridor (ARTC component), percentage of intermodal trains exiting the network within 30 minutes of schedule



Source: Data provided by ARTC.

Between July 2022 and June 2024, approximately 56.5 per cent of intermodal trains exited the network within 30 minutes of schedule, on average. Reliability was lowest in December 2022, at approximately 40.5 per cent and highest in October 2023, at approximately 63.5 per cent.

When comparing the two corridors, intermodal trains on the East–West corridor tended to be more timely than those on the North–South corridor.

Intermodal freight train frequency on the interstate network

Table 12 below, shows the numbers of scheduled weekly intermodal trains that originate and terminate in the given city pairs in 2024. These origins and destinations are those of trains, not the freight on the trains. For example, Melbourne–Perth trains dwell in Adelaide where freight is loaded and unloaded. Caution is also needed when comparing train numbers. Lower train numbers can be offset by longer train lengths.

Changes in the number of scheduled services per week relative to 2023 are:

- Sydney to Melbourne: up by three;
- Melbourne to Sydney: up by two;
- Brisbane to Melbourne: up by one;
- Melbourne to Perth and Perth to Melbourne up by three each; and
- Sydney to Perth and Perth to Sydney up by two each.

Pacific National also runs shuttle trains from Sydney to Parkes (and return). For westbound services, the freight from these trains is added to other Sydney to Perth trains waiting at Parkes, from where double stacked 1800-metre trains can operate and are formed. The reverse happens for eastbound services at Parkes.

Table 12 Number of scheduled weekly intermodal designated train services, by city pair

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
North–South corridor											
Brisbane–Sydney	2	2	5	5	6	5	3	3	4	4	4
Sydney–Brisbane	0	2	5	5	4	5	2	2	2	2	2
Sydney–Melbourne	2	1	1	2	2	5	6	5	5	8	11
Melbourne–Sydney	2	0	0	0	3	5	5	3	2	6	8
Brisbane–Melbourne	15	16	12	16	16	10	10	11	11	10	11
Melbourne–Brisbane	16	16	12	16	16	10	10	12	13	13[8]	13
Brisbane–Adelaide	2	2	2	2	1	2	2	2	2	2	2
Adelaide–Brisbane	2	2	2	2	1	2	2	2	2	2	2
East–West corridor											
Melbourne–Adelaide	8	6	6	5	5	5	5	5	6	6	6
Adelaide–Melbourne	9	6	6	6	5	5	5	5	6	6	6
Melbourne–Perth	20	20	18	18	15	13	13	15	16	16	19
Perth–Melbourne	20	20	19	19	15	14	14	15	16	16	19
Sydney–Perth	10	8	7	7	7	7	6	7	9	9	11
Perth–Sydney	10	9	7	7	7	7	6	7	9	9	11
Adelaide–Perth	0	0	0	0	0	0	0	0	0	0	0
Perth–Adelaide	0	0	0	0	0	0	0	0	0	0	0
Central corridor											
Adelaide–Darwin	6	6	6	6	6	6	6	6	6	6	6
Darwin–Adelaide	6	6	6	6	6	6	6	6	6	6	6

Sources: Working timetables of infrastructure managers (ARTC, Sydney Trains, Arc Infrastructure, UGL Regional Linx, and Aurizon) as at February 2024.

Table 13 shows the number of scheduled weekly interstate intermodal and steel trains on each line segment. This shows how intensely the interstate network is used, by schedule. Table 13 differs from Table 12 because it includes all interstate trains that travel along a given corridor, including those that continue on to another corridor, and steel trains. For example, BITRE counts a train travelling from Melbourne to Perth on all line segments of that route. The Cootamundra–Melbourne sector also includes all Melbourne–Griffith intermodal services.

Crystal Brook–Port Augusta remains the busiest segment. This is because it is a convergence point for interstate intermodal and steel trains travelling to and from Perth and Melbourne; intermodal trains to and from Sydney and Perth, and Adelaide and Darwin; and steel trains from Newcastle, Melbourne, Adelaide, and Perth to and from Port Augusta and Whyalla.

The Sydney–Cootamundra and Cootamundra–Melbourne segments remain the busiest on the North–South corridor. In addition to intermodal and steel trains, passenger and bulk commodity (mostly grain) trains use these segments extensively.

8 The 2023 count included one timetabled service that has not run since January 2023. This service is not included in the 2024 count. The comparative numbers are unchanged due to the introduction of one Aurizon service.

The most significant changes since 2023 are new intermodal services by Aurizon and QUBE on the North–South and East–West corridors. These include:

- One Aurizon Brisbane to Melbourne;
- One Aurizon Melbourne to Brisbane;
- Four QUBE Sydney to Melbourne;
- Three QUBE Melbourne to Sydney;
- Three Aurizon Melbourne to Perth;
- Three Aurizon Perth to Melbourne;
- Two Aurizon Sydney to Perth; and
- Two Aurizon Perth to Sydney.

Table 13 Total scheduled weekly interstate intermodal and steel trains, by line segment

Line segment	2020	2021	2022	2023	2024
North–South corridor					
1. Brisbane–Sydney	40	42	50	48	48
2. Sydney–Melbourne					
Sydney–Cootamundra	63	64	64	71	80
Cootamundra–Melbourne	55	55	54	61	65
East–West corridor					
3. Sydney–Crystal Brook via Broken Hill					
Sydney–Parkes via Lithgow	9	9	11	11	12
Cootamundra–Parkes	18	19	21	21	24
Parkes–Crystal Brook	32	33	36	36	40
4. Melbourne–Crystal Brook					
Melbourne–Adelaide	43	45	48	48	54
Adelaide–Crystal Brook	52	54	54	54	60
5. Crystal Brook–Perth					
Crystal Brook–Port Augusta	76	78	83	82	92
Port Augusta–Tarcoola	58	63	70	70	80
Tarcoola–Perth	46	51	58	58	68

Sources: Working timetables of infrastructure managers (ARTC, Sydney Trains, Arc Infrastructure, UGL Regional Linx, and Aurizon) as at February 2024.

Figure 10 Pacific National steel train

Note: The image above shows Pacific National Port Augusta to Melbourne steel train 3XM4 in the final stages of its journey, approaching the Somerville Road level crossing at Brooklyn, December 2023. This is a once weekly service Pacific National operates. Photo courtesy of Rodney Avery.

Intermodal train flow patterns on the interstate network

Train flow indicators based on scheduled running times give information about the planned movement of trains across the network. Table 14, below, gives timetable information about intermodal designated services, which share the line with other trains such as bulk goods trains, steel designated trains and passenger trains. Changes to the nature and scale of other train types' operations may influence intermodal train flow patterns in the infrastructure managers' path planning. Assessing what influences other trains' operations may have on intermodal train movement patterns is outside the scope of this publication. Actual times for individual trains may differ due to operational reasons.

Table 14 Scheduled inter-capital intermodal train flow patterns

Line segment/direction	Number of weekly services		Average speed (kph)		Average number of stops		Average transit time (minutes)		Average dwell time (minutes)		Average dwell time (per cent of total trip)		Average dwell per stop (minutes)	
Year	2023	2024	2023	2024	2023	2024	2023	2024	2023	2024	2023	2024	2023	2024
North–South corridor														
Brisbane to Sydney	16	17	54	53	9	9	1,084	1,098	166	180	15	16	19	21
Sydney to Brisbane	17	17	54	54	7	7	1,075	1,082	169	170	16	16	25	25
Sydney to Melbourne	18	22	59	60	5	5	978	956	195	172	20	18	38	36
Melbourne to Sydney	19	21	70	67	3	4	828	859	62	86	8	10	20	23
Brisbane to Melbourne	10	11	55	54	14	14	2,104	2,151	386	436	18	20	27	30
Melbourne to Brisbane	13	13	60	59	10	10	1,938	1,990	266	310	14	16	27	30
East–West corridor														
Melbourne to Adelaide	22	25	68	65	3	3	738	767	51	74	7	10	18	24
Adelaide to Melbourne	22	25	58	57	6	6	860	873	159	171	20	20	28	31
Adelaide to Perth	16	19	64	65	14	15	2,497	2,464	352	389	14	16	26	26
Perth to Adelaide	16	19	58	58	17	18	2,751	2,741	706	692	26	25	41	39
Melbourne to Perth	16	19	62	60	17	19	3,361	3,491	618	723	18	21	36	38
Perth to Melbourne	16	19	51	51	24	25	4,057	4,053	1,308	1,299	32	32	54	52
Sydney to Perth (via Lithgow)	8	8	64	64	18	18	3,730	3,729	700	691	19	19	38	38
Sydney to Perth (via Cootamundra West)	1	3	65	62	23	26	3,991	4,177	802	1022	20	25	35	39
Perth to Sydney (all via Cootamundra West)	9	11	59	56	22	24	4,214	4,446	1,103	1,176	26	26	50	49
Brisbane to Adelaide (via Lithgow)	1	1	51	51	14	14	3,105	3,105	907	895	29	29	65	64
Brisbane to Adelaide (via Cootamundra West)	1	1	54	54	17	17	3,145	3,145	838	838	27	27	49	49
Adelaide to Brisbane (via Cootamundra West)	2	2	52	52	13.5	13.5	3,241	3,241	916	916	28	28	68	68
Sydney to Adelaide (via Lithgow)	1	1	63	63	5	5	1,610	1,612	304	304	19	19	61	61
Sydney to Adelaide (via Cootamundra West)	1	1	61	61	7	7	1,830	1,830	429	429	23	23	61	61
Adelaide to Sydney (via Cootamundra West)	2	2	64	64	6	8	1,756	1,740	349	330	20	19	63	44
Central corridor														
Adelaide to Darwin	6	6	68	69	7	6	2,627	2,564	419	374	16	15	64	62
Darwin to Adelaide	6	6	65	65	9	9	2,745	2,740	469	472	17	17	54	54

Notes: The number of services excludes trains that do not run the entire line segment. Cootamundra to Crystal Brook, for example, excludes Adelaide to Brisbane trains.

Sources: Working timetables of infrastructure managers (ARTC, Sydney Trains, Arc Infrastructure, UGL Regional Linx, and Aurizon) as at February 2024.

North–South corridor

Notable changes from 2023 are as follows:

- Average transit times for Melbourne to Sydney traffic have increased by approximately 3.7 per cent (31 minutes);
- Average transit times for Sydney to Melbourne traffic have decreased by approximately 2.25 per cent (22 minutes); and
- Brisbane to Melbourne and Melbourne to Brisbane average transit times have increased by approximately 2.2 per cent (47 minutes) and 2.7 per cent (52 minutes) respectively.

East–West corridor

Notable changes from 2023 are as follows:

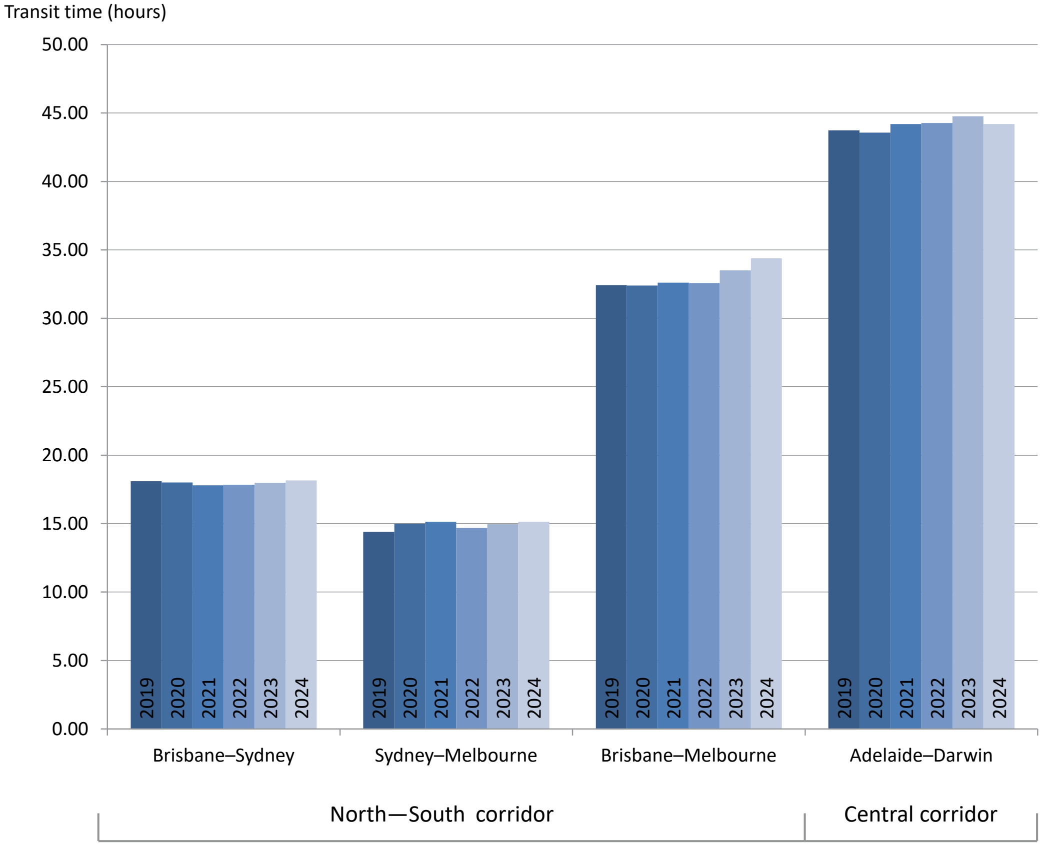
- Average Melbourne to Adelaide and Adelaide to Melbourne transit times have increased by approximately four per cent (29 minutes) and 1.5 per cent (13 minutes);
- Average Melbourne to Perth transit times have increased by almost four per cent (130 minutes) but remained unchanged for Perth to Melbourne traffic;
- Sydney to Perth (via Cootamundra West) and Perth to Sydney average transit times have increased by 4.6 per cent (186 minutes) and 5.5 per cent (232 minutes) respectively, while transit times for Sydney to Perth traffic (via Lithgow) is largely unchanged.

On most sectors of the North–South and East–West corridors, there were more services than in 2023 and these additional services' transit times, numbers of stops and dwell times have partly influenced the results.

Central corridor

There have been no significant changes in travel patterns since 2023.

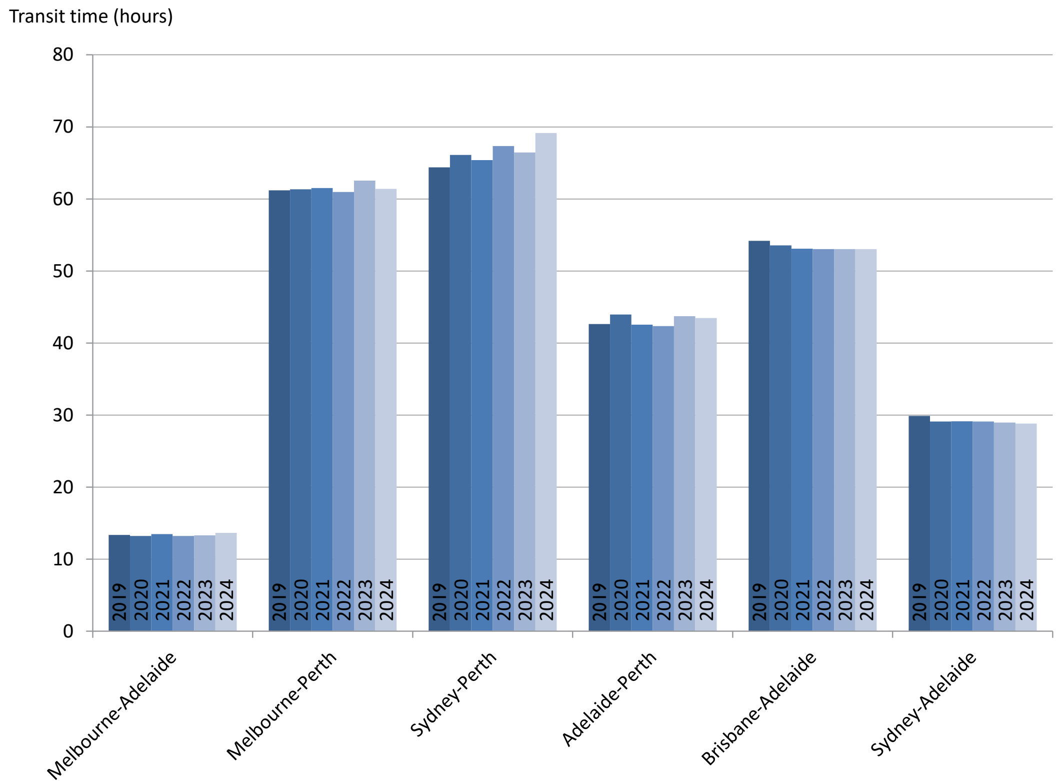
Figure 11 Average scheduled transit times, North–South and Central corridors, 2019 to 2024



Notes: Calculations include all intermodal designated trains on a given line segment travelling in both directions. The Sydney–Melbourne calculations, for example, include Brisbane–Melbourne trains.

Sources: Working timetables of infrastructure managers (ARTC, Sydney Trains, Arc Infrastructure, UGL Regional Linx, and Aurizon) as at February 2024.

Figure 12 Average scheduled transit times, East–West corridors, 2019 to 2024



Notes: Calculations include all trains on a given line segment. The Melbourne–Adelaide calculations therefore include Melbourne–Perth trains.

Some Sydney to Perth services travel via the shorter Lithgow route and some travel via the longer Cootamundra West route. The proportion of what trains take what route can vary from year to year and this affects the average results. All scheduled Sydney to Perth services travel via Cootamundra West.

The Sydney–Adelaide figures are the average for the Sydney–Adelaide component of the Brisbane–Adelaide services. There are two services in each direction per week. The Adelaide to Brisbane services travel via Broken Hill, Parkes, Cootamundra West, and Sydney. One Brisbane to Adelaide service travels via Sydney, Lithgow, Parkes, and Broken Hill. The other travels via Sydney, Cootamundra West, Parkes, and Broken Hill.

Sources: Working timetables of infrastructure managers (ARTC, Sydney Trains, Arc Infrastructure, and UGL Regional Linx) as at February 2024.

Bulk rail freight traffic, by commodity

Iron ore and coal are the rail industry's two largest bulk freight flows.

Iron ore traffic

Australia exports most of its iron ore, almost all of which is moved to port by rail. The scale of the task means rail is best suited for transporting iron ore from mine to port. The largest flows are in the Pilbara region of Western Australia.

In 2025, the Gold Valley Group began transporting iron ore from its Wiluna West Iron Ore Project in Western Australia by rail from Malcolm (near Leonora) to Esperance, via Kalgoorlie. The iron ore travels first from Wiluna West to Malcolm by road (approximately 330 kilometres), where it is transferred to rail transport for the onward leg to Esperance – a distance of approximately 620 kilometres. The iron ore previously travelled by road from Wiluna West to Kalgoorlie by road, then transferred to rail for transport to Esperance. To facilitate the shift and anticipated volumes growth, Arc Infrastructure is conducting an expanded program of resleepering and rerailing works on both the Leonora and Esperance Branch Lines (Arc Infrastructure 2025).

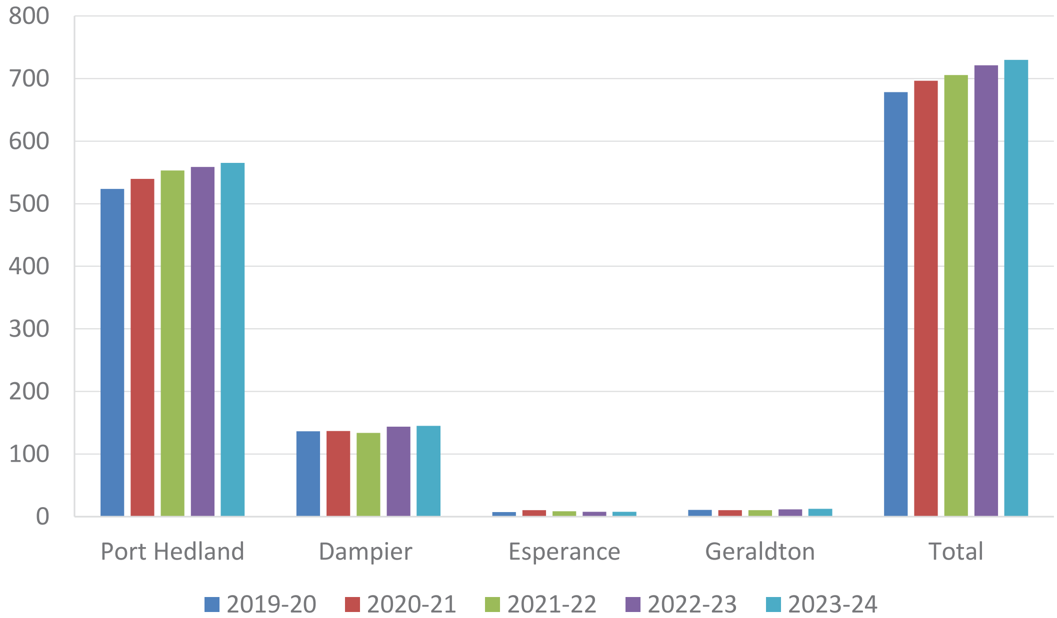
Iron ore also travels by rail from the Karara mine to Geraldton in Western Australia (Karara Mining Limited 2025).

Table 15 Iron ore exports by port, million tonnes

Port	2022–23	2023–24	Change (per cent)
Port Hedland	558.6	565.2	1.18%
Dampier	143.6	144.9	0.91%
Esperance	7.6	7.5	-1.32%
Geraldton	11.3	12.5	10.62%
Total	**721.1**	**730.1**	**1.25%**

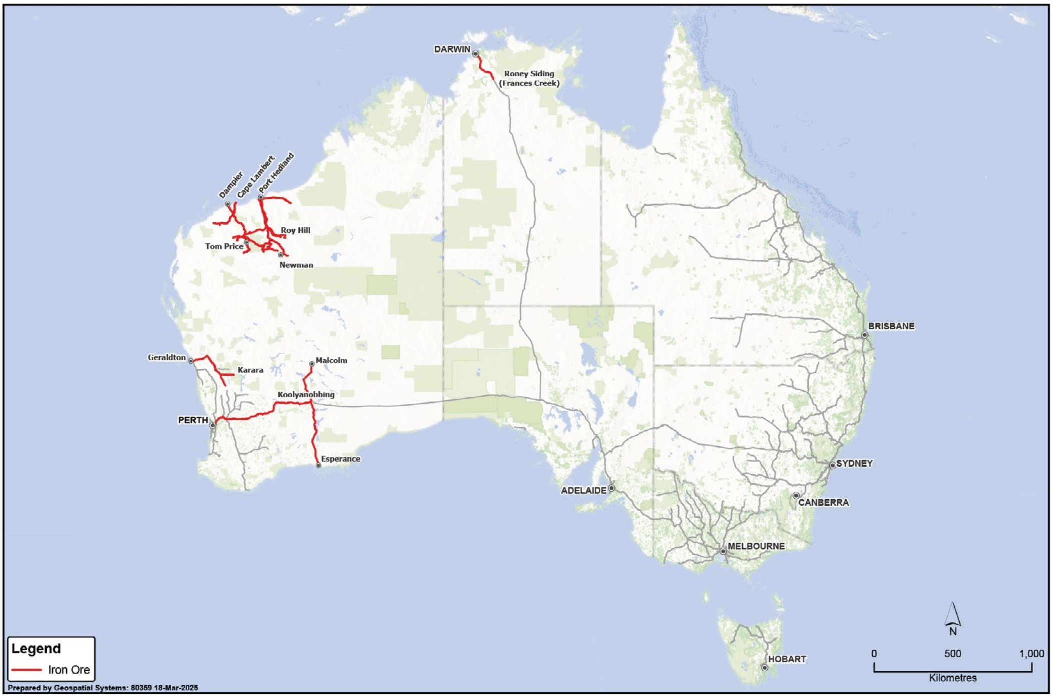
Sources: Pilbara Ports Authority (2024); Southern Ports (2024) p.34); Mid West Ports (2024), p.13.

Figure 13 Iron ore exports by financial year



Sources: Pilbara Ports Authority (2024); Southern Ports (2024), p.34; Mid West Ports (2024), p.13.

Figure 14 Iron ore transport by rail corridors



Coal traffic

Similar to iron ore, rail is the best and dominant mode for hauling coal from mine to port, particularly given Australia's coalfields are mostly located inland. Most Australian (black) coal extraction is in Queensland and New South Wales. Queensland coal is predominantly metallurgical (used in steel making) while the New South Wales coal is predominantly thermal (typically used in electricity generation)[9].

Aurizon and Pacific National dominate coal haulage, with involvement also by Bowen Rail Company (Queensland), Magnetic Rail Group (Queensland and New South Wales), Southern Shorthaul Railroad (New South Wales)[10], and TasRail. Aurizon is the main operator in Queensland, while Pacific National dominates in the Hunter Valley. Coal extracted in Tasmania is used domestically.

Table 16, below, shows Australian coal export volumes by port[11] for 2023–24 and Figure 15 shows port specific coal exports over the five years 2019–20 to 2023–24. Percentage changes for the other individual ports, and the combined total were as follows:

- Newcastle: +12.49;
- Gladstone: +10.30;
- Brisbane: +54.07;
- Abbot Point: +3.77; and
- Hay Point: -3.66.
- Total: +6.61

There was a major increase in exports through the Port of Brisbane. According to advice from the Port of Brisbane, this was due to tonnage increases by the two existing mines: Yancoal's Cameby Downs and New Hope's Acland mine. Also, there were volumes from New Wilkie Energy, which temporarily restarted the Wilkie Creek mine, but which later entered voluntary administration and ceased production.

Table 16 Coal exports, by principal ports, million tonnes, 2023–24

Newcastle	Hay Point	Gladstone	Abbot Point	Port Kembla	Brisbane
148.13	96.24	65.96	34.66	n/a	3.47

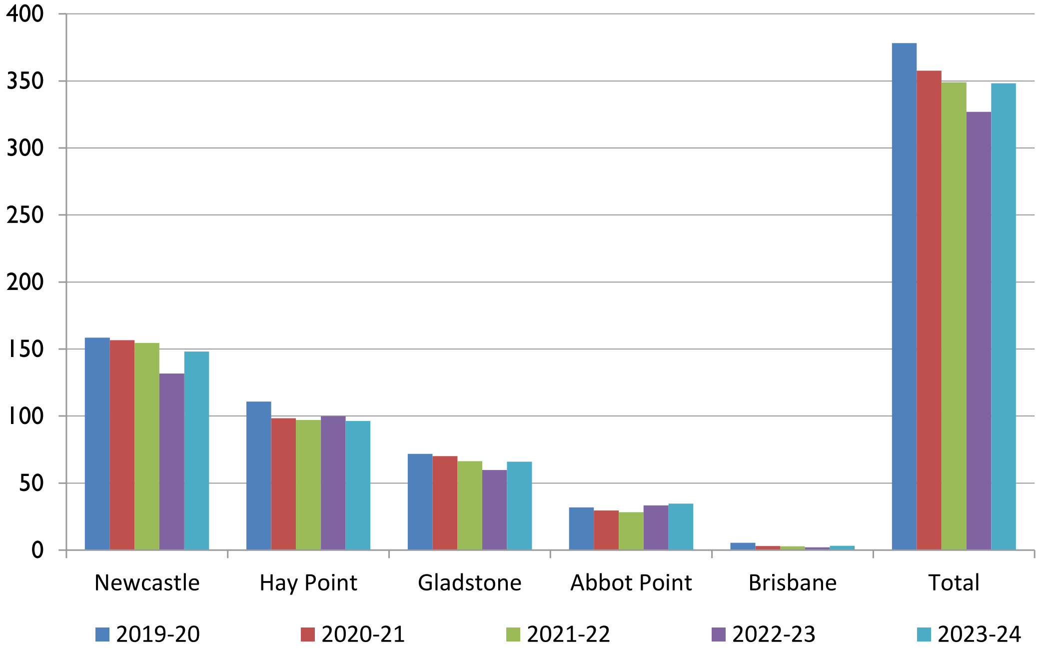
Sources: Port of Newcastle (2024); North Queensland Bulk Ports Corporation (2024), pp.15-16; Gladstone Ports Corporation (2024); Port of Brisbane (2024).

9 BITRE (2013, p. 9) gives an overview of coal attributes.

10 Bowen Rail Company operates coal trains in Queensland for Bravus Mining and Resources, while Southern Shorthaul Railroad operates coal trains in New South Wales for Centennial Coal.

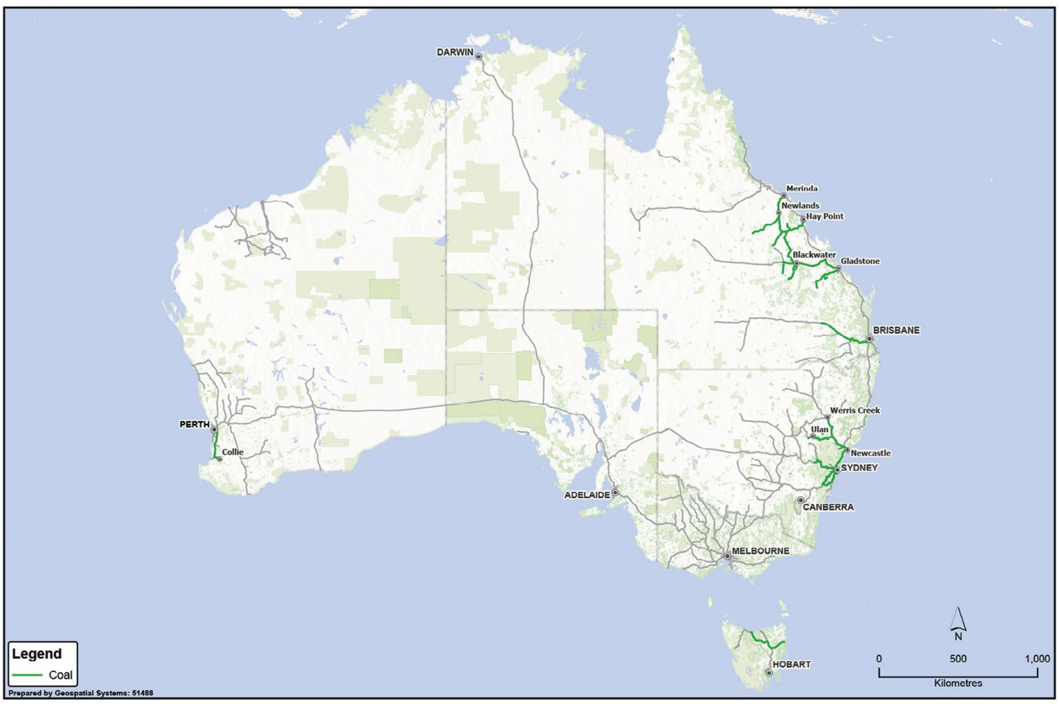
11 Data for Port Kembla is not available.

Figure 15 Coal exports by financial year



Sources: Port of Newcastle (2024); North Queensland Bulk Ports Corporation (2024), pp.15-16; Gladstone Ports Corporation (2024); Port of Brisbane (2024).

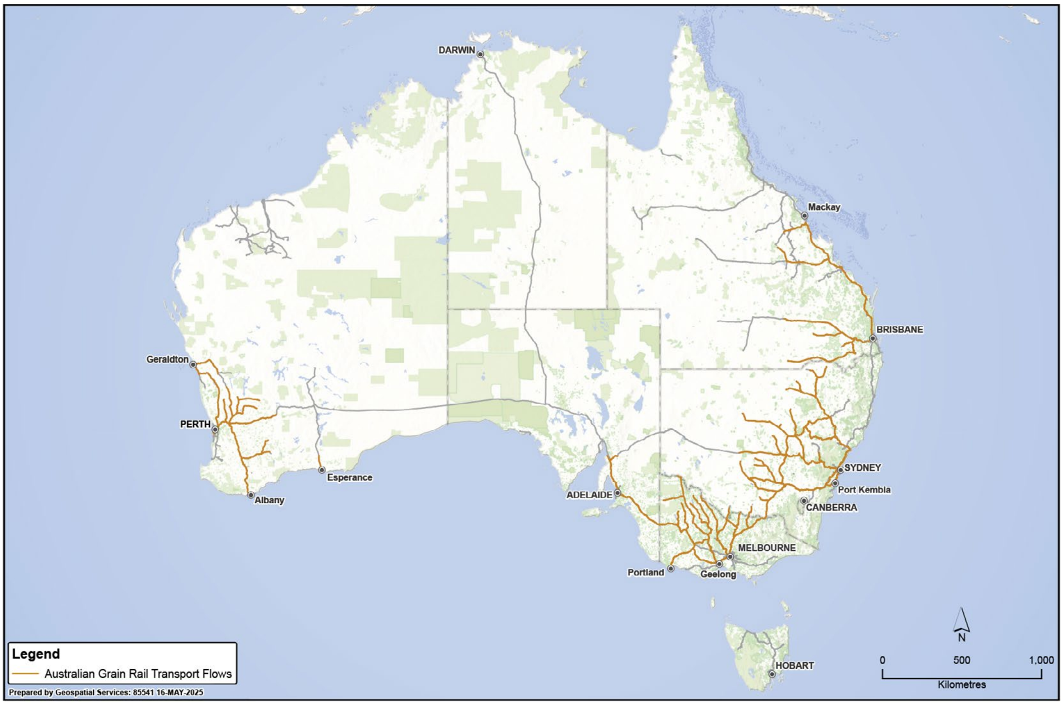
Figure 16 Coal transport by rail corridors



Grain traffic

Another major role for Australia's railways is hauling agricultural produce from rural areas to ports for export and, to a lesser extent, domestic consumption. Following bumper harvests, rail's grain haulage task increases significantly[12]. Grain harvests are dominated by cereal grains (for example wheat and barley), but also pulses and oilseeds. Rail has traditionally dominated grain transport over long distances, while road transport becomes more competitive over shorter distances or when taking grain from farmgate to consolidation point. Figure 17 shows grain flows by rail. This traffic largely uses dedicated grain haulage branch lines of varying quality, which connect with main lines.

Figure 17 Grain transport by rail flows



Notes: The major grains hauled by rail in Australia for domestic and export consumption include; milling wheat, stockfeed wheat, durum, malt barley, feed barley, sorghum, canola, chickpeas.

The map shows grain flows along the railway lines that are designated as operating in January 2025. Some railways, notably in south-west Western Australia and in central New South Wales, are not shown as they are classified non-operational. The Toolamba–Echuca line in Victoria is currently also non-operational, thus it is not shown.

12 Unlike iron ore and coal, BITRE does not have data on grain transport by rail tonnages.

While rail transport has a traditional advantage for bulk grain transportation over long distances and is the preferred mode choice, this advantage is not absolute and has been partially eroded by other factors that have improved road transport's competitiveness or restricted rail transport's efficiency[13]. These include:

- Variable infrastructure quality across the networks, slower speeds, the need in places to change locomotives from mainline types to branch line types, chokepoints and short crossing loops at strategic locations[14];
- Variable rollingstock age;
- Degrees of grain handlers' investment in grain receival sites, including closure of smaller sites;
- Improved roads and road transport services, including more widespread use of bigger and heavier trucks;
- Increased containerisation of grain, although this is still usually transported by rail;
- Deregulation of grain export marketing, which has seen smaller shipments being moved on diverse pathways for a broader range of bulk handlers and export marketers;
- Increased on-farm grain storage that is more suited to road transport;
- Increased number of farming cooperatives based around road transport;
- Rail industry restructuring, funding and ownership changes;
- Rail transport and infrastructure availability;
- Increased domestic grain consumption of wheat produced in New South Wales, for which road transport is better suited;
- Coordinating train loading times with port receival times; and
- Weather events, where smaller harvests in droughts reduce the export grain task and are focused on the domestic grain task that is mostly trucked.

While poor quality track infrastructure may reduce rail transport's efficiency, this should be seen in the context of how much grain travels on the lower grade lines in the first place.

13 *Trainline 3* discusses in detail these changes and challenges to grain transport by rail. (See BITRE 2015) .

14 For more information on track infrastructure constraints, from a grain grower's perspective. (See Grain Central 2017).

Figure 18 Pacific National grain train

Note: The image above shows Pacific National standard gauge grain train 9785 loading grain at Warracknabeal in Victoria, July 2024. Photo courtesy of Rodney Avery.

Non-bulk and short-haul rail freight traffic

Non-bulk and short-haul (a distance that is shorter than that which intermodal rail transport is usually considered viable) rail freight movements are both containerised and non-containerised. Examples of such traffic includes the Kilmore East quarry train, the Berrima–Maldon clinker train, the Railton–Devonport cement train, the Kevin–Thevenard gypsum train, the Cooks River–Tarago garbage train, and the Visy Logistics General Freight Port Shuttle rail services from the Riverina Intermodal Freight and Logistics (RiFL) Hub at Bomen (Wagga Wagga) to Port Botany and Port Melbourne. Short-haul traffic is often thought to be uncompetitive with road freight, due to the relative short distances over which the freight is moved. It can, however, be successful. To succeed, short-haul rail traffic needs:

- Minimised drayage costs between the hinterland and rail terminal;
- Low line haul and high road haul costs; and
- A convergence of parties who encourage short haul and viable hinterland terminals (BITRE 2016a, pp v–vi)[15].

Apart from rail container movements between domestic intermodal terminals, rail services also undertake maritime tasks (for import, export and Bass Strait traffic) that can be classified as follows:

- Landbridge movements, from one port to another. Container movements from around Hobart, to the Port of Burnie (for export or transfers to and from the mainland), is an example.

15 BITRE 2016a (*Why short-haul intermodal rail services succeed*), provides an in-depth discussion on the (potential) viability of short-haul rail transport in Australia.

- Regional export movements, from inland terminals to the port. This traffic includes agricultural commodities such as grains, hay, sugar, cotton, livestock, wine and logs.
- Urban import and export movements. These are short-haul container movements, linking the port terminal with urban logistics centres (where boxes are de-stuffed, stored or distributed to local businesses around the terminals). These local rail services also shift empty containers. SCT Logistics' daily container shuttle train from its Penfield intermodal terminal to the Port of Adelaide for Treasury Wines Estate is an example.
- Export maritime activities are generally based around single commodities and/or a single company's logistics-based hub, such as agricultural produce from the Fletcher International terminal at Dubbo.

Landbridge and regional movements

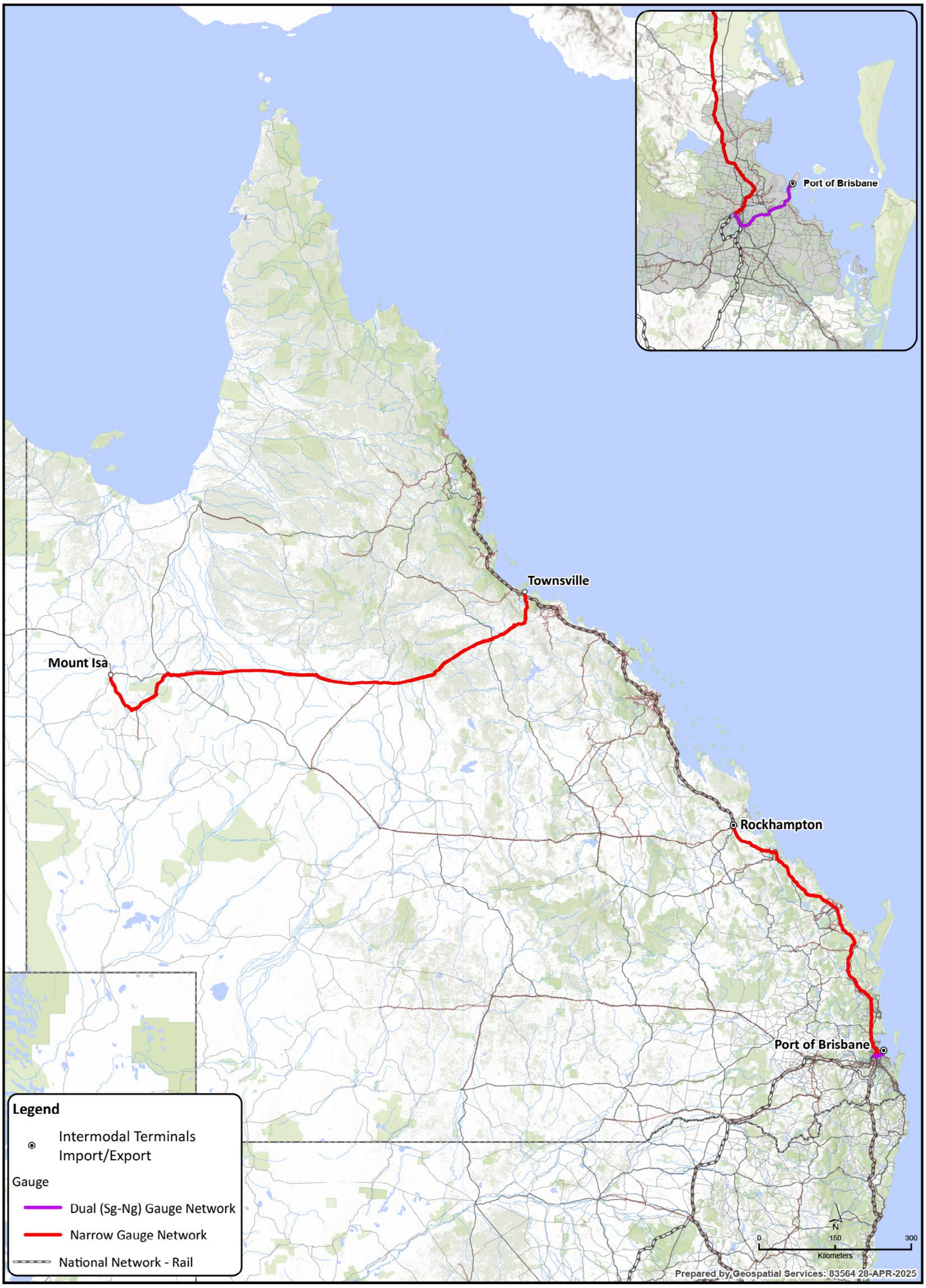
The following discussion focuses on port rail flows to or from capital cities and urban shuttles, while noting other non-capital city flows can operate.

Rail (and road) volumes of containers through the primary capital city ports are reported in BITRE's regular Waterline series. (BITRE 2024, gives the latest figures.)

Queensland

Figure 19 shows the rail container flows between Queensland intermodal terminals and the ports of Brisbane (Fisherman Islands) and Townsville.

Figure 19 Rail containerised freight operations serving the ports of Brisbane and Townsville



The only currently known containerised freight for export travelling to the ports of Brisbane and Townsville by rail is refrigerated meat from Rockhampton to Brisbane, and minerals and chemicals from Mount Isa to Townsville.

In September 2023, Aurizon started Melbourne–Sydney–Brisbane intermodal freight rail services. At Brisbane, these services operate to/from the Brisbane Multimodal terminal at the Port of Brisbane. According to Aurizon, these services cater "...to a range of containerised freight, including local manufactured goods and produce together with import and export traffic, in a co-ordinated port-rail-terminal-rail-port service" (Aurizon 2023). BITRE has not yet been able to ascertain the point(s) of origin of these freight flows to the Port of Brisbane.

Sydney Ports–Port Botany

Figure 20 Rail containerised freight operations serving Sydney Ports–Port Botany

Regional services to Port Botany are based on export container traffic, with train movements to the hinterland conveying empty boxes for filling. Rail moves a range of containerised commodities, primarily agricultural, to Port Botany. This includes:

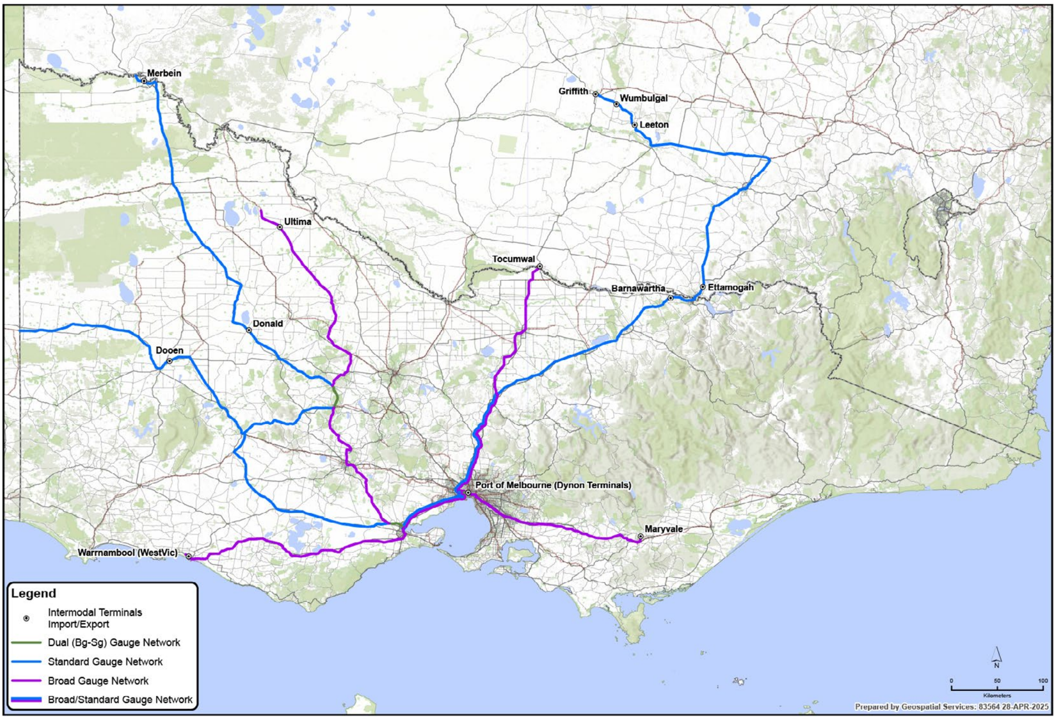
- Narrabri – specialised grain, Viterra pack cereals (wheat and barley), oilseeds, pulses, cotton
- Dubbo – specialised grain, oilseeds, pulses, and refrigerated meat
- Coonamble – specialised grain
- Narromine – specialised grain
- Warren South – cotton
- Wee Waa – cotton

- RiFL/Bomen[16] – paper, cotton, grain, oilseeds, pulses, refrigerated meat, timber, other agricultural products
- Trangie South – cotton
- Kelso (Bathurst) – grain
- Werris Creek – grain, meat and other agricultural products

Port of Melbourne

Figure 21 shows the major regional container export flows through the Port of Melbourne. It does not show rail container flows through the port that originate or are destined for Tasmania.

Figure 21 Rail containerised freight operations serving the Port of Melbourne



There are regional flows, both from within Victoria and from southern New South Wales. Products transported by rail are as follows.

Intrastate Victoria

- Merbein (Mildura) – grain, wine, grapes, fruit;
- Donald – peas, grain;
- Seaway Container Export Services, at Warrnambool – meat, dairy products, machinery and ingots;

16 The Riverina Intermodal Fright and Logistics Hub (RiFL) opened in December 2022. Paper products that were previously loaded on to trains at Harefield, about 15 kilometres from the hub, are now loaded at RiFL. For more information about the hub see https://wagga.nsw.gov.au/projects/past-projects/completed-projects/2022-projects/rifl.

- Wimmera Container Line, at Dooen (near Horsham) – grain, hay, and pulses;
- Maryvale in the Latrobe Valley – containerised paper;
- Ultima – hay and grain; and
- SCT Logistics rail hub at Barnawartha – import/export trade for solar farms, grain, cotton, resin, meat, biodiesel, machinery and wine.

Due to the cessation of white paper production at Maryvale, rail services from Maryvale now only operates three days per week, instead of the previous 13 services per fortnight. Additional services run if required, due to additional demand.

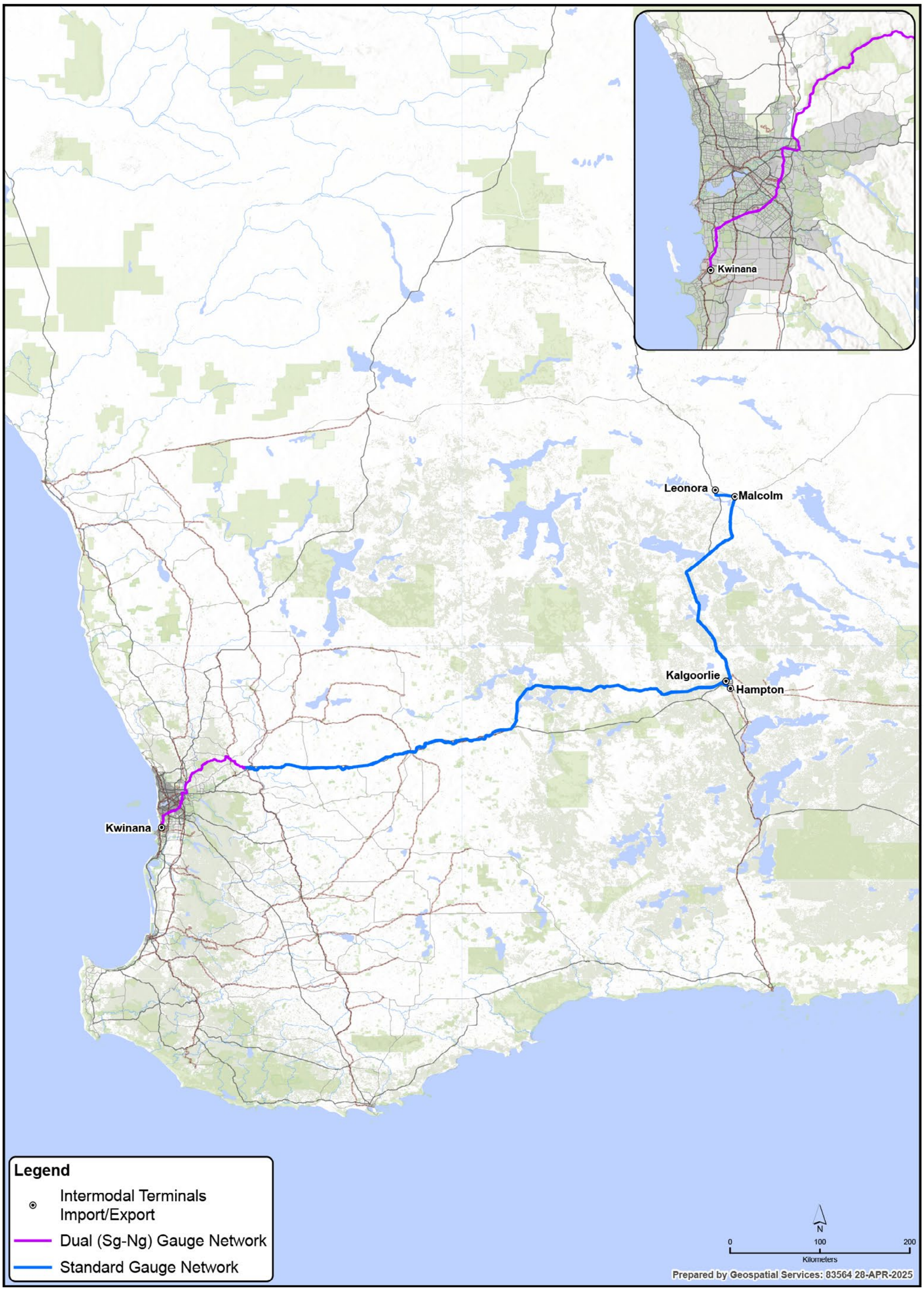
Southern New South Wales

- Tocumwal – grain and hay[17];
- Griffith and the Wumbulgal terminal – containerised wine, rice, grain, cotton;
- Rice and pelleted feeds for animals, from Leeton; and
- Containerised paper and bottled water from the Ettamogah Rail Hub.

17 Previous rice, potatoes, and dairy traffic on this line dropped off from late 2021 due to disruptions on the Shepparton line.

Kwinana

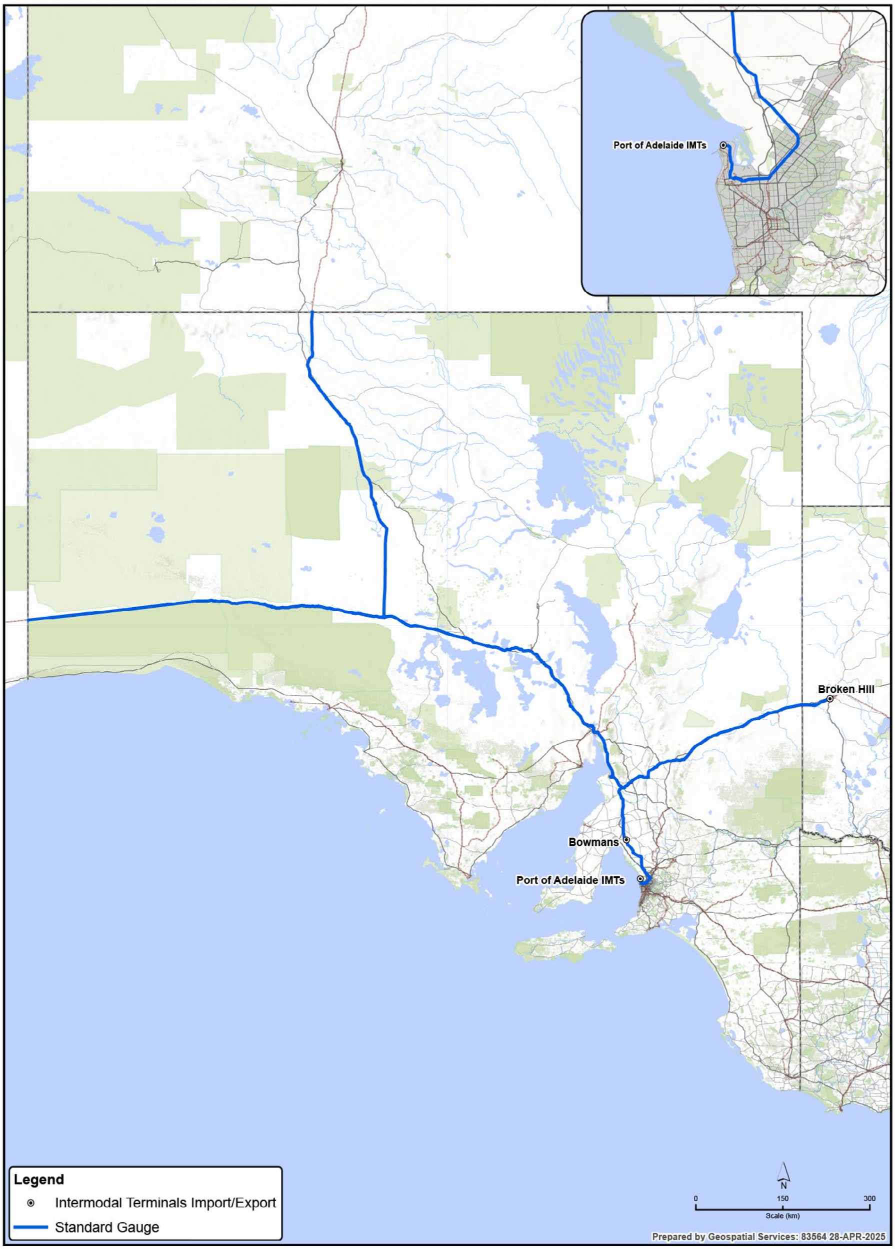
Figure 22 Rail containerised freight operations serving Kwinana



The primary regional container export flows are rare earth minerals and nickel from Leonora and Malcolm and nickel products from a nickel smelter south of Kalgoorlie.

Port Adelaide

Figure 23 Rail containerised freight operations serving the Port of Adelaide



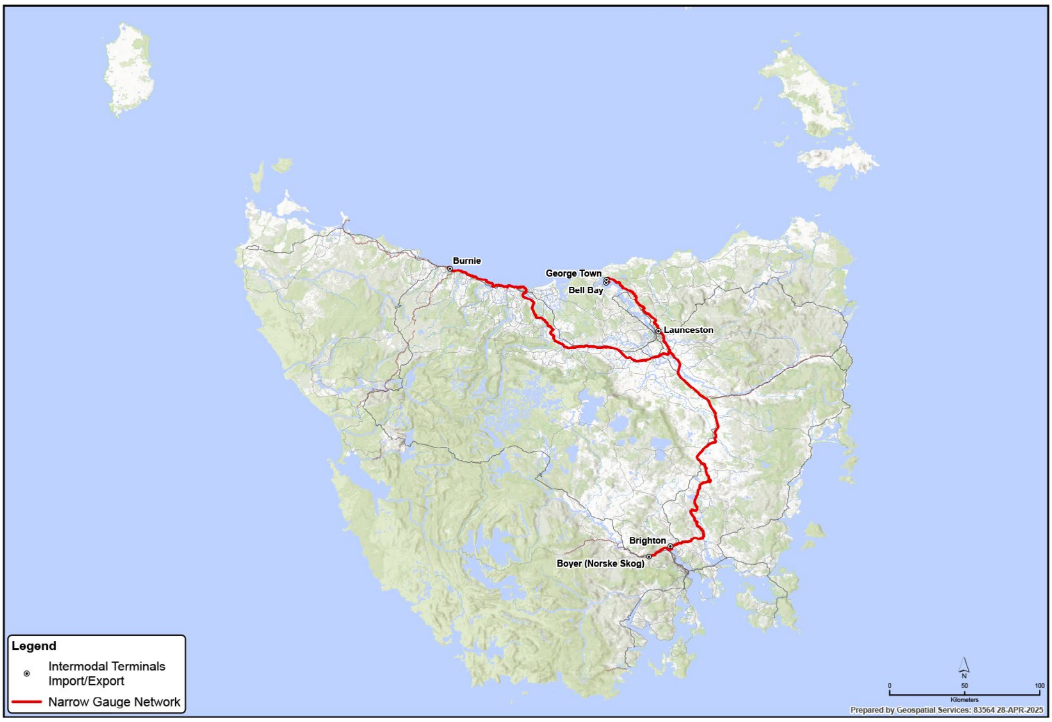
There are regional maritime and domestic bulk container traffic flows to Port Adelaide. Purpose-built domestic bulk containers are used to haul mineral sands, such as from the Murray Basin in NSW, to Broken Hill for further processing, then railed to Port Adelaide and to Western Australia. Minerals Sands are exported through Inner Harbor at Berth 29 (and transported by rail from Broken Hill to Western Australia for further processing into finished product). The minerals sands travel to the port and Western Australia by rail in purpose built 20-foot bulk containers. One to two trains enter the port per week.

CBH resources use QUBE Logistics (after acquiring Bowmans Rail) to deliver purpose-built containers with zinc concentrates from Rasp Mine at Broken Hill to Port Adelaide every two weeks. Regional trains operate between the QUBE's intermodal terminal and the Flinders Adelaide Container Terminal (FACT) (Outer Harbor). FACT is used for the export of agricultural products such as hay, pulses, and project materials. The facility is also used as a consolidation point for a range of commodities, a task that would otherwise be done at the port. SCT operates a service from Penfield, on the northern outskirts of Adelaide, to Outer Harbor. This service predominantly carries export wine products (Treasury Wines).

Tasmania

TasRail operates the Tasmanian Rail Network, as a vertically-integrated railway. With modernised terminals located at Burnie, Brighton and George Town (Bell Bay), TasRail provides freight haulage and storage services throughout the state. Containerised freight services connect major industrial producers to Tasmania's premier shipping ports where freight is moved across Bass Strait. Bulk freight services provide efficient, integrated, end-to-end supply chain services and the haulage of bulk commodities to storage facilities for onward export. TasRail also operates Tasmania's only publicly-owned bulk handling, storage and ship loading facility for bulk minerals, which is located within the Port of Burnie.

Figure 24 Rail container operations serving Tasmanian ports



Rail traffic terminals in Tasmania include:

- George Town: A multi-modal terminal with a container storage area capable of handling containerised general freight, metal ingots and bulk log freight. TasRail also has direct rail access to two woodchips mills within Bell Bay.
- Devonport: A freight terminal handling containerised general freight;
- Burnie: An upgraded multi-modal freight terminal, which handles containerised general freight, bulk metal concentrates, paper products, and metal ingots;
- Launceston: A freight terminal handling containerised general freight; and
- Brighton: A multi-modal freight terminal with container hardstand and storage area that handles containerised general freight, bulk log freight, and metal ingots.

TasRail hauls zinc ingots, bulk minerals concentrates, bulk cement, coal, finished paper products, sugar, recycled metal, glass bottles, fish food, fertiliser, construction materials, consumer goods, groceries and aluminium ingots.

Short-haul urban maritime container movements

Short-haul urban shuttle trains provide a rail link from seaports to nearby intermodal (distribution) centres. These services are advantageous by virtue of the fact they reduce road congestion into and out of the ports and connecting arterial roads. There are several flows of short-haul urban maritime container movements. These include:

- Yennora–Port Botany (approximately 34 kilometres);
- Minto–Port Botany (approximately 50 kilometres);
- Moorebank–Port Botany (approximately 42 kilometres);
- Enfield–Port Botany (approximately 18 kilometres);
- Direk/Penfield–Outer Harbor, Port Adelaide (approximately 33 kilometres);
- Kenwick–Fremantle (North Quay) (approximately 35 kilometres)
- Forrestfield/Kewdale–Fremantle (Inner Harbour) (approximately 39 kilometres); and
- Fremantle (North Quay)–Kwinana (approximately 28 kilometres).

The Yennora and Minto operations handle imports and exports. The terminals conduct logistics activities for imported goods, including storage, consolidation and deconsolidation, and onwards road distribution to nearby warehouses. Exports include empty container transfers to the port. In May 2024, DP World announced the launch of its new Yennora–Port Botany rail service. This involves a twice daily return rail service from the Yennora Intermodal Terminal to Port Botany, with an expected annual capacity of 160,000 TEUs (DP World 2024).

The Western Australian Government subsidises the movement of (loaded) containers by rail from intermodal terminals at Forrestfield, Kenwick, Rockingham and Kwinana into North Quay at Fremantle. Empty containers and are not subsidised. Intermodal Group (IMG)/Watco operate train services between Fremantle and Forrestfield, with 2–3 trains per day, 6–7 days a week. In August 2024, IMG/Watco began a (daily) five day a week service between Fremantle and its newly opened facility at Kenwick. Each IMG/Watco train can haul up to 100 import/export containers. Aurizon operate 1–2 trains per day, five days per week between Kwinana and North Quay.

In 2023–24, the average monthly proportion of containers moved into and out of the Port of Fremantle was 18.6 per cent (Fremantle Ports 2024, p.39). This was down from 20.1 per cent in 2022–23 (Fremantle Ports 2023, p.6).

The (Melbourne) Port Rail Transformation Project, which was intended to provide a rail solution to meet the needs of the growing port and reduce truck movements across Victoria, particularly in Melbourne's inner western suburbs, has been completed. According to advice from the Victorian Department of Transport, the key elements of the project are:

- Integrated provision of port, rail, land and assets at the port - Port of Melbourne will provide rail land and rail assets on a similar basis to how it provides wharf and road land and assets;
- New on-dock rail terminal capacity - development of a new on-dock rail terminal at Swanson Dock East;
- New road and rail infrastructure - to improve operational efficiencies of rail inside the port gate; and
- Improved rail terminal operation arrangements and transparency.

Box 2 Further resources on non-bulk freight activity

Most of Australia's major ports report throughput statistics by freight type, freight origin, and freight destination on their websites, through a search facility, or in their annual reports.

BITRE's Waterline series reports quarterly data on rail traffic volumes through the mainland state capital city ports (where traffic is measured in, TEU containers (See https://www.bitre.gov.au/search?keys=waterline).

Chapter 3

Urban passenger transport results – heavy and light rail

Each of the mainland state capital cities operate urban heavy rail passenger rail services. Melbourne, Sydney, Adelaide, Canberra, the Gold Coast, and Newcastle operate light rail services. These services enable the mass movement of passengers. They provide an alternative to private cars, which minimises road congestion.

Patronage

Table 17 Urban heavy rail patronage (millions of journeys), 2022–23 and 2023–24

	Brisbane[a]	Sydney[b]	Melbourne	Adelaide	Perth	Total
2022–23	42.86	256.5	157.1	12	53.2	521.6
2023–24	47.25	325.3	182.5	12.3	59.7	627

Notes: a. Brisbane's patronage figure is based on Queensland Rail's City Train network, whose scope is what it defines as south east Queensland. The quoted patronage also does not include the separately administered Airtrain line.

b. Sydney's patronage includes Sydney Metro services.

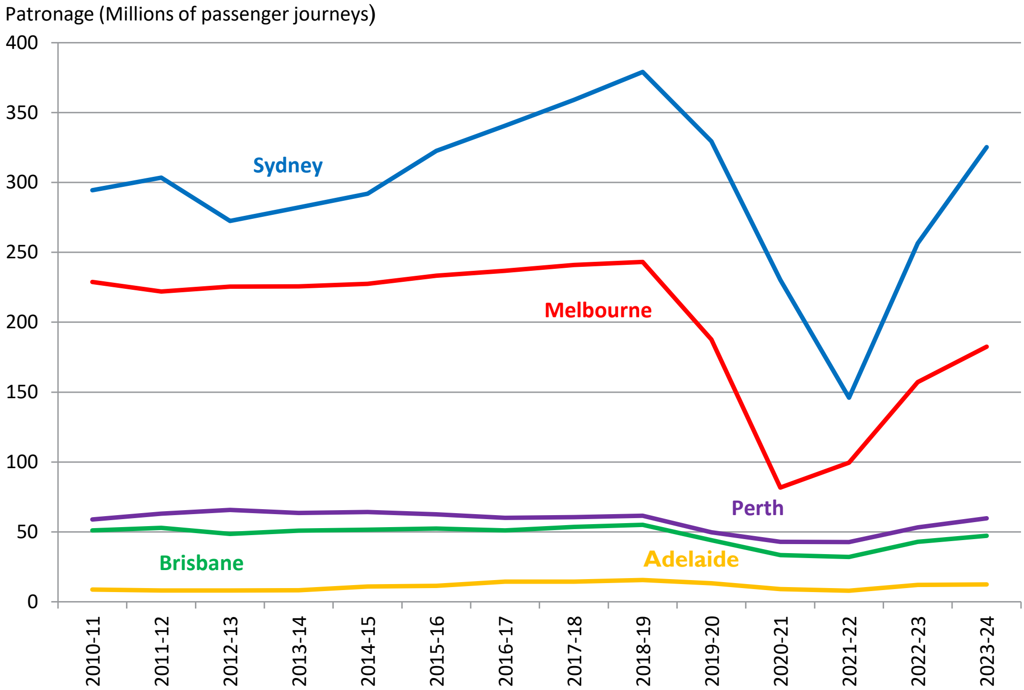
Sources: (2022–23 data) Public Transport Authority of Western Australia (2023), p.22; Data Vic (undated); Department for Infrastructure and Transport (2023), p.38; Queensland Rail (2023), p.40; Sydney Metro (2023), p.40; advice from Transport for NSW.

(2023–24 data) Public Transport Authority of Western Australia (2024), p.22; Department of Transport and Planning (2024), p.49; Department for Infrastructure and Transport (2024), p.46; Queensland Rail (2024), p.18; Sydney Metro (2024), p.58; advice from Transport for NSW.

Total urban heavy rail patronage for 2022–23 was approximately 521.6 million passenger journeys, up from 328 million passenger journeys the previous financial year. This was an increase of almost 60 per cent. Patronage grew in all cities, from approximately 25 per cent in Perth to approximately 75 per cent in Sydney. It was the first increase seen in all cities in a single financial year since 2018–19.

In 2023–24, total urban heavy rail patronage was approximately 627 million passenger journeys, an increase of approximately 20.2 per cent on the previous financial year. Patronage grew in all cities, from 2.5 per cent in Adelaide, to almost 27 per cent in Sydney.

Figure 25 Heavy rail patronage in Australian cities

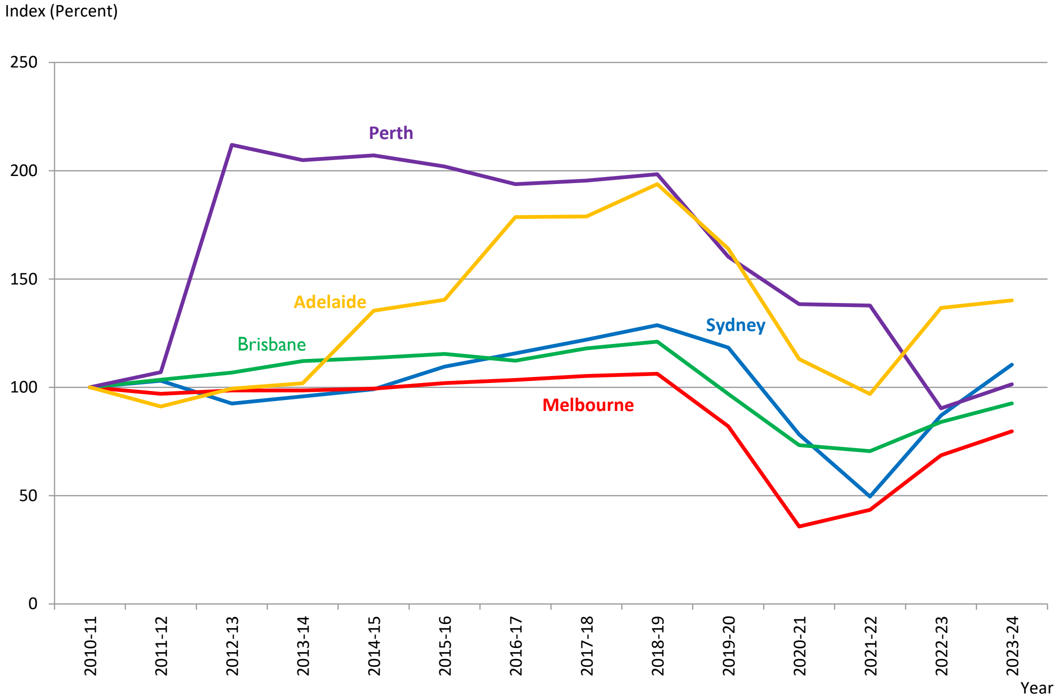


Sources: (2022–23 data) Public Transport Authority of Western Australia (2023), p.22; Data Vic (undated); Department for Infrastructure and Transport (2023), p.38; Queensland Rail (2023), p.40; Sydney Metro (2023), p.40; advice from Transport for NSW.

(2023–24 data) Public Transport Authority of Western Australia (2024), p.22; Department of Transport and Planning (2024), p.49; Department for Infrastructure and Transport (2024), p.46; Queensland Rail (2024), p.18; Sydney Metro (2024), p.58; advice from Transport for NSW.

Previous editions of Trainline, citing service provider reporting and advice.

Figure 26 Index of urban heavy rail patronage in Australian cities



Sources: IIndex based on patronage data shown in Figure 25.

Table 18 Light rail patronage (millions of journeys), 2022–23 and 2023–24

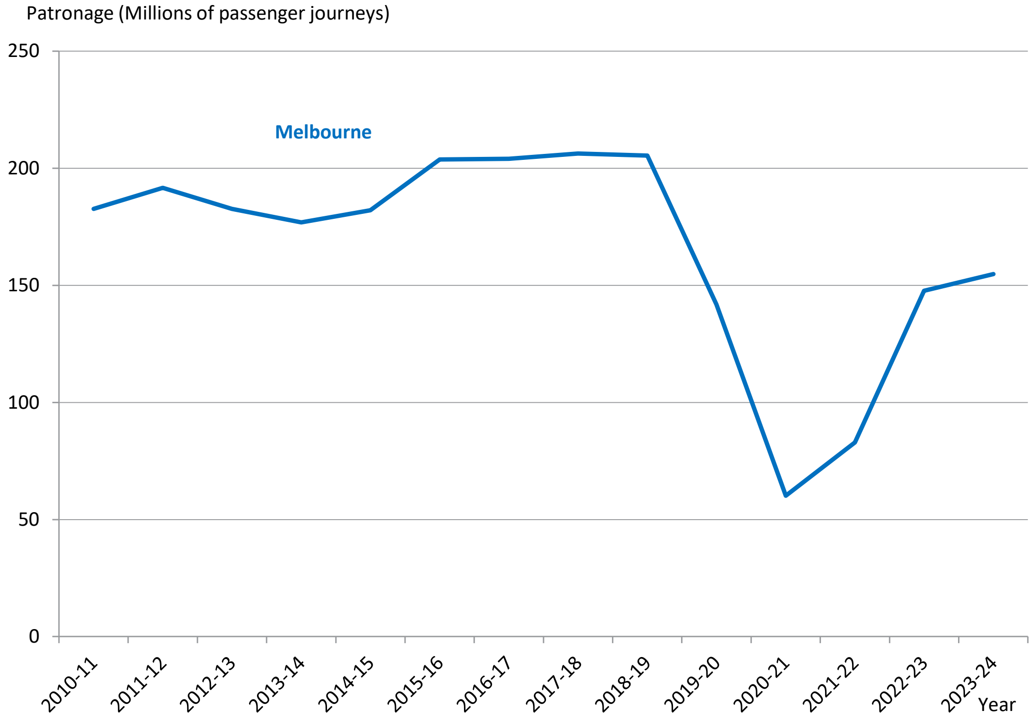
	Sydney	Melbourne	Adelaide	Gold Coast	Canberra	Newcastle	Total
2022–23	37.6	147.6	7.5	10.4	3.7	.94	207.74
2023–24	46.4	154.8	8.8	11.2	4.18	1.0	226.38

Sources: (2022–23 data) Data Vic (undated); Department for Infrastructure and Transport (2023), p.38; Canberra Metro Operations (undated); Department of Transport and Main Roads (2023), p.218; advice from Transport for NSW.

(2023–24 data) Department of Transport and Planning (2024), p.51; Department for Infrastructure and Transport (2024), p.46; Canberra Metro Operations (undated); Department of Transport and Main Roads (2024), p.28; advice from Transport for NSW.

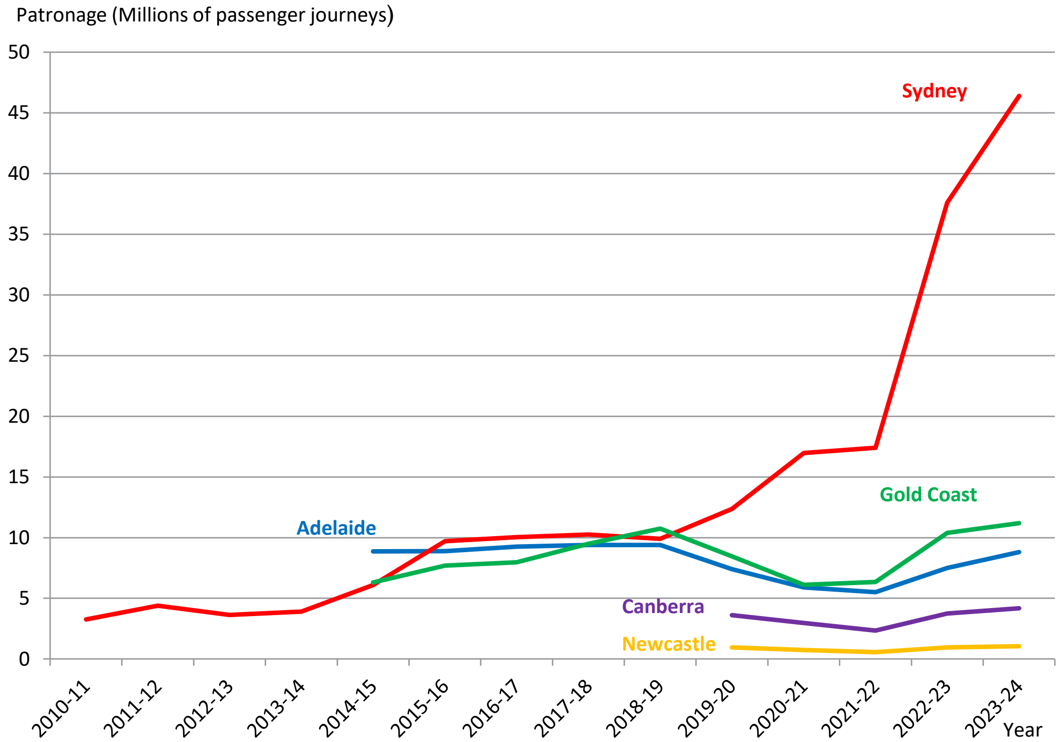
Total light rail patronage in 2023–24 grew by approximately 9.5 per cent. Patronage grew in all cities, from 4.9 per cent in Melbourne, to 26 per cent in Sydney.

Figure 27 Melbourne light rail patronage



Source: Data Vic (undated); historical annual reports.

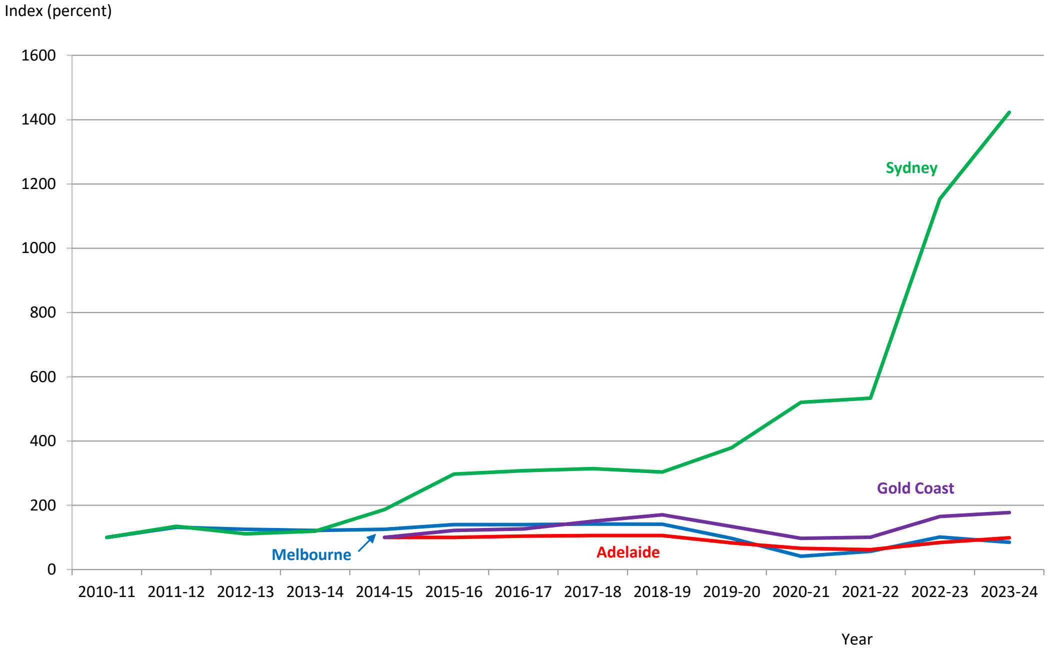
Figure 28 Sydney, Adelaide, Gold Coast, Canberra and Newcastle light rail patronage



Note: Pre 2014–15 data for Adelaide is not shown due to a patronage calculation methodology change.

Sources: Department of Transport and Planning (2024), p.51; Department for Infrastructure and Transport (2024), p.46; Canberra Metro Operations (undated); Department of Transport and Main Roads (2024), p.28; advice from Transport for NSW; historical annual reports.

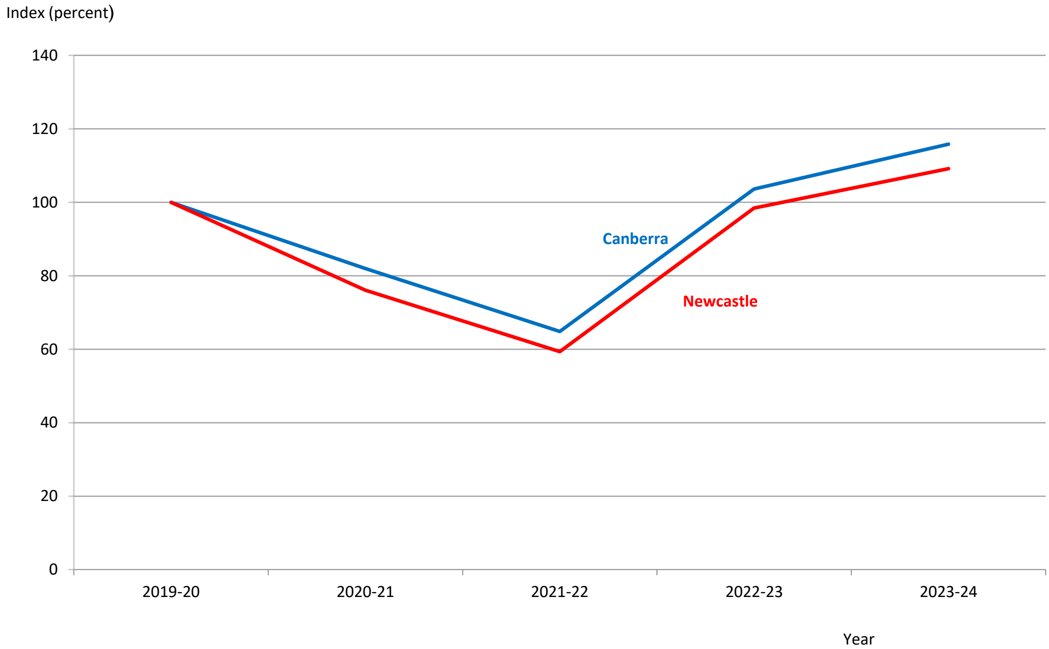
Figure 29 Index of light rail patronage Melbourne, Sydney, Adelaide and Gold Coast



Note: The index base year for Melbourne has been re-set from 2004–05 to 2010–11, for graph formatting reasons.

Sources: Index based on reported patronage data.

Figure 30 Index of light rail patronage Canberra and Newcastle



Sources: Index based on reported patronage data.

Commuting Mode Share

Urban passenger rail services are largely aligned to service weekday commuter demand to and from city centres. The task is skewed to the morning and afternoon peak periods. Table 19, below, shows urban rail journey-to-work mode share, according to the results of the 2021 Australian Census.

Table 19 Urban rail journey-to-work mode shares, 2021

	Brisbane	Sydney	Melbourne	Adelaide	Perth	Canberra
Heavy rail	4.8	8.9	6.3	1.7	6.5	-
Light rail	-	0.2	2.0	0.6	-	1.7

Notes: All cities except Canberra refer to greater metropolitan areas. Canberra refers to Canberra and Queanbeyan.

Mode shares defined as persons who caught a train/tram for all or part of their journey to work. Calculations exclude census respondents who did not specify travel mode, worked at home or did not go to work.

Tram/light rail census data includes respondents who: caught a tram/light rail; caught a train and tram/light rail; or caught a bus and tram/light rail. The tram/light rail data is therefore an underestimate because it does not include all possibilities, for example, car and tram/light rail.

Source: Australian Bureau of Statistics (2022).

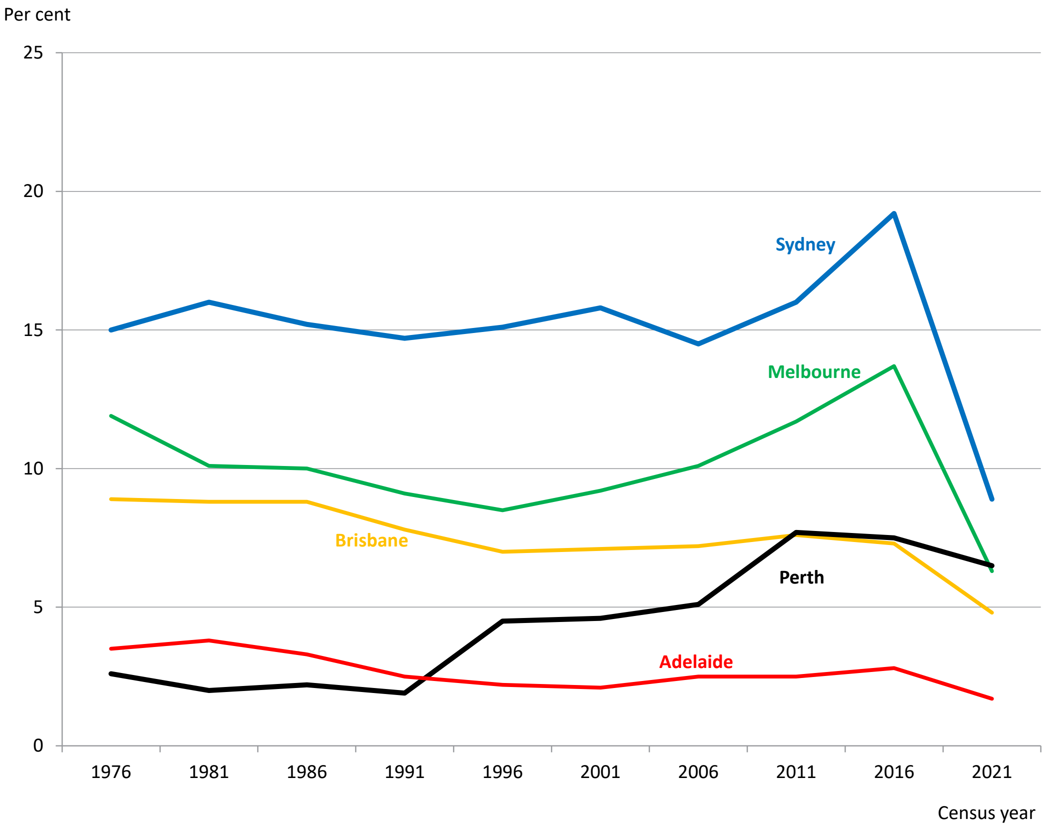
Following long-term declines in urban rail patronage for all cities from the mid-1970s, ridership began recovering in the 1990s. Figure 31, below, shows the journey-to-work mode share data for heavy rail, derived from the census results since 1976.

In 2021, urban heavy rail's mode share decreased sharply in all cities compared to 2016, except Perth, which had a more modest decline. Details of these declines are as follows:

- Sydney: 54 per cent;
- Melbourne: 54 per cent;
- Brisbane: 34 per cent;
- Adelaide: 39 per cent; and
- Perth: 13 per cent.

By way of comparison, mode share for travel by bus also halved in Sydney, Melbourne, and Brisbane, while it remained relatively unchanged in Adelaide and Perth. Travel by private motor vehicle as a proportion of total mode share, however, increased in each city.

Figure 31 Journey-to-work mode share, urban heavy rail, 1976–2021



Note: Cities refer to greater metropolitan areas.

Sources: Australian Bureau of Statistics (2022), Mees and Groenhart (2012).

Punctuality

Punctuality is important to rail's competitiveness. Poor punctuality not only worsens the transport "experience" but can affect the commercial (work) and personal activities of those that depend on reliable transport services.

Customers rely on timetables for infrequent services in particular. Punctuality is therefore part of a journey's perceived time. Punctuality is less significant for frequent "turn up and go" services. Real-time information at railway stations, light rail stops, online and through smart phone applications are playing a growing trip-planning role. Measures of punctuality are largely determined by the definitions of "on time", which varies between operators.

Table 20 Urban heavy rail punctuality, on time performance, 2023–24

Network	Result (%)	Target (%)	Measure
Sydney Trains	88.1	92	At least 92% of peak services arrive within five minutes for Sydney Trains services and six minutes for NSW TrainLink (Intercity) services.
Sydney Metro	99.55	98	'Headway within tolerance'
Melbourne	93	92	Arriving at destination no later than 4 minutes 59 seconds late
Brisbane	94.22	95	Arriving within 3 minutes 59 seconds of schedule for suburban trains and within 5 minutes 59 seconds of schedule for inter-urban services
Adelaide	96.6	94	No more than 4 minutes 59 seconds after the timetabled arrival time at the destination
Perth	94.31	95	Arriving within 4 minutes of schedule

Sources: Department of Transport and Planning, Victoria (2024), p.41; Public Transport Authority of WA (2024), p.92; Queensland Rail (2024), p.13; Sydney Metro (2024), p.58; Transport for NSW (undated); Adelaide Metro (undated).

Table 21 Light rail punctuality, on time performance, 2023–24

Network	Result (%)	Target (%)	Measure
Sydney (Central Station-Dulwich Hill)	89	90	Calculated as the percentage of services within the maximum journey time plus four minutes tolerance, measured along the full length of the route.
Sydney (Circular Quay-Randwick and Randwick-Kingsford)	89	90	Calculated as the percentage of services within the maximum journey time plus four minutes tolerance, measured along the full length of the route.
Melbourne	81.2	79	Arrives no later than four minutes and 59 seconds after and departs no earlier than 59 seconds before the timetable
Adelaide	98.96	98	No more than 4 minutes 59 seconds after the timetabled arrival time at the destination
Gold Coast	95.26	95	The percentage of services that arrive and depart on time when compared with the contract timetable. Punctuality is only measured at key stations.
Canberra	98.93	98	Arriving at a measuring stop no more than 2 minutes after its scheduled arrival time
Newcastle	n/a	n/a	Neither early nor late. Early is departing before the scheduled departure time and late is departing more than 59 seconds after the scheduled departure time.

Note: The Adelaide result is the average monthly result for the financial year. The result is based on Adelaide Metro's KPI 1.1 that 'measures all frequent trips (15 minute frequency or less) at the commencement of the trip.' The Canberra result is the average monthly result for the financial year.

Sources: Adelaide Metro (undated); Department of Transport and Planning, Victoria (2024), p.41; Transport for NSW (2024), p.32; advice from Transport for NSW; Canberra Metro Operations (undated); Translink (undated).

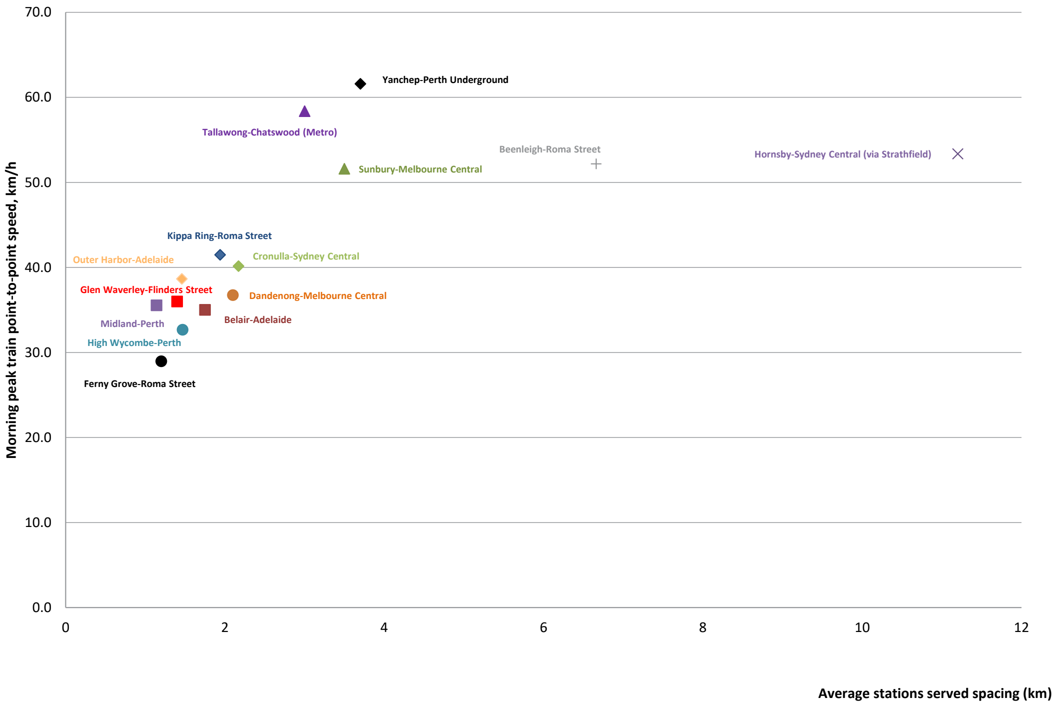
Speed and stopping patterns

Heavy rail

Figure 32 shows the relationship between station spacing and corresponding average train speeds for selected Australian urban passenger rail lines. All station spacing shown is based upon a mix of peak hour limited stops and all stops services. For limited stops services, station spacing is based on distances between stations where the services stop, not the number of actual stations on the line. For example, the Hornsby–Sydney Central example is that of a TrainLink service from the Central Coast that also provides a limited stops service within suburban Sydney. It only has two stops between Hornsby and Sydney Central, with an average station spacing of 11.2 kilometres and an average point-to-point speed of almost 55 kilometres per hour. The actual number of stations in service between Hornsby and Sydney Central (on the Main North route), however, is 16, with an average station spacing of 1.9 kilometres. By way of contrast, the Belair–Adelaide example is that of an all stops service with an average distance between stops of 1.75 kilometres and an average point-to-point speed of 35 kilometres per hour.

Australia's older passenger lines have relatively short station spacing (for all stops services) and, thus lower speeds. In contrast, newer lines, such as Mandurah–Perth, have wider all stops station spacing, which allows higher average speeds. In addition to speed, wider station spacing allows for simpler train schedules because there is little need for express services. Wide station spacing, however, reduces the capacity for patrons to access railway stations by walking. Integration of the railway with other modes of transport, such as the provision of feeder bus services, whose arrival and departure times are aligned to that of train services, and park and ride facilities therefore become crucial. Limited stops services help overcome short station spacing by skipping certain stations. The number of stops between origin and destination for limited stops services varies by time of day and service origin.

Figure 32 Heavy rail station spacing and illustrative train speeds, 2025



Source: BITRE analysis of published route timetables.

Light rail

Average scheduled light rail speeds also generally correlate to stop spacing, together with integration with/segregation from road traffic and pedestrian traffic.

Table 22 Light rail stop/station spacing and scheduled speeds, 2025

	Gold Coast	Sydney[a] (Route L2)	Melbourne[b] (Route 72)	Melbourne[c] (Route 96)	Adelaide[d]	Canberra	Newcastle
Average station spacing (metres)	1,155	650	290	530	510	920	540
Average point to point scheduled speed (km/h)	27	16	14.6	19.7	17.7	30	13.5

Notes: a. Calculations are based on travel from Randwick terminus to Circular Quay terminus.
b. Calculations are based on travel from Kew terminus to Federation Square stop.
c. Calculations are based on travel from St Kilda terminus to Southern Cross Station stop.
d. Calculations are based on travel from Glenelg terminus to Adelaide Railway Station stop.

Source: BITRE analysis.

Light rail average speeds depend largely on a light railway's function and its operating environment. A line designed to operate in a dense pedestrianised zone has lower speeds than vehicles operating in a segregated corridor with wide station/stop spacing. Sometimes a single route will have a mixed infrastructure type.

Sydney's light rail operates mostly on segregated lines. Canberra's light rail network is entirely segregated, except for intersections, where variable frequency traffic signals prioritise light rail traffic at most intersections. The Gold Coast and Newcastle are also segregated. The Gold Coast and Canberra have the widest station/stop spacing in Australia. This, combined with its traffic segregation and priority traffic signalling (in Canberra), enables the light rail vehicles to achieve the highest average scheduled speeds in Australia. Newcastle's light rail, which runs on battery power with charging at each stop, has approximately half the average distance between stations/stops and less than half the scheduled average speed than Canberra and the Gold Coast.

Most of the Melbourne light rail network is shared with road traffic. In the example of Route 72 (Kew terminus to the Federation Square stop component) (shown above) this, combined with narrow spacing between stops, causes it to have an average scheduled speed that is just over half that of the Gold Coast and Canberra lines. Along the St Kilda road section, Route 72 light rail vehicles share the line with an increasing number of other light rail vehicles from other routes as they enter St Kilda Road (when travelling to Federation Square), which increases line congestion and reduces speed. By way of contrast, the route in the second Melbourne example shown above (St Kilda terminus to Southern Cross Station) is mostly segregated. It uses the former St Kilda heavy rail corridor that was converted to light rail in 1987, which forms approximately 65 per cent of the route, and some shared sections with road traffic, and its higher average speed and greater stop spacing than Route 72 reflects this.

Frequency

Figure 33 to Figure 39, below, show urban heavy rail service frequency by the time between arrivals at the relevant city central stations, for services originating at various designated points across the networks. All cities provide express and all stops services, to varying degrees.

Frequency is important to service quality and, therefore, mode choice. Greater frequency means less average time between services. Frequency also influences overall travel times. It can affect how long passengers wait for a train and how closely the train departure (or arrival) time is to a passenger's preferred time. Passengers' perceptions of service frequency are therefore closely related to their perception of total journey times (including waiting time, in-vehicle journey time and transfer time).

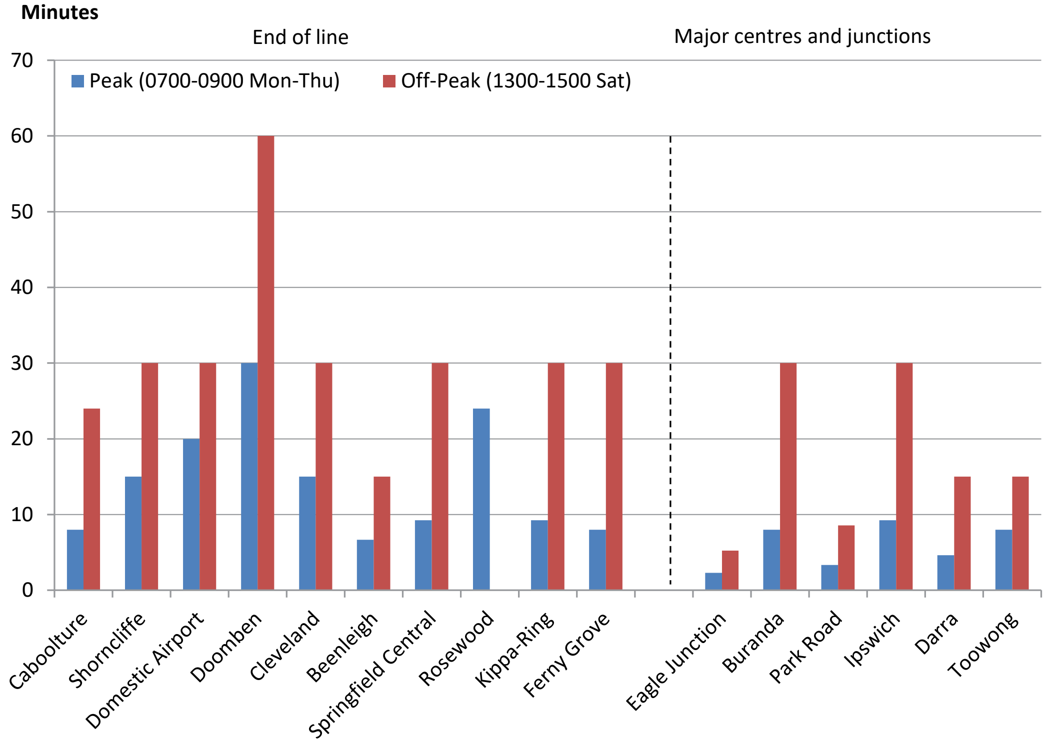
Frequency is also important in integrating rail services both with other rail lines and other transport modes. Services may have coordinated arrival and departure times for passenger interchanges between services. However, the scale of large urban networks can make coordination unfeasible. In these cases, high frequency is crucial in reducing passengers' interchange waiting times. Major centres and junction stations generally have high service frequencies due to service densification. As Figure 33 to Figure 39, below, show, all Australian capital cities with urban heavy rail services mostly have greater service frequency during peak periods.

Heavy rail

Brisbane

In 2025, service frequency in Brisbane was mostly unchanged from the previous analysis in 2023.

Figure 33 Average time between trains for services arriving at Brisbane Roma Street Station, 2025



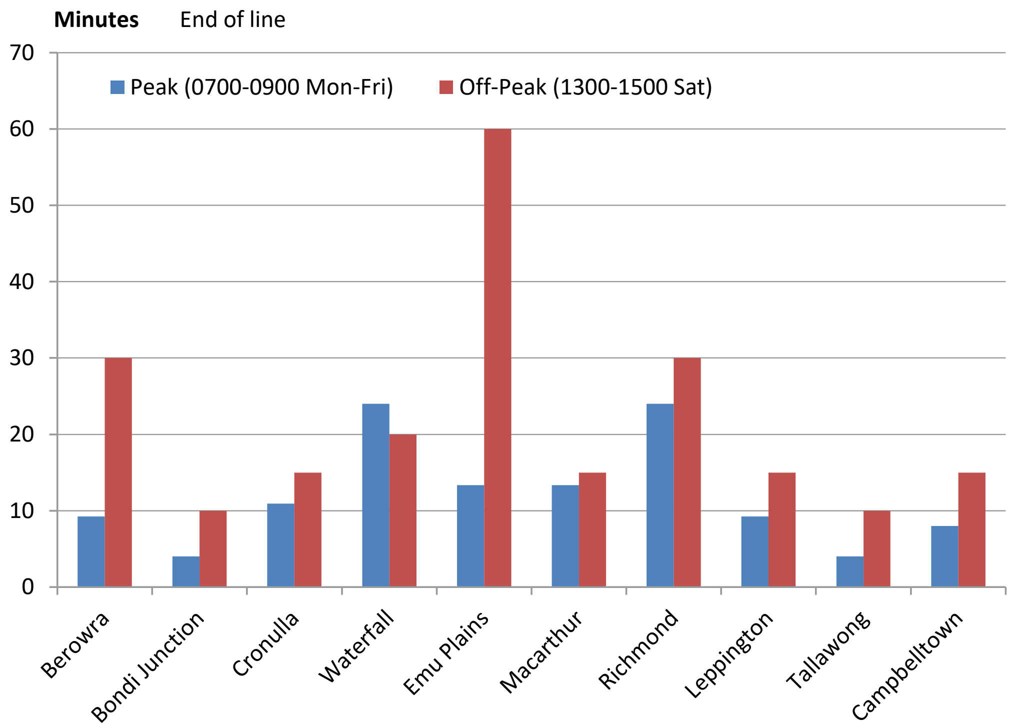
Source: Translink (2025).

Sydney

There are three heavy rail operators in Sydney – Sydney Trains, NSW TrainLink, and Sydney Metro. Sydney Trains serves all stations throughout the conventional Sydney network. NSW TrainLink operates inter-urban services from Newcastle/Central Coast, Lithgow/Blue Mountains, and Kiama/South Coast to Sydney Central via the conventional Sydney suburban network. These TrainLink services also serve some major centres and junctions within the Sydney suburban network, as semi-express services. Sydney Metro operates Tallawong–Sydney Central–Sydenham services on the separate, driverless Sydney Metro network. Metro services from Tallawong to Chatswood started in May 2019. The metro line was later extended from Chatswood to Sydney Central and Sydenham, which began revenue operations in August 2024. Both conventional and metro services now operate to Sydney Central from the co-located Epping, Chatswood, and Sydenham stations. This means a passenger can now travel to Sydney Central from these stations on either the conventional or metro network.

The opening of the expanded Sydney Metro line has increased service frequency significantly at Epping and Chatswood. Peak hour service frequency from Chatswood and Epping increased from between approximately 110 per cent (Chatswood) to 150 per cent (Epping). Peak hour service frequency at Sydenham only grew by approximately 10 per cent, due partly to the temporary closure of the Bankstown line for conversion to metro services. Off-peak frequency has similarly increased by between approximately 65 per cent (Sydenham) and 85 per cent (Epping). Off peak service frequency from Sydenham grew more than peak hour frequency due partly to the introduction of eight additional Sydney Trains services on top of the new metro services.

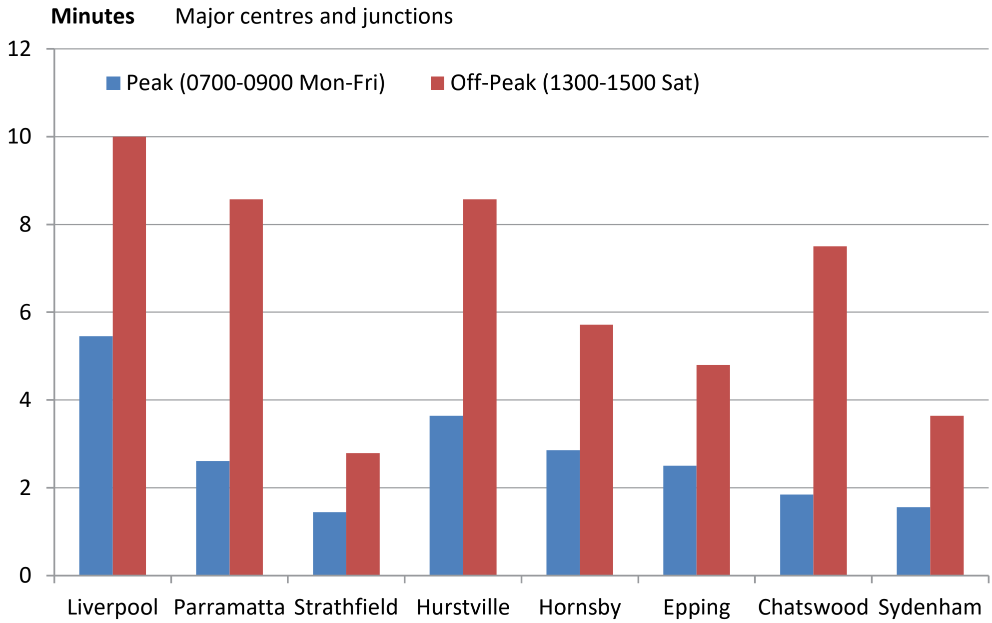
Figure 34 Average time between trains for services arriving at Sydney Central from end of line stations, 2025



Note: Tallawong services operated by Sydney Metro.

Source: Transport for NSW (2025).

Figure 35 Average time between trains for services arriving at Sydney Central from major centres and junctions, 2025



Note: Epping, Chatswood, and Sydenham figures denote combined conventional and metro services serving those (co-located) stations.

Source: Transport for NSW (2025).

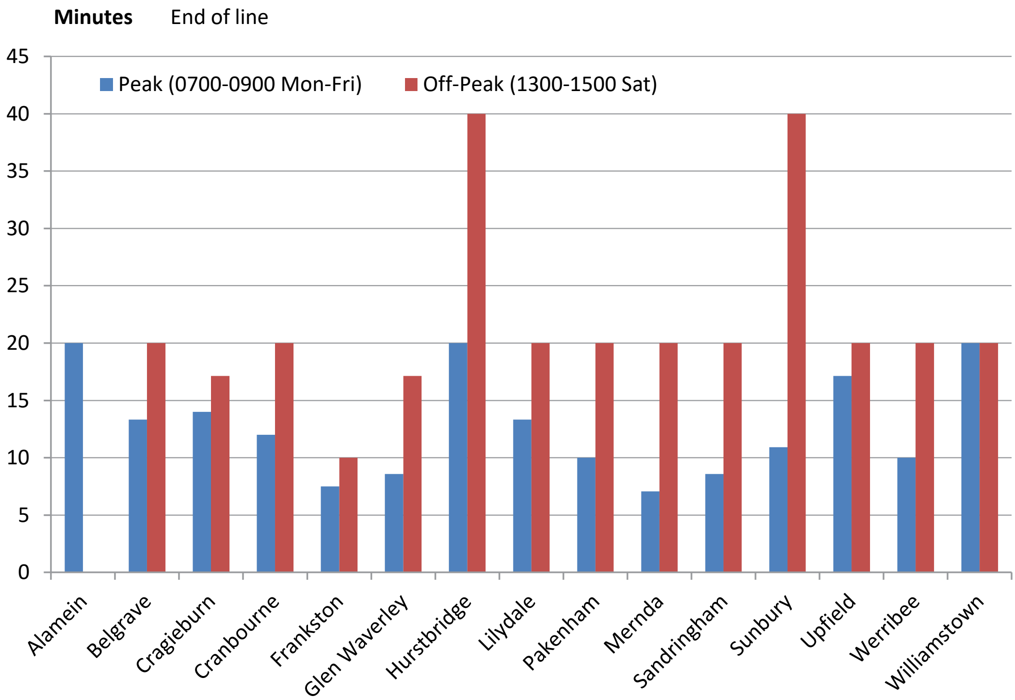
Melbourne

There was no change in Melbourne's service frequency in 2025 compared to the 2023 analysis. The 2025 analysis has three and two additional peak and non-peak services respectively from Sunbury, but this is due to the inclusion in the analysis of V/Line services from the Bendigo line that stop at Sunbury to take on passengers. These services were previously not included in the analysis. These services do not travel to Flinders Street Station, but terminate instead at Southern Cross Station. They are included in the analysis due to the close proximity of Flinders Street and Southern Cross stations in the Melbourne CBD.

The 2025 analysis shows East Pakenham as an end of line station, in place of Pakenham, for the first time. This is due to the expansion of services on the Pakenham line to the newly built East Pakenham station. Service frequency from East Pakenham in 2025 was unchanged from service frequency from Pakenham in the 2023 analysis.

Peak hour service frequency varies considerably across the Melbourne network, with smaller branch lines running fewer services. For end of line services, Mernda and Frankston had the greatest peak service frequency, with trains arriving at Flinders Street Station on average every seven and eight minutes respectively. Alamein, Hurstbridge, and Williamstown had the fewest peak services, with an average arrival every 20 minutes each. Inclusion of the V/Line services from Sunbury decreased average times between services from 11 minutes to nine minutes (peak) and 40 minutes to 24 minutes (non-peak). Average non-peak service frequency varied from 10 minutes on the Frankston line to 40 minutes on the Hurstbridge line. Alamein had no direct services to Flinders Street station in the non-peak period. Rather, shuttle trains ran to Camberwell (which also serves the Lilydale and Belgrave lines), where passengers changed trains for ongoing travel.

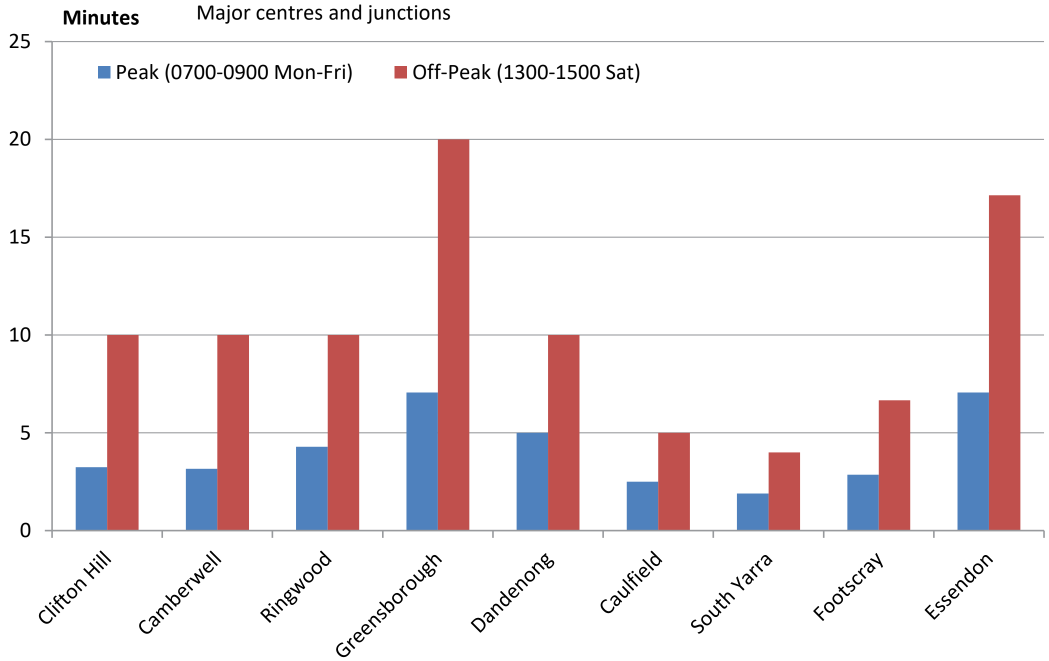
Figure 36 Average time between trains for services arriving at Flinders Street Station from end of line stations, 2025



Source: Data provided by Public Transport Victoria.

Peak period service frequency from Melbourne's major centres and junctions is high, ranging from 2–7 minutes. South Yarra was the busiest junction/major centre station, with an average arrival at Flinders Street Station from there every two minutes, while trains arrive at Flinders Street Station on average every seven minutes from Essendon and Greensborough. During off peak periods, service frequency at most of the major centres and junctions is approximately half that of peak period services. In the off-peak, frequency ranges from four minutes (South Yarra), to 20 minutes (Greensborough). South Yarra is the busiest station because it channels converged traffic from the Pakenham, Cranbourne, Frankston, and Sandringham lines.
There were no changes in service frequency in 2025 compared to 2023.

Figure 37 Average time between trains arriving at Flinders Street Station from major centres and junctions, 2025

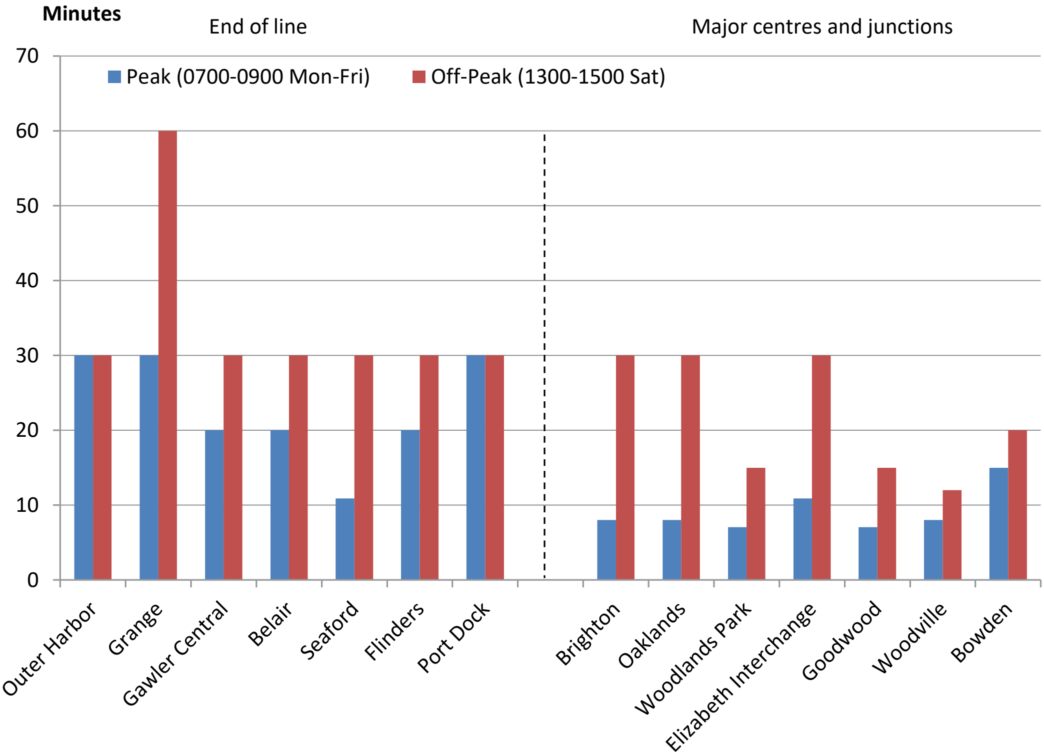


Source: Data provided by Public Transport Victoria.

Adelaide

Adelaide heavy rail service patterns are strongly geared to peak-period commuting to Adelaide Railway Station. Adelaide's lower service levels reflect its modest patronage compared to the other networks. The major change since the previous BITRE analysis in 2023 has been the opening of the Port Dock spur and services from its Port Dock Station (a branch off the Outer Harbor line) on 25 August 2024. There were four peak and non-peak services each to Adelaide Railway station from Port Dock Station. These new services flowed through to the junction station at Woodville, which had four additional peak and non-peak services.

Figure 38 Average time between trains for services arriving at Adelaide Railway Station, 2025

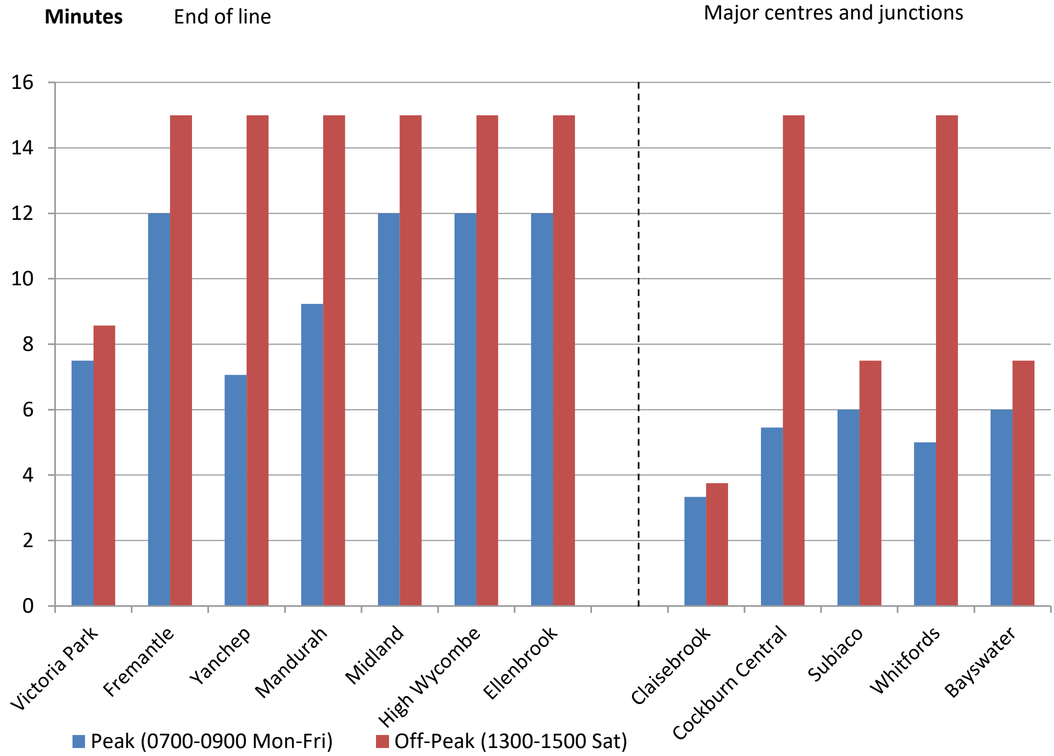


Source: Adelaide Metro (2025).

Perth

In 2024, the Yanchep Extension on the Joondalup line, and the Morley–Ellenbrook line opened. Rail services on the Armadale and Thornlie lines were suspended beyond Victoria Park station, due to infrastructure works on the Armadale and Thornlie lines. Due to the truncation of these services to Victoria Park Figure 39 shows service frequency from Victoria Park as an end of line station in place of Armadale and Thornlie. Service frequency from the major centre of Cannington is also not shown as it on the Armadale line beyond Victoria Park, where there were no rail services.

Figure 39 Average time between trains for services arriving at Perth Central and Perth Underground stations, 2025

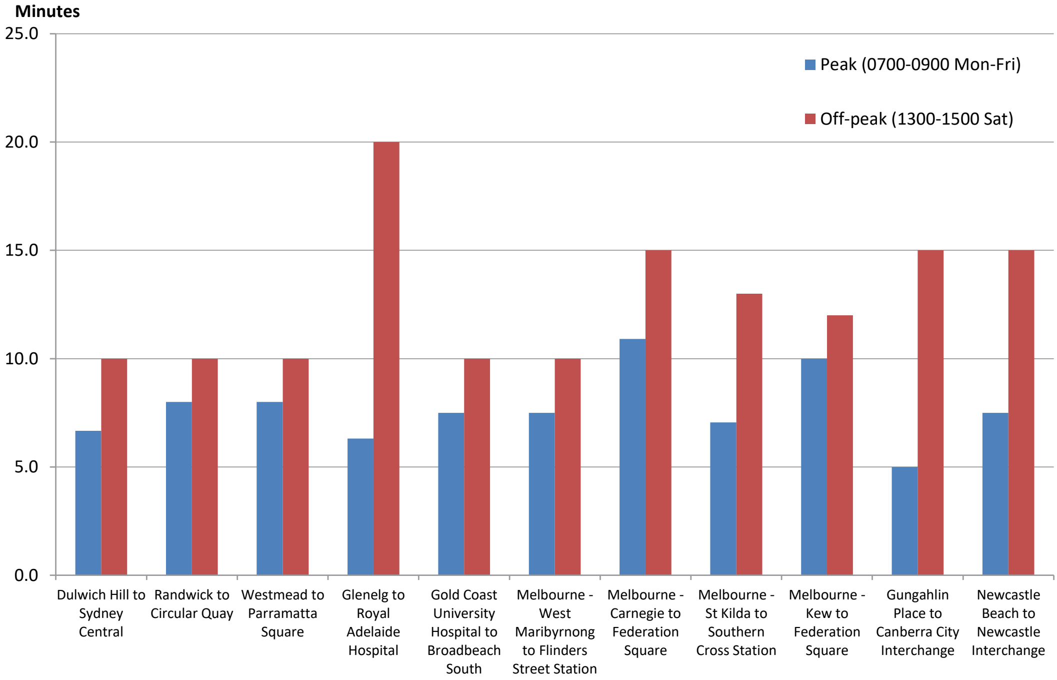


Source: Transperth (2025).

Light rail

Light rail frequencies in Australia vary (see Figure 40). Peak hour frequency in the samples shown is mostly less than ten minutes. Off-peak times are between 10–20 minutes.

Figure 40 Average time between light rail services, by route and direction, 2025



Notes: Gold Coast operations do not run to timetables.

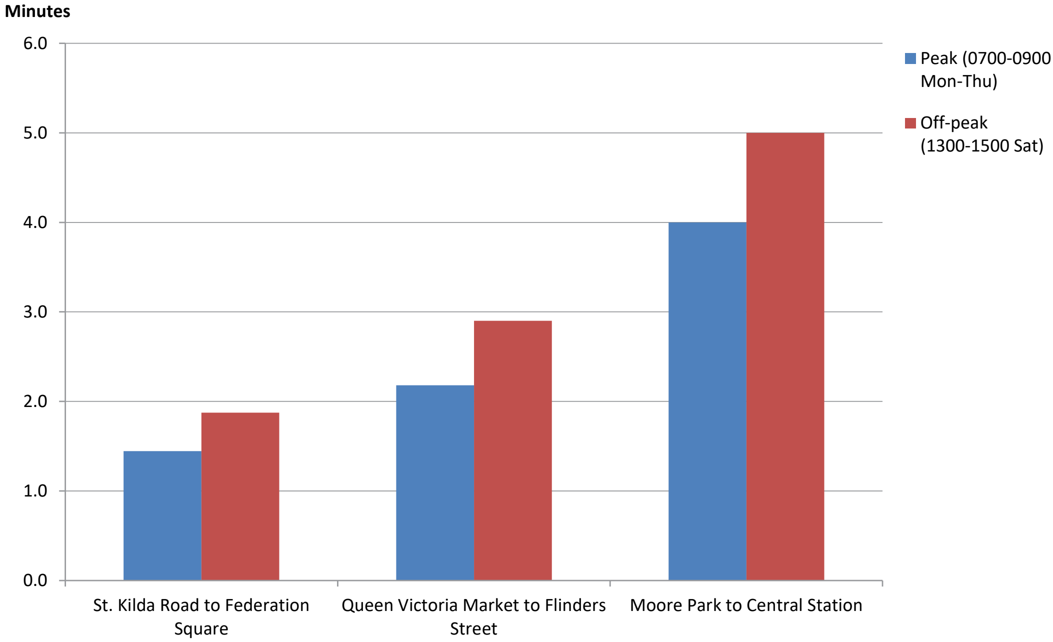
Melbourne and Sydney services have a separate timetable for Fridays. As such, calculated peak hour frequency as shown above is based on the published Monday-Thursday timetables.

Peak hour calculations are based on peak hour directions of travel.

Sources: Transport for NSW (2025); G:link (2025); Public Transport Victoria (2025); Adelaide Metro (2025); Canberra Metro (2025).

Care is needed when comparing Melbourne to other Australian cities with light rail services. Many Melbourne routes share tracks (converged routes), particularly in and near the CBD, which increases service frequency. This means a passenger waiting at a converged routes stop may not have to wait as long as they otherwise would, depending on their destination. For example, someone travelling from Federation Square to the Toorak Road/St Kilda Road stop is served by seven routes. That same person travelling from Federation Square to Camberwell, however, is served by only one route (which travels via the Toorak Road/St Kilda Road stop) before diverging from the converged route corridor.

Figure 41 Average times between light rail services – converged routes, 2025



Sources: Public Transport Victoria (2025); Transport for NSW (2025).

Figure 41, above, shows average times between light rail services on a sample of converged route corridors in Melbourne and Sydney. For Melbourne, it is for seven converged services departing Stop 22 (St. Kilda Road/Toorak Road), with Federation Square as the arrival point[18], and three converged services departing Queen Victoria Markets, with Flinders Street as the arrival point[19]. For Sydney, it is for the L2 and L3 converged services departing Moore Park, with Central Station as the arrival point. Frequency along St. Kilda Road is high because seven routes share the corridor. Frequency is slightly less on the Queen Victoria Markets to Flinders Street corridor due to the lower number of routes serving the corridor. For services to Central Station, frequency is lower again as only two routes serve the corridor.

18 These services are routes 3(a), 5, 6, 16, 64, 67, and 72.

19 These services are routes 57, 59, and 19.

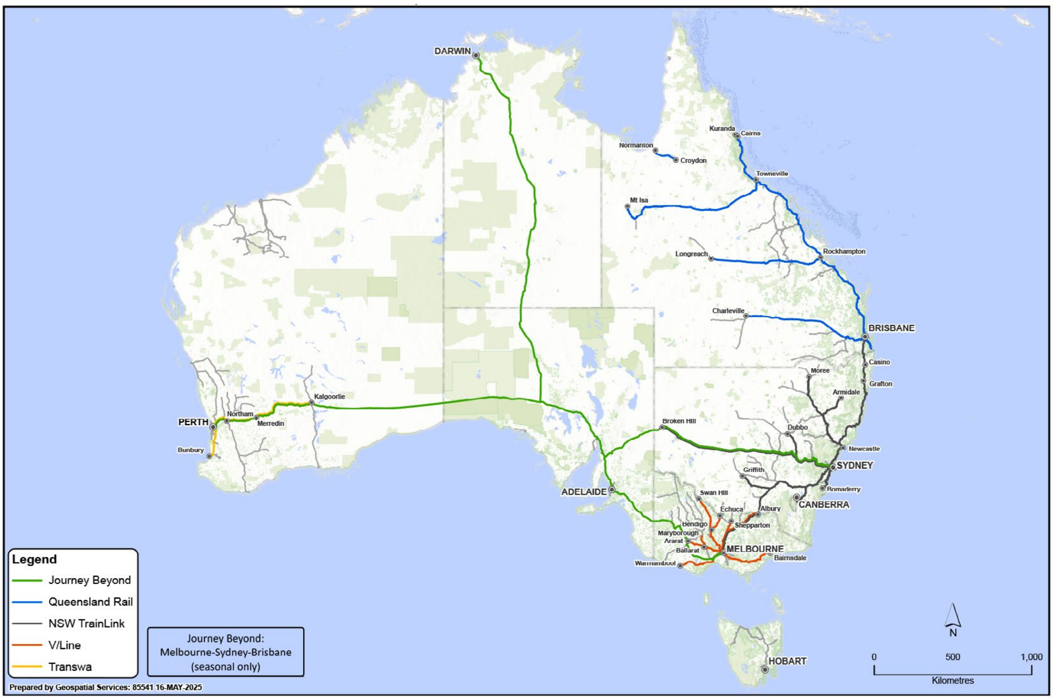
Chapter 4

Passenger transport results – Non-urban rail

Non-urban passenger traffic, broadly described as day-return (under four-hour) and long-distance (over four hours) travel, can be further classified by the primary travel markets served:

- "Inter-city" or "regional" travel, such as Sydney–Hamilton, Brisbane–Nambour, Melbourne–Bendigo and Perth–Bunbury. Such services could include daily commuting or day-return business or leisure travel;
- Long-distance connections between cities (such as Brisbane–Sydney) and regional centres, such as Brisbane–Rockhampton, and Perth–Kalgoorlie; and
- (Premium) tourist-focused services such as the Kuranda Scenic Railway (Queensland Rail), and Adelaide–Darwin (The Ghan) (Journey Beyond).

Figure 42 Non-urban passenger services, by operator



Patronage

The scale of an operator's passenger task is largely determined by the function of their railway. Table 23, below, shows the latest available financial year patronage statistics, by operator. Railways with a large commuter task have higher patronage than those which cater largely to long-distance travel. Only a small amount of rail travel for NSW TrainLink, for example, is regional travel.

Similar to urban patronage, non-urban patronage is influenced by broad, macroeconomic factors and local, network specific factors.

Table 23 Non-urban rail patronage, by operator, 2022–23 and 2023–24 (millions of journeys)

		NSW TrainLink				
	Queensland Rail	Intercity	Regional	V/Line	Transwa	Total
2022–23	.694	28	1.18	17.6	.170	47.64
2023–24	.614	33.4	1.37	22.49	.161	58.03

Notes: Data excludes patronage on services delivered under the Queensland "TransLink" brand. TransLink data is reported in urban patronage.

Sources: (2022–23 data) NSW Trains (2023), p.14; NSW Transport Open Data (undated); Public Transport Authority of Western Australia (2023), p.25; Queensland Rail (2023), p.16; V/Line (2023), p.14.

(2023–24 data) NSW TrainLink (2024), p.10, NSW Transport Open Data (undated); V/Line (2024), p.12; Queensland Rail (2024), p.16; advice from Public Transport Authority of Western Australia.

Total non-urban rail patronage for 2022–23 was 47.64 million passenger journeys. This was an increase of approximately 97 per cent compared to the previous financial year. All operators saw patronage growth, ranging from 19.8 per cent (Transwa) to 115.7 per cent (NSW TrainLink).

Total patronage in 2023–24 was 58.03 million passenger journeys. Compared to 2022–23, this was an increase of almost 22 per cent. Queensland Rail patronage declined by approximately 11.5 per cent. NSW TrainLink patronage grew by approximately 19.3 per cent (Intercity), and 16.1 per cent (Regional). V/Line patronage grew by approximately 27.8 per cent. Transwa patronage declined by approximately 5.5 per cent, but this needs to be seen in the context of the temporary closure of the Australind train service to Bunbury due to infrastructure upgrade works and its replacement by an interim road coach service. Patronage on all other Transwa rail services grew. When excluding the Australind service from the Transwa total, patronage grew by approximately 6.35 per cent.

According to the V/Line annual report, patronage in 2023–24 was the highest ever recorded on the V/Line network (V/Line 2024, p.5)[20]. According to V/Line, introduction of the regional fare cap on 31 March 2023 has driven significant patronage growth. V/Line further notes travel on weekends and school holidays and on long distance services was particularly popular (V/Line 2024 p.10)[21].

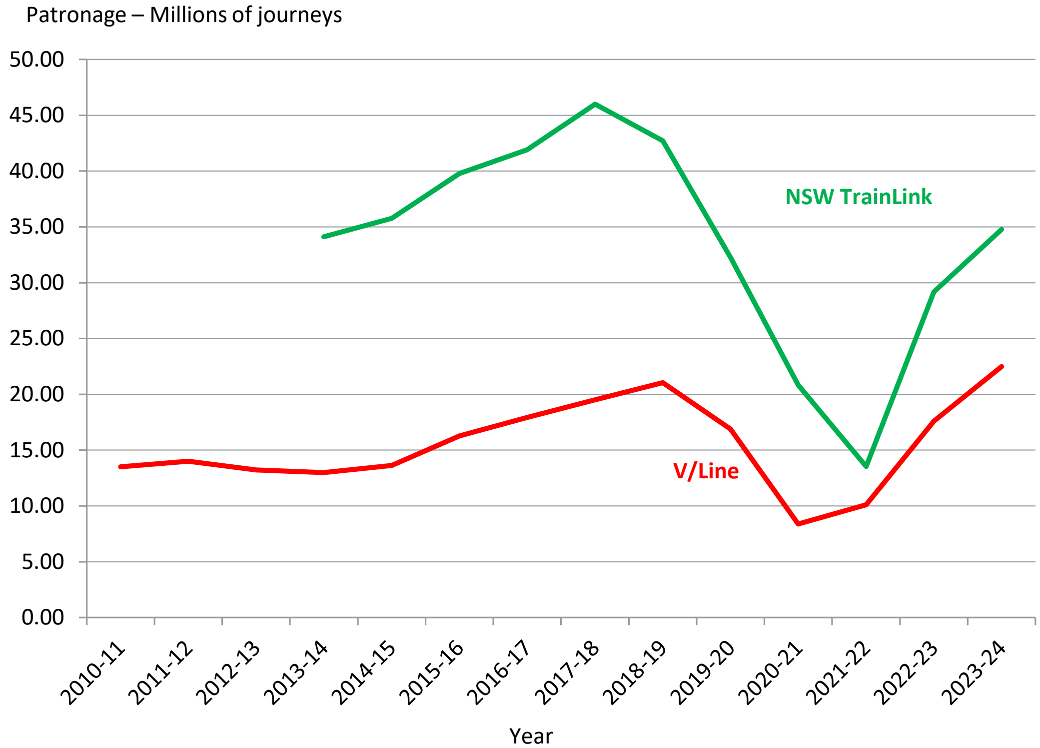
According to the NSW TrainLink annual report, patronage in 2022–23 surpassed pre COVID-19 pandemic levels and stabilized in 2023–24 (NSW TrainLink 2024, p.7).

20 This statement refers to combined rail and coach patronage of 23.8 million passenger journeys.

21 For additional information on the regional fare cap, see https://www.ptv.vic.gov.au/more/introducing-fairer-fares-for-regional-victorians/.

The bulk of V/Line's and TrainLink's patronage is inter-city commuter services, such as Katoomba to Sydney and Geelong to Melbourne, while almost all of Queensland Rail's and Transwa's patronage is from longer distance non-commuter travel.

Figure 43 Non-urban rail patronage – NSW TrainLink and V/Line



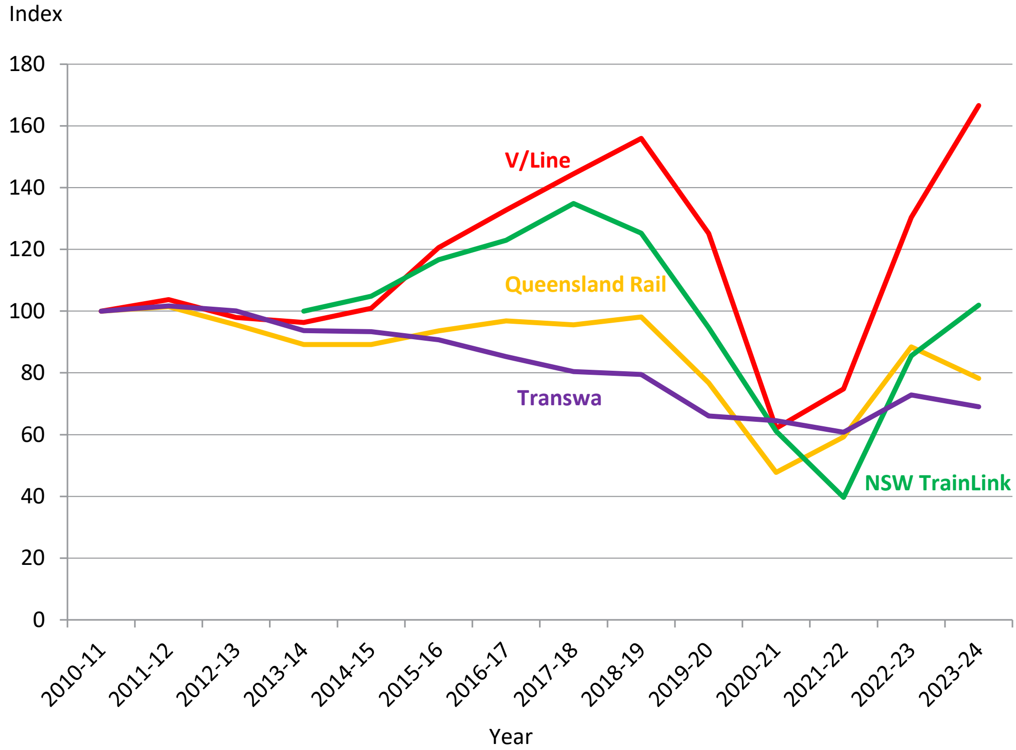
Note: The NSW TrainLink figures are the sum of regional (train) and intercity patronage. There is no New South Wales TrainLink data shown for the period prior to 2012–13 due to the formation of TrainLink on 1 July 2013, which merged regional and intercity services under one operator. Including previous years' data would not be comparing 'like for like'.

Sources: NSW TrainLink (2024), p.10, NSW Transport Open Data (undated); V/Line (2024), p.12; previous editions of Trainline.

Figure 44 Non-urban rail patronage – Queensland Rail and Transwa

Sources: Queensland Rail (2024), p.16; advice from Public Transport Authority of Western Australia; previous editions of Trainline.

Figure 45 Index of non-urban rail patronage, by operator



Notes: The NSW TrainLink index is the sum of regional (train) and intercity patronage. There is no New South Wales TrainLink data shown for the period prior to 2012–13 due to the formation of TrainLink on 1 July 2013, which merged regional and intercity services under one operator. Including previous years' data would not be comparing 'like for like'. Queensland Rail data exclude services under the TransLink brand on the Sunshine Coast and Gold Coast lines.

Sources: Index based on reported patronage data.

Figure 46 Southern Cross Station

Note: The image above shows VLocity DMU sets at Southern Cross Station in Melbourne, April 2025. Photo courtesy of Rodney Avery.

Punctuality

Table 24 Punctuality, on time performance 2023–24

Operator	Service type	Result (%)	Target (%)	Measurement
Queensland Rail	QR Traveltrain	69.34 force majeure	75	-
NSW TrainLink	Intercity	85.2	92	Arriving within six minutes
	Regional & interstate	59.6	78	Arriving within 10 minutes
V/Line	Commuter	88	92	Arriving on time to five minutes and 59 seconds
	Long distance	83.6	92	Arriving on time to 10 minutes and 59 seconds
Transwa	Australind	n/a	90	Arriving within 10 minutes
	Prospector	58.62	80	Arriving within 15 minutes
	MerredinLink	71.62	90	Arriving within 10 minutes
	AvonLink	92.05	90	Arriving within 10 minutes

Note: Australind data for 2023–24 not applicable due to the temporary replacement of rail services with road coach services due to infrastructure upgrades.

Sources: V/Line (2024), p.13; NSW TrainLink (2024), p.32; Queensland Rail (2024), p.13; Public Transport Authority of Western Australia (2024), p93.

Punctuality targets for non-urban rail services are generally higher for markets which are likely to have a higher value-of-time. For example, trains which service inter-city commuter corridors, such as NSW TrainLink's peak inter-city services and V/Line's commuter services have targets of 92 per cent and smaller margins for being considered on time. Conversely, Transwa's long distance Prospector train has a lower target and greater margin.

NSW TrainLink attributes delays to its intercity services to infrastructure issues, rail infrastructure manager delays, incidents within the suburban network, rollingstock issues, security issues, and crew and passenger delays. It attributes regional and interstate delays to infrastructure (manager) related delays, particularly copper line wire theft, and crew availability issues (NSW TrainLink 2024, p.32).

V/Line attributes its below target results to trespassers, unruly passengers, temporary speed restrictions (including at major construction sites – 'track force protection') and delays in shared sections of the network (V/Line 2024, p.14).

Transwa attributes its below target results, where they occurred, to infrastructure and signaling related delays, train crossing issues, and mechanical issues (Public Transport Authority of Western Australia 2023, p. 93).

Queensland Rail does not comment on its annual report about reasons for train service delays, but notes it is improving punctuality by safely reducing dwell times at stations, and a dedicated performance 'Engine Room', which have improved punctuality by more than 11 per cent (Queensland Rail 2024, p.16).

Actual time running analysis of the Melbourne-Albury corridor

This section compares actual running times of all timetabled Melbourne to Albury and Albury to Melbourne passenger train services against scheduled times, as shown in the ARTC Master Train Plan (timetable). The comparison is for the period 1–31 May 2024. BITRE used the online 4Trak tool for extracting the trip details from which it did its analysis. For the purposes of this analysis, 'Melbourne' is Southern Cross Railway Station and 'Albury' is Albury Railway Station. Two operators provide the train services – V/Line and NSW TrainLink. The results are aggregated. No operator specific results are shown. BITRE calculated the Melbourne–Albury journey distance as 317.5 kilometres, based on ARTC's published line diagrams[22].

4Trak sometimes had either no record or only a partial record for a given service. This is why the results, shown in Table 25 and Table 26, below, list more scheduled services than fully recorded and partially recorded[23] services and why the number of services results do not always balance. The fact there is no record of a given service does not in itself mean there was no service[24]. It just means there is no record (available) of the service under the train's identifier for the given day.

Where there was a partial record of a service, BITRE recorded the information that was available, even though it was unable to record the entire trip details. For example, a partially recorded service may have an arrival time but no departure time. The number of fully recorded services figures are only for those services for which there is a complete trip record.

The analysis recorded the following:

- the time train services commenced their journey;
- the time train services completed their journey;
- average point-to-point speeds; and
- total journey times.

22 See: https://www.artc.com.au/customers/maps/system/melbourne-crystal-brook/.

23 Partially recorded services included are those that have either a recorded departure or arrival time only. Partial records that do not have either a departure or arrival time are excluded.

24 It is not known why there are sometimes no records or only partial records for a given service. BITRE in no ways claims or suggests there is a problem with 4Trak when this happens.

From this, the analysis calculated totals and averages for the period recorded, by direction of travel.

BITRE acknowledges there are numerous factors that affect how close to schedule train services run. The analysis is not a performance review or measure of either the infrastructure managers or the train operators. BITRE is also unable to assess the reasons for differences between scheduled and actual departure, arrival, and running times. The term 'later than schedule' used in this analysis should not be confused with 'late'. 'Later than schedule' in this analysis means later than the published departure or arrival time to the minute. V/Line and NSW TrainLink each have their own (different) measures of punctuality, as shown in Table 24. It is also not possible to apply these measures in the analysis because the results are aggregated across the two operators.

Table 25 and Table 26, below, show the results, noting the number of scheduled services is the sum of those recorded on the corresponding ARTC Mater Train Plan for the assessed period. There were 10 scheduled services each day over the period assessed – five in each direction. Scheduled times for each service was the same for each day of the week. V/Line ran six daily services – three in each direction. These services, all using VLocity sets, operated exclusively between Melbourne and Albury. NSW TrainLink ran four daily services – two in each direction. They operated between Sydney and Melbourne via Albury, all using XPT sets. The analysis only recorded the Melbourne–Albury component of these services. Factors affecting journey times along the Sydney–Albury component could influence the Albury–Melbourne component.

Table 25 Albury to Melbourne (southbound) results

Number of scheduled services	155	Average scheduled transit time (hours: minutes: seconds)	03:40:48
Number of fully recorded services	118	Average actual transit time	03:38:27
Number of partially recorded services	25		
Transit			
Transit number on time to the minute	3	Average scheduled speed (kilometres per hour, point to point)	87.00
Transit number faster than schedule	79	Average actual speed	88.01
Transit number less than 30 minutes longer than schedule	31		
Transit number 30 minutes or longer than schedule	5		
Departures			
Average departure from Albury earlier than schedule	00:01:00	Number departing on time to the minute	44
Average departure from Albury later than schedule	00:19:29	Number departing earlier than schedule	2
		Number departing less than 30 minutes later than schedule	57
		Number departing 30 minutes or more later than schedule	25
Arrivals			
Average arrival at Melbourne earlier than schedule	00:12:34	Number arriving on time to the minute	3
Average arrival at Melbourne later than schedule	00:23:49	Number arriving earlier than schedule	56
		Number arriving less than 30 minutes later than schedule	54
		Number arriving 30 minutes or more later than schedule	19

Table 26 Melbourne to Albury (northbound) results

Number of scheduled services	155	Average scheduled transit time (hours: minutes: seconds)	03:28:24
Number of fully recorded services	109	Average actual transit time	03:28:01
Number of partially recorded services	26		
Transit			
Transit number on time to the minute	3	Average scheduled speed (kilometres per hour, point to point)	91.60
Transit number faster than schedule	70	Average actual speed	91.93
Transit number less than 30 minutes longer than schedule	32		
Transit number 30 minutes or longer than schedule	4		
Departures			
Average departure from Melbourne earlier than schedule	00:05:13	Number departing on time to the minute	36
Average departure from Melbourne later than schedule	00:07:42	Number departing earlier than schedule	14
		Number departing less than 30 minutes later than schedule	64
		Number departing 30 minutes or more later than schedule	6
Arrivals			
Average arrival at Albury earlier than schedule	00:06:55	Number arriving on time to the minute	4
Average arrival at Albury later than schedule	00:13:43	Number arriving earlier than schedule	78
		Number arriving less than 30 minutes later than schedule	33
		Number arriving 30 minutes or more later than schedule	12

The tables show the following key findings.

Services to Melbourne (southbound):

Transit times

- Average actual transit times for the fully recorded services was approximately two minutes less than scheduled times.
- Average actual speeds for the fully recorded services was approximately one kilometre per hour faster than scheduled speeds.
- Approximately 67 per cent of fully recorded services completed their journey faster than schedule. Approximately 26 per cent took 1–29 minutes longer than schedule. Approximately 2.5 per cent of services completed their journey on time to the minute. Approximately four per cent of services completed their journey 30 minutes or longer than schedule.

Departures

- Approximately 36.5 per cent of recorded services (both fully recorded and partially recorded services) departed Albury on time to the minute or earlier than schedule.
- Approximately 44 per cent of services departed 1–29 minutes later than schedule.
- Approximately 19.5 per cent of services departed Albury 30 minutes or later than schedule.
- Of all the departures later than schedule, the average delay was approximately 19 minutes.

Arrivals

- Approximately 42.5 per cent of recorded services (both fully recorded and partially recorded services) arrived at Melbourne earlier than schedule. On average, these services were approximately 12.5 minutes earlier than schedule.
- Approximately 2.5 per cent of services arrived on time to the minute.
- Approximately 41 per cent of services arrived 1–29 minutes later than schedule.
- Approximately 14.5 per cent of services arrived 30 minutes or later than schedule.
- Of all the later than schedule arrivals, the average delay was approximately 24 minutes.

Services to Albury (northbound):

Transit times

- Average actual transit times for the fully recorded services was approximately the same as scheduled times.
- Average actual speeds for the fully recorded services was approximately the same as scheduled speeds.
- Approximately 64 per cent of fully recorded services completed their journey faster than schedule. Approximately 29.5 per cent took 1–29 minutes longer than schedule. Almost three per cent of services completed their journey on time to the minute. Approximately 3.5 per cent of services completed their journey 30 minutes or longer than schedule.

Departures

- Approximately 30 per cent of recorded services (both fully recorded and partially recorded services) departed Melbourne on time to the minute.
- Approximately 11.5 per cent of services departed earlier than schedule.
- Approximately 53.5 per cent of services departed 1–29 minutes later than schedule.
- Approximately five per cent of services departed 30 minutes or later than schedule.
- Of all the later than schedule departures, the average delay almost eight minutes.

Arrivals

- Almost 61.5 per cent of recorded services (both fully recorded and partially recorded services) arrived at Albury earlier than schedule. On average, these services arrived almost seven minutes earlier than schedule.
- Approximately three per cent of services arrived on time to the minute.
- Approximately 26 per cent of services arrived 1–29 minutes later than schedule.
- Approximately 9.5 per cent of services arrived 30 minutes or later than schedule.
- Of all the later than schedule arrivals, the average delay was almost 14 minutes.

In summary and based on the results discussed above, on average:

- A typical Albury to Melbourne service during the assessed period departed Albury close to schedule. It completed its journey in a time close to schedule at a point-to-point speed that was close to schedule. It arrived into Melbourne either earlier than schedule or less than 30 minutes later than schedule.
- A typical Melbourne to Albury service departed Melbourne on time to the minute or less than 10 minutes later than schedule. It completed its journey in a time close to schedule at a point-to-point speed close to schedule. It arrived into Albury either slightly earlier than schedule or less than 15 minutes later than schedule.

BITRE is able to provide more detailed (aggregated) analysis of the results, such as day of the week, upon request.

Travel times

Travel times are important for commuter travellers as one factor in determining rail transport's competitiveness against other transport modes. These travellers may consider comparative door-to-door travel times rather than the speed of a given service when making transport mode choices. For non-urban services, the value of travel time varies according to the market and purpose of travel. Time-rich tourist travellers are likely to value comfort and enjoyment of the journey ahead of time. The Adelaide–Darwin Ghan is a case in point. Conversely, the opposite tends to apply to commuters who are time poor. Rail travel also provides a community service to those who do not have access to other transport modes.

Transit times shown in Table 27, below, show the running characteristics of selected non-urban passenger rail services. The characteristics of some services, particularly the shorter distance commuter services, can vary. Some services stop at all stations while others, particularly those operating in peak hours, may have only minimal scheduled stops, which enables them to achieve faster point-to-point speeds and shorter travel times. For example, the Melbourne to Bendigo service cited below is able to achieve a relatively high average point-to-point speed by skipping nine of the usual 11 stops along its 162-kilometre course. By way of comparison, one sample all stops non-peak service on the same line takes approximately 10 minutes longer to complete its journey, at an average point-to-point speed almost 10 kilometres per hour slower[25].

The running times of the services cited below show little variance compared to 2023 and 2024.

25 This is the weekday 1206 service that arrives at Bendigo at 1357 hours.

Table 27 Illustrative travel times, 2025

Route	Operator	Gauge	Distance (km)	Electrified	Scheduled transit time	Average speed (km/h)	Stopping stations (no.)
Regional/intercity scheduled 3 hour 59 minutes travel time or less							
Brisbane to Nambour	QR (TransLink)	Narrow	105	Yes	1h 52m	56	22
Brisbane to Varsity Lakes	QR (TransLink)	Narrow	89	Yes	1h 20m	67	11
Newcastle Interchange to Muswellbrook	NSW TrainLink	Standard	123	No	1h 36m	77	12
Sydney to Newcastle Interchange	NSW TrainLink	Standard	165	Yes	2h 39m	62	14
Sydney to Wollongong	NSW TrainLink	Standard	82	Yes	1h 32m	53.5	7
Sydney to Bathurst	NSW TrainLink	Standard	238	No	3h 38m	65.5	9
Sydney to Katoomba	NSW TrainLink	Standard	110	Yes	1h 53m	58	11
Melbourne to Ballarat	V/Line	Broad	118	No	1h 16m	93	6
Melbourne to Bendigo	V/Line	Broad	162	No	1h 42m	95	3
Melbourne to Warrnambool	V/Line	Broad	276	No	3h 32m	78	10
Melbourne to Geelong	V/Line	Broad	81.5	No	53m	92	4
Melbourne to Seymour	V/Line	Broad	99	No	1h 35m	62	10
Melbourne to Traralgon	V/Line	Broad	158	No	2h 20m	68	12
Melbourne to Albury	V/Line	Standard	317.5	No	3h 36m	88	10
Midland to Northam	Transwa	Standard	102	No	1h 20m	80	1
Long-distance 4 hours travel time or more							
Townsville to Mount Isa	QR Travel	Narrow	977	No	20h 55m	47	8
Brisbane to Charleville	QR Travel	Narrow	777	No	16h 35m	47	15
Brisbane to Cairns	QR Travel	Narrow	1,681	No	25h 20m	66	26
Brisbane to Rockhampton (electric Tilt Train)	QR Travel	Narrow	639	Yes	8h 05m	79	11
Sydney to Canberra	NSW TrainLink	Standard	330	No	4h 9m	79.5	9
Sydney to Dubbo	NSW TrainLink	Standard	462	No	6h 26m	72	14
Sydney to Armidale	NSW TrainLink	Standard	579	No	8h 2m	72	19
Sydney to Brisbane	NSW TrainLink	Standard	852	No	14h 12m	69	24
Sydney to Melbourne	NSW TrainLink	Standard	946	No	10h 50m	87	16
Melbourne to Swan Hill	V/Line	Broad	345	No	4h 45m	73	7
Perth to Kalgoorlie	Transwa	Standard	653	No	6h 55m	95	17
Melbourne to Adelaide	Journey Beyond	Standard	828	No	10h 25m	79	8
Adelaide to Darwin	Journey Beyond	Standard	2,971	No	53h 15m	56	3

Notes: The speed shown is the point to point speed over the length of the service, including stops.
'Newcastle' denotes Newcastle Interchange.

Sources: Queensland Rail Travel (2025); Transport for NSW (2025); Translink (2025); Transwa (2025); V/Line (2025); Journey Beyond Rail Expeditions (2025).

Average train speeds of non-urban services are also influenced by:

- Track quality, curves, level crossings and capacity;
- Rollingstock standards and quality, influenced by its power, propulsion, in-cab signalling and the existence of a tilting mechanism;
- Railway procedures, including crew changes, loading and unloading passengers/luggage and right-of-way priority relative to other trains;
- Station (stop) spacing; and
- For tourist-focused trains such as The Ghan, scheduled extended stops en route for passengers to do off-train tours.

The Brisbane–Nambour, Sydney–Newcastle Interchange, and Sydney–Wollongong services have relatively low average point-to-point speeds, as they have many scheduled stops en route. In addition, the Sydney–Wollongong rail corridor is circuitous due to the 'steam era' alignments through the mountainous terrain in which trains on that corridor operate, which reduces speed.

There is a wide dispersion of transit times across V/Line services, due to different stopping patterns that cater for different markets and differing track conditions. In addition to fewer stops in peak periods, V/Line's Melbourne–Geelong, Melbourne–Ballarat, and Melbourne–Bendigo commuter services are relatively fast due to the VLocity DMU sets used (which operate at speeds of up to 160 kilometres per hour) and the Regional Rail Link and Regional Fast Rail infrastructure on which they operate.

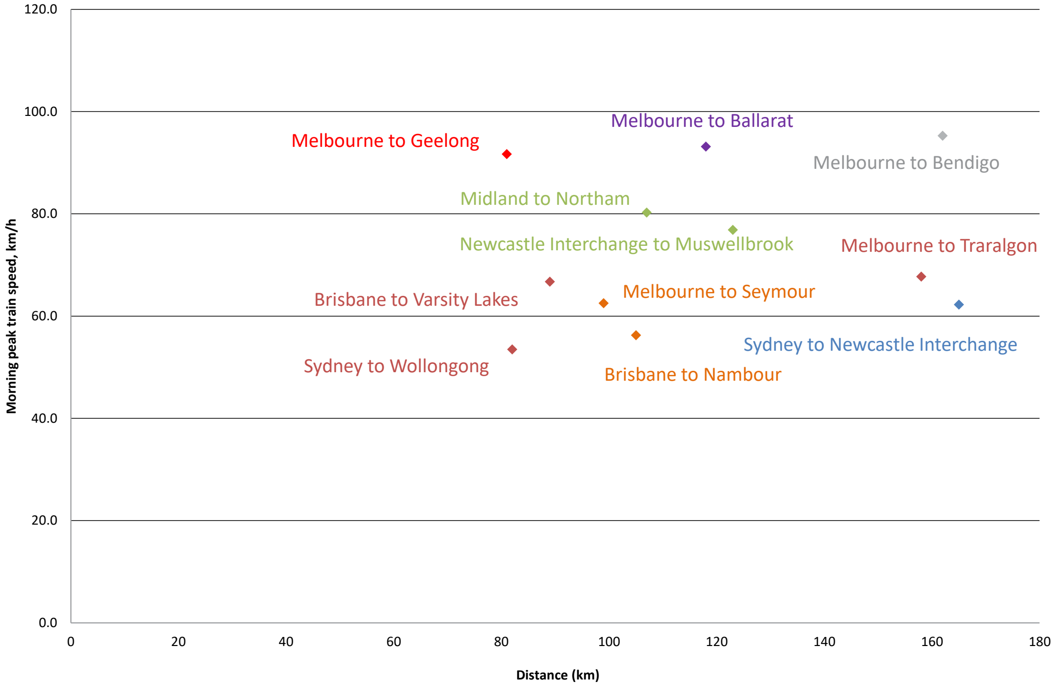
The following services listed above have average point-to-point speeds of 90 kilometres per hour or greater:

- Melbourne to Bendigo, 95 kilometres per hour;
- Melbourne to Ballarat, 93 kilometres per hour;
- Melbourne to Geelong, 92 kilometres per hour; and
- Perth to Kalgoorlie, 95 kilometres per hour.

Long-distance passenger trains in Australia typically have uncompetitive transit times compared to air and some road coach travel[26].

26 Long-distance trains provide services for centres along their route, thus acting as medium-distance services also, while some are entirely touist oriented.

Figure 47 Distance and illustrative speeds for selected non-urban services, 2025



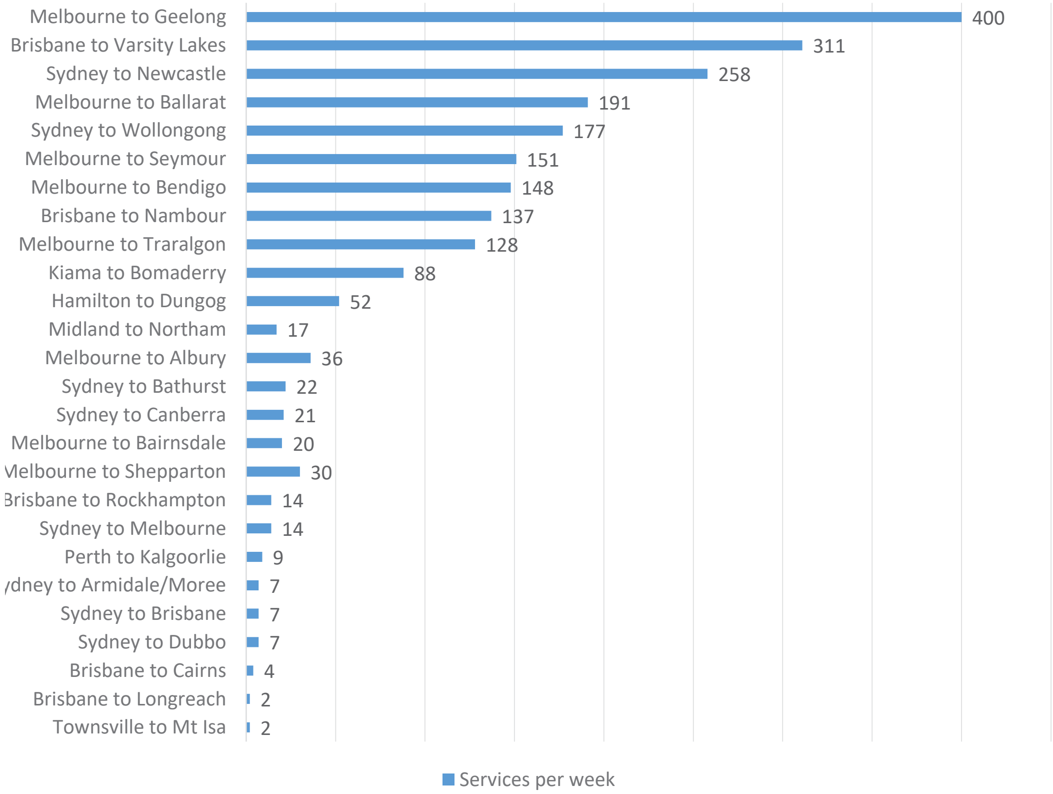
Source: BITRE analysis.

Figure 47, above, shows average timetabled point-to-point train speeds and distances travelled for non-urban services that are of less than three hours in duration. The calculations are for selected services shown in Table 27. Of particular note is the Melbourne to Bendigo service, which maintains a high average point-to-point speed over a relatively long distance, and the Sydney to Wollongong service, which is of a relatively short distance, and has a low average point-to-point speed. The Melbourne to Bendigo service achieves this through having a dedicated corridor through suburban Melbourne (Regional Rail Link), good track infrastructure (Regional Fast Rail), fast rollingstock, and having only three stops en route, while the Sydney to Wollongong service has seven stops, it shares part of the line with suburban services in Sydney, and it is subject to tight curves for much of the journey. The Melbourne to Bendigo service illustrated in the chart travels approximately twice the distance of the corresponding Sydney to Wollongong service and it completes the journey at almost twice the average point-to-point speed. The Melbourne to Traralgon service, which also operates on Regional Fast Rail infrastructure and with the same rollingstock, does not have the same average point to point speed as the Melbourne to Bendigo service, as it does not have a dedicated rail corridor through suburban Melbourne, but shares the track infrastructure with Melbourne urban services for approximately 65 of its 158 kilometres route distance. The two other Regional Fast Rail services, to Geelong and Ballarat, have similarly high speeds as the Melbourne to Bendigo service.

Frequency

Frequency is important for non-urban services because it determines how closely a train departure and arrival is to a passenger's preferred time. Service frequencies can also determine the amount of time a passenger waits for a train and is therefore closely aligned with perceptions of total travel time and its generalised cost. The most significant change since 2024 is the Geelong line, which has 46 additional services per week.

Figure 48 Services per week, 2025



Notes: Based on calculation of outbound 'down' services. Does not include return services.

The Sydney-Wollongong figures exclude truncated services that depart from Waterfall.

The Sydney-Newcastle figures include long distance services that stop at nearby Broadmeadow.

Services include trains that arrive at but do not terminate at destination, for example, Brisbane to Cairns services that stop at Rockhampton.

Perth-Bunbury services are not shown in this edition due to the temporary closure of Perth-Bunbury services for infrastructure upgrades.

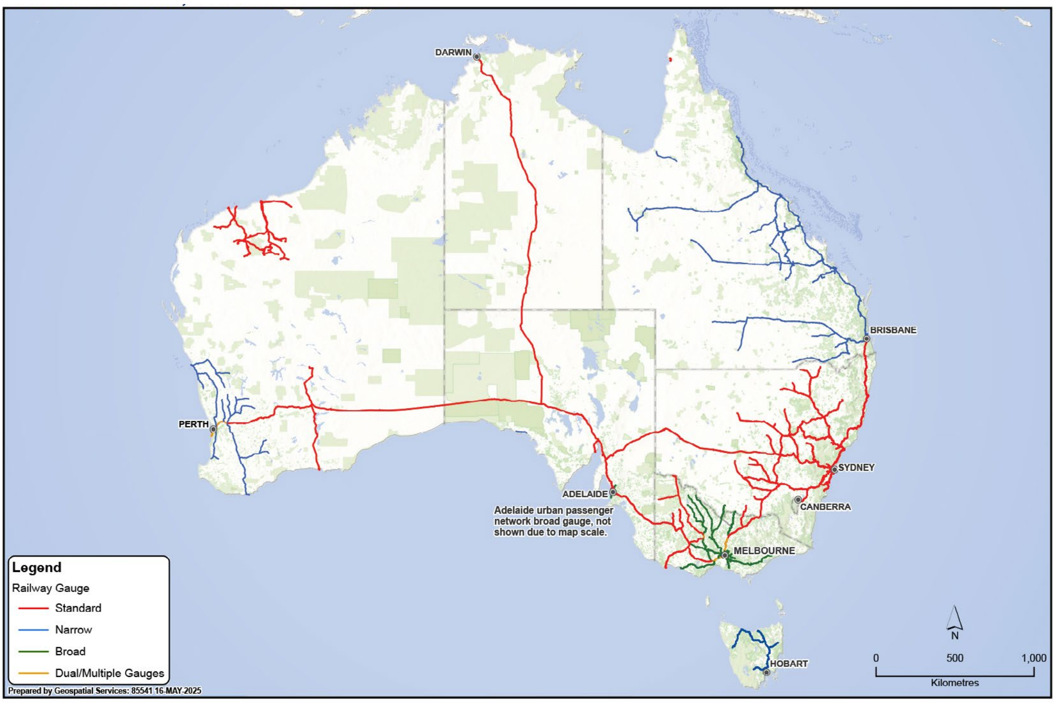
Sources: Queensland Rail Travel (2025); Transport for NSW (2025); Translink (2025); Transwa (2025); V/Line (2025).

Figure 48, above, shows the number of scheduled services per week on selected inter-city/commuter and regional/interstate passenger rail services. Inter-city/commuter services have the highest frequency.

Chapter 5
Infrastructure

Australia's colonies (then states in the post-federation era) built the continent's first railways as separate networks, often with different gauges. The networks mostly radiated from the state (previously colonial) capitals, with cross-border links coming only after intrastate (intra-colonial) lines met at the borders. The exception is Queensland, whose early railways consisted of a network of disparate railways that connected inland areas with coastal ports. These railways were eventually linked, forming the current Queensland network. While aspects of the break of gauge legacy remain, interstate trains now operate across a continuous 1,435 mm 'standard' gauge.

Figure 49 Railway network, by track gauge, December 2024



Notes: The lines shown here are the railways that are open for traffic at December 2024.

Broad ("Irish") gauge is 1600 mm; standard ("Stephenson") gauge is 1435 mm; and narrow ("Cape") gauge is 1067 mm.

Current network

Table 28 shows BITRE's estimate of operational route kilometres of heavy railways in Australia. BITRE estimates there were approximately 31,212 route-kilometres of operational heavy railways in Australia in December 2024. No railways in Australia that are in scope are known to have closed since the previous estimate in February 2024. The figures are subject to rounding.

Approximately eight per cent of the network is broad gauge, 35 per cent is narrow gauge, 56 per cent is standard gauge, and less than one per cent is dual gauge.

Approximately 11.3 per cent of the network is electrified. Queensland has the largest electrified network, principally due to the electrified line between Rockhampton and Brisbane and a number of electrified coal lines in the Central Queensland Coal Network. Elsewhere, overhead power systems have been installed on lines with relatively intensive urban and some intercity passenger services.

Most of the network is single-tracked (approximately 87 per cent). Most urban networks, the Sydney–Melbourne line (of which around three-quarters is double-track), and parts of the Pilbara network is multiple track.

Table 28 Estimate of route kilometres of open (operational) heavy railways, December 2024, by jurisdiction, gauge, and electrification

	State or Territory								
	ACT	NT	NSW	Qld	SA	Tas	VIC	WA	Total
Route kilometres by gauge									
Broad			73.0		127.1		2,281.4		**2,481.5**
Narrow				7,600.6	66.0	614.4		2,642.1	**10,923.0**
Standard	7.5	1,690.0	6,668.8	117.1	2,605.8		1,805.5	4,649.7	**17,544.3**
Dual				37.1			53.3	173.5	**263.8**
Total	**7.5**	**1,690.0**	**6,741.8**	**7,754.7**	**2,798.9**	**614.4**	**4,140.2**	**7,465.2**	**31,212.6**
Route kilometres by electrification									
1 500V DC			688.4				377.2		**1,065.6**
25 kV AC				2,173.6	82.5			226.5	**2,482.7**
Total	**nil**	**nil**	**688.4**	**2,173.6**	**82.5**	**nil**	**377.2**	**226.5**	**3,548.2**

Notes: V denotes volts and kV denotes kilovolts. DC denotes 'direct current' and AC denotes 'alternating current'.
Totals may not balance due to rounding. Excludes light rail, sugarcane tramways and heritage only railways.

Sources: Revised BITRE estimates; data provided by Sydney Trains, Aurizon, Rio Tinto Alcan, and TasRail; advice from Freight Victoria.

Dedicated commodity networks

The primary railway traffic flows are iron ore, coal, grains, intermodal, and urban passenger. Major parts of the Australian railway network are dedicated to serving individual commodity flows.

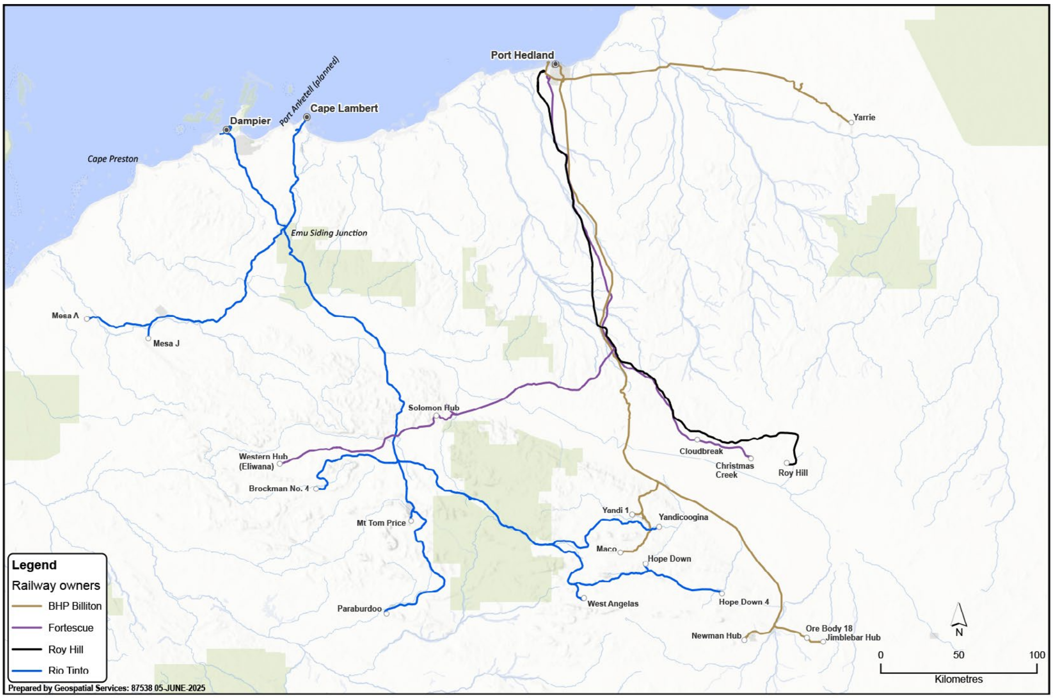
Iron ore networks

Most iron ore transport by rail in Australia occurs in the Pilbara region of Western Australia. Mining companies built the iron ore railway networks in the Pilbara region exclusively to serve the iron ore mines, as was the Karara (Western Australia) spur line and the Middleback railways (near Whyalla) in South Australia. As bespoke developments, these lines were generally built to very high standards to accommodate the large envisaged traffic. There has been extensive subsequent capacity expansion (signalling, track and train capacity) on many of the lines.

The railways of the Pilbara region are all vertically integrated. They are privately owned and operated. There are four operators:

- Rio Tinto: The Robe River to Cape Lambert and the former Hamersley Iron's network to Port Dampier. Since 2012, trains on the Hamersley railway have been approximately 2.4 kilometres long and with a capacity of 26,000 tonnes (BITRE 2013, p. 31). Rio Tinto inaugurated its first driverless train revenue service on 10 July 2018. The train carried 28,000 tonnes of iron ore over 280 kilometres from Tom Price to Cape Lambert (Rio Tinto 2018). In 2022, Rio Tinto started revenue operations on its newly constructed 166-kilometre branch line to the Gudai-Darri mine, in an expanded use of its driverless train operations (Rio Tinto 2022).
- BHP: The Goldsworthy line (to Yarrie) and the Newman line run to Port Hedland. Each train on the Newman line can carry approximately 37,000 tonnes (BITRE 2013, p. 27). The Goldsworthy (to Yarrie) line ceased operations 2014 but remains mothballed.
- Fortescue Metals Group: The Fortescue Hamersley line from Solomon Hub and the Christmas Creek line run to Port Hedland. Trains on these lines can haul 232 cars at 42 tonne axle loads. In December 2020, Fortescue Metals Group opened its 143-kilometre Western Hub (Eliwana) line, as part of the development of the new Western Hub.
- Roy Hill Holdings: A 344-kilometre railway from Roy Hill to Port Hedland, which began operations in December 2015. These trains typically haul 232 ore cars, with a payload of more than 32,000 tonnes of ore.

Figure 50 **Pilbara iron ore railways, by infrastructure owner**



Coal networks

Coal lines occur mostly in eastern Australia, generally being grafted onto the existing mixed-traffic networks. Track standards are high, and there are some electrified systems in Queensland, but they are of a lower standard than the dedicated iron ore lines.

Aurizon manages the Central Queensland Coal Network (CQCN), under an open access regime. The network is narrow gauge with train axle loads of 26.5 tonnes. Bravus Mining and Resources owns the Carmichael Rail Network, which connects to the CQCN. ARTC manages the New South Wales (standard gauge) Hunter Valley system in New South Wales. The systems are:

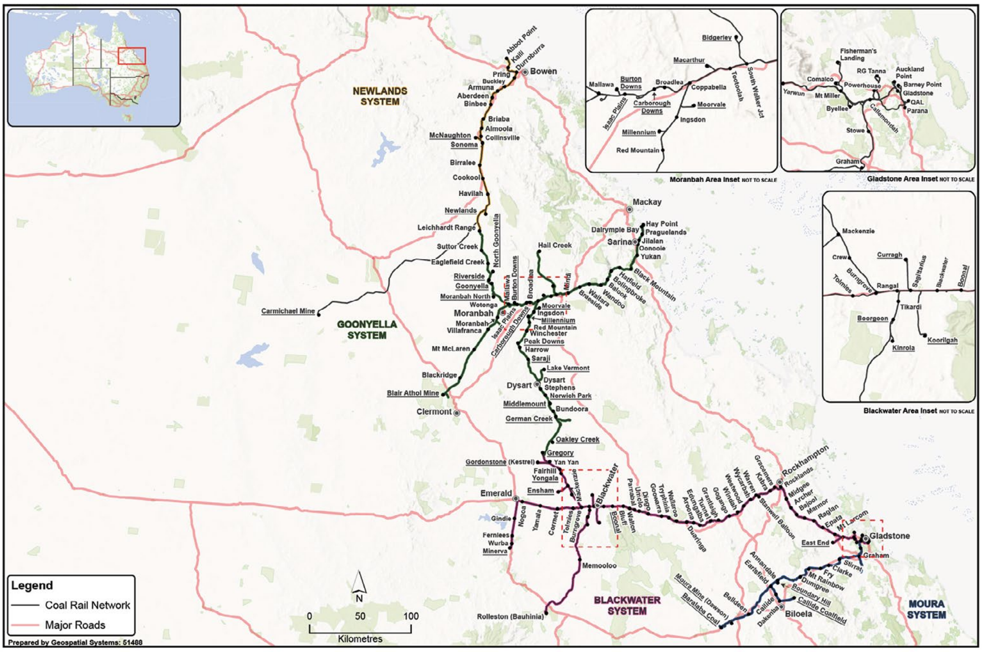
- **Newlands (CQCN):** Newlands is at the northern end of the Bowen Basin. In 2012, the Newlands system was linked to Aurizon's Goonyella System, which has given additional flexibility to access the Port of Abbot Point. The project included construction of the 69-kilometre 'Northern Missing Link', which connects the two rail systems, along with substantial upgrades to existing Newlands rail infrastructure. (For more details see Aurizon 2024a)
- **Goonyella (CQCN):** Goonyella is an electrified system that services the Bowen Basin coal region. It connects to the export terminals at Hay Point/Dalrymple Bay near Mackay, and Abbot Point near Bowen. (For more details, see Aurizon 2024a)
- **Blackwater (CQCN):** This system services the Bowen Basin coal region and it is the largest system in Central Queensland in terms of route kilometres. It delivers coal to the two export terminals at the Port of Gladstone – RG Tanna Coal Terminal and the Wiggins Island Coal Export Terminal (WICET). The system consists of mostly electrified duplicated lines that extend west from Rockhampton. (For more details see Aurizon 2024a)

- **Moura (CQCN):** This system runs from Moura to Gladstone where it connects to the two export terminals – the RG Tanna Coal Terminal and the WICET. In late 2015, Aurizon finished the Wiggins Island Rail Project (WIRP), which involved the development of new rail lines and upgrades of existing lines to WICET. The project created a link between the coal terminal and mines in the Southern Bowen and Surat Basins. The project comprised interdependent infrastructure projects across the Blackwater Rail System, the Moura Rail System and the North Coast Line. (For more details see Aurizon 2024a)
- **Galilee/Carmichael Rail Network (Queensland):** This network (line) opened in 2022. Bravus Rail Company hauls thermal coal from the Carmichael mine in the Galilee Basin along a newly constructed 200-kilometre railway that connects to the CQCN Newlands system near Collinsville. Maximum train axle loads are 26.5 tonnes, at maximum speeds of 80 kilometres per hour. Approximately six trains run on the network each day (Bowen Rail 2023).
- **South-West Rail Corridor (Queensland):** Aurizon hauls coal from the West Moreton Coal System along the South-West Rail Corridor through to the Port of Brisbane. Axle loads vary across the corridor. (For more details see Aurizon 2024a.)
- **Hunter Valley (New South Wales):** Coal is transported to three coal-loading terminals in Newcastle and to domestic users. According to ARTC's latest public reporting, contracted export coal volumes were 196.5 mega tonnes per annum in the first quarter of 2023, declining to 117 mega tonnes per annum in 2031, as some access holders (train operators) choose not to roll over some volume (ARTC 2023, p.5). Train axle loads are 30 tonnes for most of the network. The North Coast line to Stratford and the lines south to Vales Point on the Central Coast are rated for 25 tonne axle loads. The existing 30 tonne axle load infrastructure can accommodate 32.5 tonne axle loads but the higher load provides limited benefit unless the outline gauge is increased. Trains consisting of '120 tonne' (30 tonne axle load) wagons are typically restricted to 60 kilometres per hour when loaded and 100 kilometres per hour when empty. Locomotives of up to 30 tonne axle load are authorised to run at 80 kilometres per hour (ARTC 2023, p.14). Average train sizes as contracted with ARTC in 2022 was 8,433 tonnes. This was approximately 12.5 per cent higher than a decade earlier (ARTC 2023, p.12). Permitted train lengths are approximately 1300–1500 metres. (ARTC 2023, p.13).

Figure 51 ARTC Hunter Valley Coal Network

Note: Map courtesy of ARTC.

Figure 52 Central Queensland Coal Network



Other places of significant coal haulage by rail includes:

- The West Moreton coal fields in southern Queensland;
- The Southern mine region at Wongawilli Colliery, New South Wales;
- The Metropolitan Colliery, near Helensburgh, New South Wales;
- The Tahmoor colliery, near Picton, New South Wales;
- The Western coal region, near Lithgow, New South Wales; and
- Fingal, in Tasmania.

Grain railways

Unlike dedicated iron ore and coal railways, grain railways usually feed into main or secondary mixed-use lines – see Figure 17. Grain lines are generally of a lower technical and operational standard. Some are in a poor condition and traffic is seasonal. Unlike iron ore and coal railways also, the transportation of grain by rail often competes with road transport. It is market contestable.

The technical and operational diversity of the grain lines, mostly reflecting the varying importance (levels) of different branch traffic flows, has led to the classification of lines according to their technical standards (and, thus weight-bearing capability or train speed), their economic importance, or to their viability. The respective categories across the states[27] are outlined below.

27 Most of South Australia's grain railways are not currently operational and the remaining lines have not been classified.

Box 3 Further reading on grain transport

- http://www.graincorp.com.au/
- https://www.cbh.com.au/
- https://www.awb.com.au/
- https://www.ldc.com/au/en/business-lines/grains-oilseeds/

Queensland

The “network capabilities” of railways in Queensland are classified according to the maximum permitted axle loads on a given section of track. Network information packs for access seekers provide details about track standards and permitted axle loads and train speeds. Often the axle-load limits are 15 tonnes at maximum speeds of 70 kilometres per hour. For more information on Queensland Rail’s regional network, including network standards, see (Queensland Rail 2024a).

New South Wales

While the New South Wales Government’s country railways are categorised by class of track – from Class 1 to Class 5, this is an engineering standard only; not an operational standard. Operationally, there is considerable variation within each standard.

Grain transport by rail in parts of New South Wales is becoming more efficient as a result of improvements to the NSW Government’s Country Regional Network (CRN). The NSW Government’s Fixing Country Rail Program funds rail infrastructure enhancement projects that improve connectivity constraints affecting regional freight rail services. Projects funded through Fixing Country Rail allow for more modern, longer and heavier trains to use the network, that improves efficiency and reduces costs for freight producers and operators. As a strategic program, Fixing Country Rail also funds project business cases and feasibility studies to determine the future viability and strategic alignment of projects.

According to Transport for NSW, Fixing Country Rail is about:

- “moving freight more efficiently around NSW;
- increasing capacity, access and reliability of the rail network;
- reducing the cost of getting goods to market;
- supporting jobs, growth and economic productivity; and
- supporting a freight modal shift from road to rail.” (Transport for NSW 2024a)

Key rail network strategies developed by Transport for NSW inform funded projects in the program.

Annual work plan improvements include replacement of life expired bridges, under-bridges and culverts; level crossing and signalling system upgrades; ballast re-surfacing and depth increase; track re-conditioning; re-railing with heavier rail (new and used); and replacement of timber sleepers with steel sleepers. All lines now feature full ‘face’ steel sleeper pattern and continuous welded rail, except in sections where jointed track remains.

Projects funded under Fixing Country Rail have included:

- building rail sidings, which enable trains to load and unload goods, while enabling trains on the same line to pass unhindered;
- building and upgrading crossing loops that allows the use of high productivity trains;
- upgrading the network so that trains can carry larger loads;
- business cases and feasibility studies to determine the feasibility of delivering rail freight projects in the future (Transport for NSW 2024a).

Details of current projects and projects completed since 2019 are shown below.

Table 29 Fixing Country Rail projects

Project Name	Project Type	Status (2024)
Bellata Rail Siding	Construction	Completed 2023
Berry to Bomaderry	Construction	Completed 2022
Coolamon Siding Extension	Construction	Completed 2023
Coonamble South Siding	Construction	Completed 2020
Ettamogah Rail Hub Siding Expansion	Construction	Completed 2019
Hermidale Multi User Siding	Construction	Completed 2019
Junee to Griffith Line Upgrade	Construction	Completed 2022
Mount Murray Loop	Construction	Completed 2020
Narromine to Ulan Upgrade	Construction	Completed 2022
Port Waratah Yard Configuration	Construction	Completed 2020
Red bend Rail Siding	Construction	Completed 2023
Riverina Intermodal Freight & Logistics Hub	Construction	Completed 2021
Tarago Crossing Loop Extension	Construction	Completed 2019
Temora West Rail Siding	Construction	Completed 2020
Condobolin Rail Siding	Construction	Delivery
Main West Bi – Directional Signalling (Wallerawang section)	Construction	Delivery
Gilgandra to Coonamble – 25 TAL	Design and Construction	Delivery
Wumbulgal – Siding	Design and Construction	Delivery

Source: Information provided by Transport for NSW.

The track maintenance strategy has also improved line capabilities (speed and/or higher axle loads). Heavier and more powerful locomotives can operate on sections of the CRN where they previously could not (for example to Walgett) and wagons can carry heavier payloads. (For details of maximum axle loads across the network see UGL Regional Linx 2024, p.2)

For more information on Fixing Country Rail see Transport for NSW 2024a.

Victoria

Victoria has seven track standard classifications. The highest standard is Class 1, and the lowest is Class 5 (VicSig 2024). Details are as follows:

- Class 1: Sections of the Regional Fast Rail network. Maximum speeds are 160 kilometres per hour;
- Class 2: The standard for metropolitan and country passenger lines, with maximum speeds of 115 kilometres per hour and 130 kilometres per hour in some sections for diesel multiple unit sets;
- Class 2M (Deniliquin line, no description);
- Class 2U: A modified version of Class 2 for Regional Fast Rail but of a lower standard than Class 1. Maximum speeds are 130 kilometres per hour;
- Class 3: Passenger lines with low volumes and some grain lines. Maximum speeds are 80–100 kilometres per hour, depending on axle loads;
- Class 4: Lesser branch lines, with maximum speeds of 80 kilometres per hour; and
- Class 5: Lines that are short or have very little traffic, with minimal track maintenance. Maximum speeds are 50 kilometres per hour.

The state's amended Murray Basin Rail Project is ongoing[28]. According to the Victorian Government, the current project includes:

- re-sleepering, adding ballast and adjusting track on the Ouyen to Murrayville Line (complete);
- track upgrades from Ararat to Maryborough to increase maximum axle loads (complete);
- new or upgraded sidings at Donald and Merbein (complete);
- new and extended passing loops at Elmhurst, Emu and Tourello;
- upgraded signalling at Ararat, Maryborough, and Dunolly junctions, and the Ouyen yard;
- re-sleepering from Sea Lake to Dunolly (complete); and
- planning and assessment work for further upgrades (Victoria's Big Build, 2023).

The estimated cost of the project is $885.7 million, of which the Commonwealth Government is contributing $528.1 million. The Australian Government's contribution includes $5 million for additional planning in developing options for full gauge standardisation of the network, which is contingent on an equal contribution from the Victorian Government (Department of Infrastructure, Transport, Regional Development, Communications and the Arts 2024).

Western Australia

Grain railways in Western Australia are classified by their viability and cost-competitiveness. Tier 1 lines are currently considered to be cost-competitive when compared with road transport and to remain competitive given probable future cost increases. Tier 2 railways are currently cost-competitive with road, given prevailing rail access prices and train operating costs. Tier 3 lines are regarded as unviable as rail volumes are low and trains are more expensive when compared with road transport. They are also typified by low (16-tonne) axle loads, with low-standard track structure (Freight and Logistics Council of Western Australia 2010, p.2). All Tier 3 lines are currently non-operational.

The Western Australian Government's Revitalising Agricultural Region Freight (RARF) Strategy identifies investment opportunities in the freight rail line network and provides a list of prioritised rail and intermodal projects on the currently operational Tier 1 and 2 networks (Department of Transport, Western Australia 2020).

28 For details of the project's original scope, see BITRE 2017, p.63.

In implementation of the Strategy, the West Australian Government announced a funding boost through the $200 million Agricultural Supply Chain Improvements (ASCI) program in May 2022. ASCI is jointly funded by the Commonwealth ($160 million) and state ($40 million) governments to support the following four tranches of projects:

- $22 million for four rail siding extensions for CBH grain bins at Moora, Brookton, Cranbrook, and Broomehill, complementing CBH investment in rail loading facilities;
- $46 million for seven additional grain rail siding upgrades at Avon, Kellerberrin, Dowerin, Konnongorring, Ballidu, Mingenew, and Perenjori North, which will help CBH load longer trains faster;
- $60 million for the Midland Line Main Line upgrading from 16 to 19 tonne axle loading between Carnamah and Mingenew, allowing heavier trains and a 20 per cent increase in train loads; and
- $72 million for the Southern Wheatbelt region towards the investigation and potential progressive recommissioning of the Narrogin-Kulin-Wickepin rail line (closed since 2013) and associated works to service grain and other potential customers in the Narrogin-Kulin-Wickepin area. The first stage of this project was the completion of a technical and economic investigative study to assess the most efficient/useful way to implement the investment (Minister for Transport; Planning; Ports 2022).

According to advice received from the Western Australian Department of Transport in December 2024:

- The Brookton rail siding extension had been completed;
- The Broomehill rail siding extension is completed and rail loading facilities should be completed by early 2025;
- The Konnongorring rail siding upgrade and extension is completed and the rail loading facilities will be completed in 2025;
- The Cranbrook and Moora rail siding upgrades are in progress and due for completion in 2025;
- Design of the Perenjori North rail siding is complete;
- The Ballidu, Kellerberrin, Avon and Mingenew rail siding projects' detailed design is progressing to 100 per cent, while the Dowerin rail siding detailed design is progressing to 85 per cent[29];
- Finalisation of the funding agreement for the upgrade of the Midland Line between Carnamah to Mingenew from 16 tonne to 19 tonne axle loads is in progress; and
- The investigative study into the Narrogin-Kulin-Wickepin Tier 3 lines has been completed.

Tasmania

The Tasmanian and Australian governments are jointly funding the renewal of the Tasmanian Rail Network through the Tasmanian Freight Rail Revitalisation Program (TFRRP). The Program continues to be delivered via a series of funding tranches. Tranche Four, which was completed in 2024, was a $94 million investment that involved the replacement of near life-expired rail and sleepers, structure upgrades (bridges and culverts), level crossing renewals and formation projects (TasRail 2024, p.7).

29 The 85 per cent design statement refers to the maturity of the project's drawings and engineering, where there is more advanced detail on existing utilities, proposed major utility relocations, extent of roadway modification required, better articulated designs and other supporting concepts, which further define the intent of the project.

Box 4 Inland Rail

Inland Rail is a strategic national infrastructure project aiming to increase resilience and improve supply chain productivity between Melbourne, Brisbane, Perth, Sydney, Adelaide, Newcastle, and the Illawarra, to meet Australia's growing freight task.

Inland Rail will connect Melbourne and Brisbane via Victoria's existing north east standard gauge line, western New South Wales and Queensland, via Toowoomba. It will span from a new intermodal terminal at Beveridge on the northern outskirts of Melbourne to the existing North–South corridor ('coastal route') at Kagaru on the southern outskirts of Brisbane. The project will support double-stacked container operations running between Beveridge and the proposed terminal at Ebenezer in Queensland, with single-stacked container operations onwards to Kagaru (39 kilometres).

The Commonwealth Government is taking a staged approach to the delivery of Inland Rail, prioritising construction from Beveridge to Parkes in New South Wales by 2027. North of Narromine, work is underway to gain the required environmental planning approvals and land acquisition needed for the project corridor, to provide more certainty that the project can be built to an agreed budget and timeframe.

When fully completed, Inland Rail will provide freight train operators with:

- A 1,600-kilometre inland railway traversing eastern inland Australia;
- Up to 21 tonne axle loads at maximum speeds of 115 kilometres per hour;
- Container double-stacking;
- Maximum train lengths of 1,800 metres (the equivalent of 110 B-Double trucks), and
- Scheduled transit times of less than 24 hours for Melbourne-Brisbane services, which will be up to 10 hours less than the existing coastal route via Sydney.

Over 70 per cent of Inland Rail will involve upgrading existing infrastructure ('brownfield' construction). The remaining sections consist of 'greenfield' construction, chiefly the Narromine-Narrabri section and most sections in Queensland.

Construction of the first section of track between Parkes and Narromine was finalised in September 2020 and is now operational. The northern section of Narrabri to North Star Phase 1 was opened for train operations on 27 October 2023.

Major construction activities continue in Victoria, with the track lowering works (to facilitate double-stacking) completed at Barnawartha North in December 2023, and the Beaconsfield Parade Bridge at Glenrowan, which was officially opened by the Hon Catherine King MP on 1 March 2024. Works at the Seymour–Avenel Road bridge and the Wangaratta Station Precinct continue, with completion expected in 2025. In addition, construction started on the Stockinbingal to Parkes section in New South Wales in September 2023.

For more information on Inland Rail please see the Inland Rail website: https://inlandrail.com.au/.

Interstate network indicators

Access revenue yield indicator (ARTC)

The access revenue yield data that ARTC provides is the revenue per '000 gross tonne kilometres that a reference intermodal train generates for ARTC in specific line segments.

Access revenue is the infrastructure manager's income made from train operators using the railway. ARTC's access charge has two parts: a flagfall charge, which is a reservation charge for booking a train path on a given line segment, invariant with tonnage; and a variable charge, which varies directly with the train operator's gross tonne kilometres. Thus, as a train's tonnage increases, the average access charge per tonne declines.

This access charging regime encourages train operators to operate longer trains. Longer trains enable infrastructure managers to increase tonnage throughput, as there are limited train paths. However, longer trains require track infrastructure that can accommodate the longer trains. Consequently, interstate network infrastructure managers have upgraded their networks to accommodate longer trains.

Table 30, below, is ARTC's revised index of the maximum access yield for the interstate network it manages. The indicator measures the changes (relative to the base year of 2009–10, not shown in the table) in the maximum access revenue yield per gross tonne kilometre. As the access revenue yield is calculated on a nominal reference train, this measure essentially identifies if there have been any real changes in access charges. Changes in this composite indicator may reflect changes in:

- Real access charges (higher charges will increase the indicator);
- Train operators' use of existing capacity (heavier/longer trains will lower the indicator); or
- Enhancements in rail infrastructure and train operators' uptake of those enhancements (more uptake of improvements, through heavier trains, will lower the indicator).

Table 30 Index of real maximum access revenue yield, interstate network (2011–12 = 100)

	2012–13	2013–14	2014–15	2015–16	2016–17	2017–18	2018–19	2019–20	2020–21	2021–22	2022–23	2023–24
North–South corridor												
Acacia Ridge–Border Loop	100	100	100	100	100	100	100	100	97.63	97.61	97.59	97.57
Border Loop–Newcastle	100	100	100	100	100	100	100	100	97.63	97.61	97.59	97.57
Macarthur–Albury	100	100	100	100	100	100	100	100	97.79	97.67	97.67	97.63
Albury–Tottenham	100	100	100	100	100	100	100	100	97.79	97.67	97.67	97.63
East–West corridor												
Melbourne–Adelaide	100	100	100	100	100	100	100	100	97.99	97.63	97.62	97.58
Adelaide–Kalgoorlie	100	100	100	100	100	100	100	100	97.87	97.67	97.67	97.64
Cootamundra–Parkes	100	100	100	100	100	100	100	100	97.84	97.58	97.64	97.61
Parkes–Broken Hill	100	100	100	100	100	100	100	100	98.00	97.66	97.65	97.61
Broken Hill–Crystal Brook	100	100	100	100	100	100	100	100	97.81	97.66	97.65	97.62

Note: Numbers are subject to rounding.

Source: Data provided by ARTC.

Permitted train lengths on the interstate network

Permitted train lengths influence track capacity. On Australia's predominantly single track, crossing loops and passing lanes contribute to capacity. Since the mid-1990s in particular, infrastructure managers have built longer crossing loops and passing lanes (approximately 6-8 kilometres in length) across the interstate network. Track alignment and gradients also determine permitted train lengths.

Permitted unrestricted train lengths on the interstate network are as follows:

- 1,500 metres Brisbane–Sydney;
- 1,500 metres Melbourne–Adelaide (1800 metres restricted); and
- 1,800 metres Sydney–Melbourne, Cootamundra–Crystal Brook, Adelaide–Perth, Tarcoola–Darwin.

The 'unrestricted' train length is the maximum length operators can operate any scheduled service without reference to the infrastructure manager. The length is shorter than the standard loop length on the line segment. The 'restricted' train length is the maximum train length permitted on the line segment. Under restricted access terms, trains that exceed the prevailing loop length can be operated by ensuring trains that have to be passed can be accommodated within the prevailing loop length.

Passing lanes[30] have been built on the single track sections between Junee and Melbourne on the Sydney–Melbourne corridor. This, combined with double track between Sydney and Junee, and Albury and Seymour, have enabled the use of unrestricted 1800 metre trains between Sydney and Melbourne.

Double stacking capability on the interstate network

Double stacking containers on wagons increases capacity. In Australia, double stacking involves stacking one hi-cube (9 feet 6 inch, or 2.896 metres high) container on top of another in a low-floor (well) wagon. The stacking height must be no higher than 6.5 metres, and mass limits must not be exceeded. Double stacking is permitted west of Goobang (Parkes) and west of Adelaide to Perth and Darwin. Figure 53, below, illustrates.

Clearances on the North–South corridor are restricted to single stacking of hi-cube containers. The increasingly prevalent higher maxicube (10 feet 6 inch, or 3.20 metre) containers travel in low-floor well wagons.

30 A passing lane differs from a passing loop by virtue of the fact they are approximately eight kilometres in length, as opposed to approximately 1500 metres and 1800 metres, which is the typical crossing loop length on the interstate network, depending on the corridor. Passing lanes enable trains to cross each other without stopping, subject to timings.

Figure 53 Double stacking capability on the interstate network

Track quality of the interstate network

The maintenance and standards of railway infrastructure influence train operating performance. The infrastructure quality, maintenance regime and underlying economic life of the infrastructure influence the permitted track speed and smoothness of wagon ride.

For safety, maintenance, planning and regulatory reasons, infrastructure managers regularly measure the condition of their track. They measure the extent to which the track deviates from the 'designated' (or 'true') alignment, expressed as a track quality index (TQI). The TQI is a statistical measure calculated from the standard deviations of a number of different track geometry parameters. The TQI for a given line segment is taken as the average of the individual TQI sample readings over a given period. A lower TQI number denotes improved track quality. The rate of track quality decline, where it occurs, is influenced by such factors as the quality of renewal material and work, the level and type of track usage, weather and local geographical factors, and the skill and timeliness of ongoing maintenance work.

Infrastructure managers regularly operate trains with a track geometry measuring carriage. The carriage is equipped to measure and record a range of geometric parameters. There is a variety of track geometry measuring cars in Australia and hence a variety means of measuring and analysing the parameters that make up the TQI. Further, track quality is reported as a composite measure of the different geometric parameters. This composite measure can differ between systems depending on the parameters used[31].

31 Trainline 6, has a case study on ARTC's 'AK Car' track measuring operations (See BITRE 2018c).

Figure 54 to Figure 57 show TQIs by line segment for the ARTC North–South and East–West corridors, and Aurizon's Northgate (Tarcoola)–Darwin corridor. The figures show trends in track condition for the line segments.

The TQIs shown for both infrastructure managers consist of:

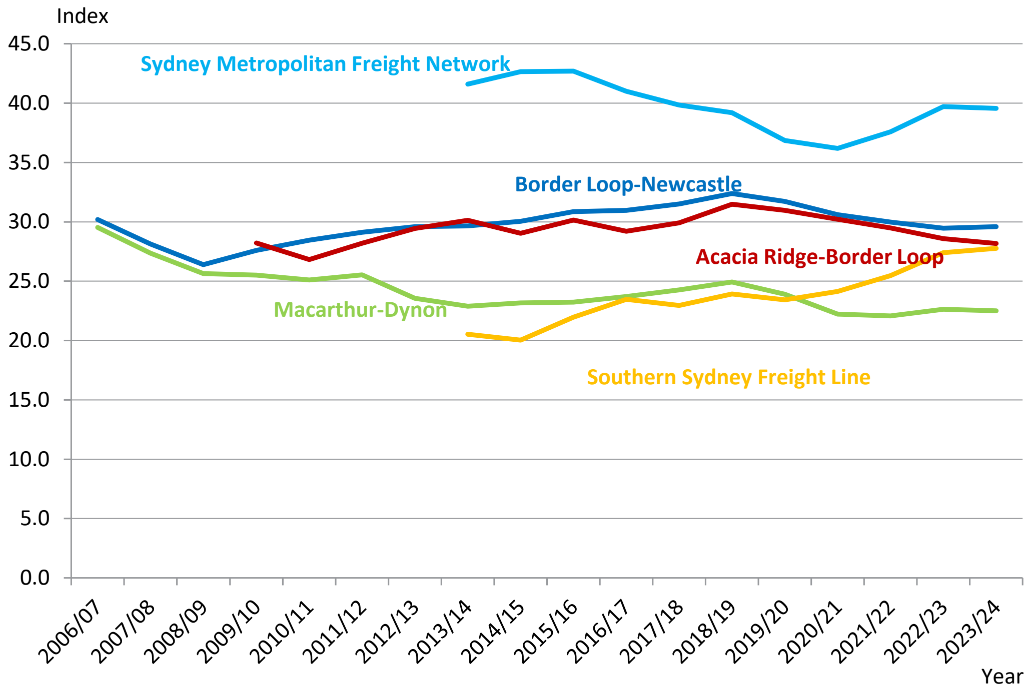
- Gauge;
- Twist (short), measured over two metres;
- Vertical irregularities ('top'), deviation over a 20-metre inertial reading (average of left and right rail); and
- Horizontal line irregularities ('versine'), 5/10 metre chord emulation (average of left and right rail).

These are based on average Standard Deviations over 100 metre sections.

The specific composition of the index varies between infrastructure managers, reflecting both differences in priority and different operational environments across the network. As such, the indexes are not comparable between the two infrastructure managers. However, TQI changes for each individual sector are comparable.

ARTC

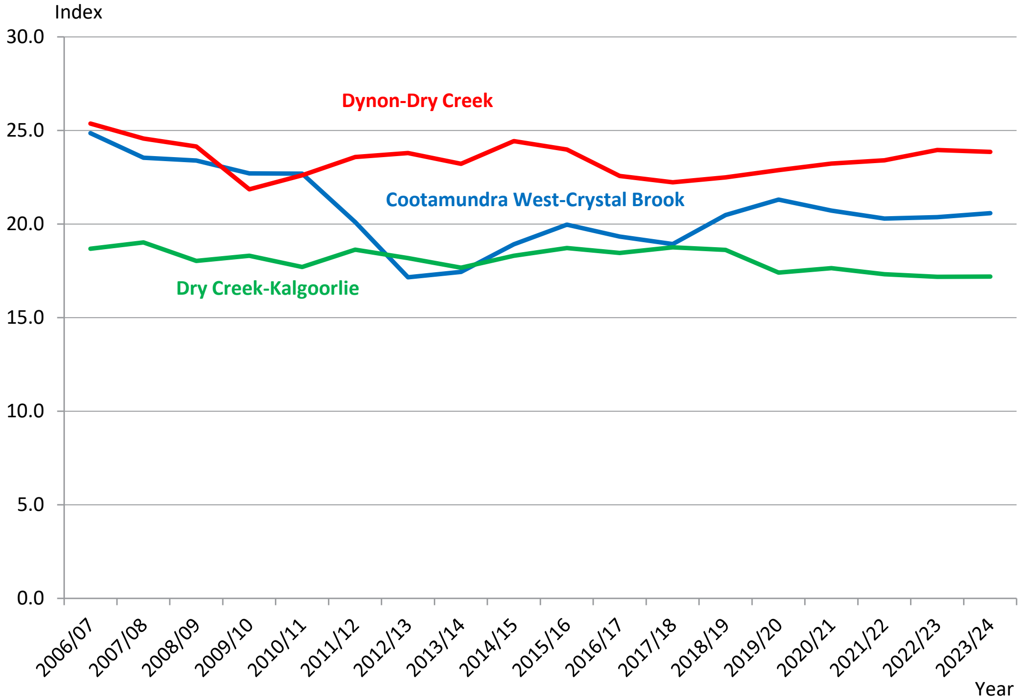
Figure 54 ARTC track quality index, North–South corridor



Note: Lower indices indicate higher track quality.

Source: Data Provided by ARTC.

Figure 55 ARTC track quality index, East–West corridor



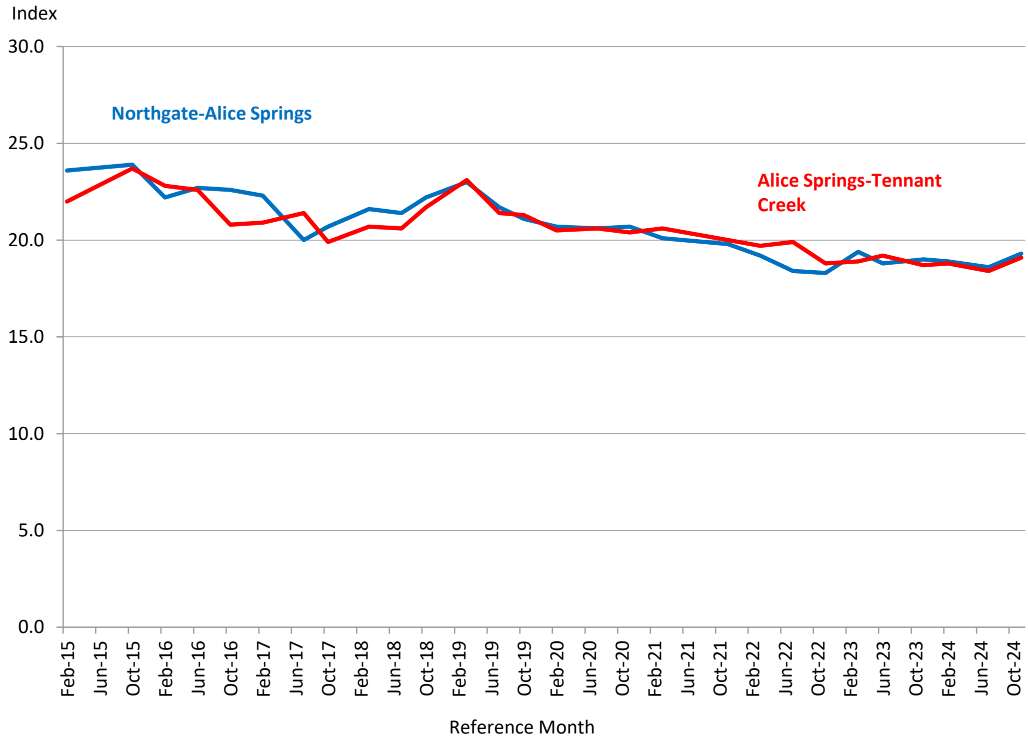
Note: Lower indices indicate higher track quality.

Source: Data Provided by ARTC.

In 2023–24, there was minimal variation – up to approximately 1.5 per cent – to track quality on all sectors of the ARTC network. The greatest improvement was on the Acacia Ridge–Border Loop sector, at 1.47 per cent. The greatest decline in quality was 1.32 percent on the Southern Sydney Freight Line corridor.

Aurizon

Figure 56 Aurizon Track Quality Index, Northgate–Tennant Creek

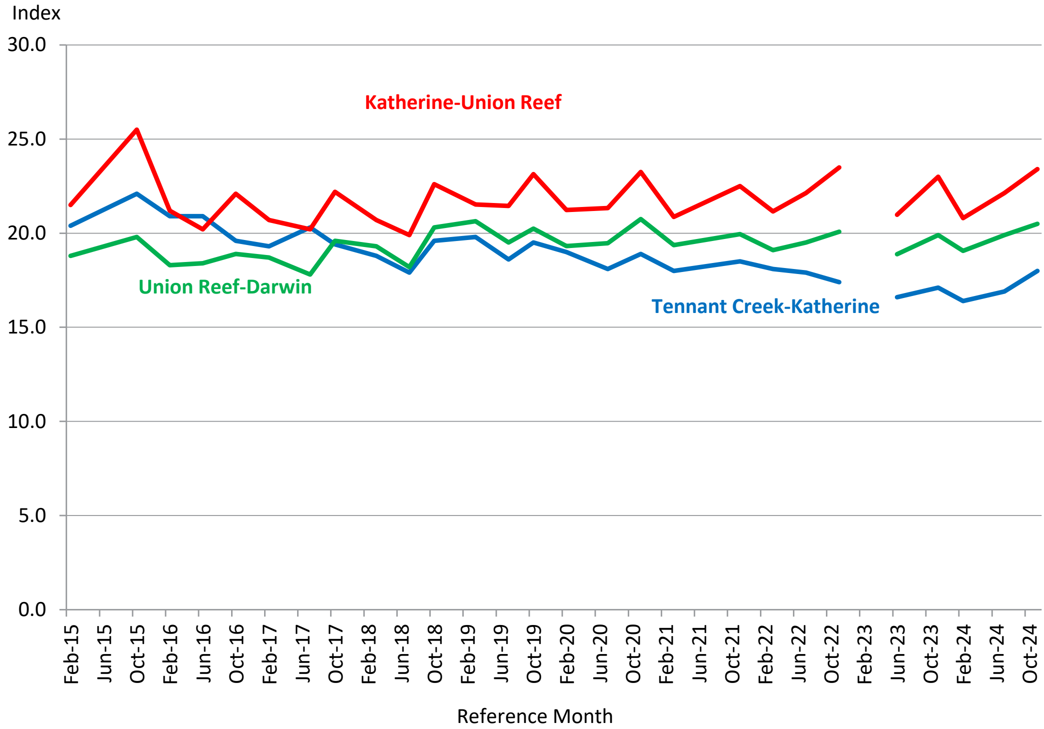


Notes: Northgate is the start of the Aurizon rail infrastructure. It is located shortly north of Tarcoola, where it diverges from the ARTC network.

Lower indices indicate higher track quality.

Source: Data Provided by Aurizon.

Figure 57 **Aurizon track quality index, Tennant Creek–Darwin**



Note: Data for 2023 not available due to track outage.
Lower indices indicate higher track quality.

Source: Data Provided by Aurizon.

Aurizon's Northgate (Tarcoola)–Darwin line TQI data is divided into five segments. When comparing the average of the three indices in 2024 to the three indices in 2023, track quality on both the Northgate–Alice Springs and Alice Springs–Tennant Creek sections was roughly unchanged (improved by less than one per cent).

When comparing the average of the three 2024 indices on the Tennant Creek–Katherine, Katherine–Union Reef, and Union Reef–Darwin sections to the two indices in 2023[32], track quality declined marginally, from approximately 0.5-2.0 per cent.

32 There is no data for March 2023 due to a track outage.

TasRail

TasRail reports TQI results in its annual report. Table 31, below, shows relative track quality of the TasRail network in June 2023 and June 2024.

Table 31 TasRail track quality index

	Rating (per cent)							
Sector	June 2023 (Good)	June 2024 (Good)	June 2023 (Fair)	June 2024 (Fair)	June 2023 (Poor)	June 2024 (Poor)	June 2023 (Very Poor)	June 2024 (Very Poor)
West	79.5	78.5	17.5	18.9	2.4	2.3	0.5	0.2
South	64.9	70.6	25.9	23.7	7.7	4.8	1.4	0.8
Melba	90.3	93.4	9.5	6.3	0.2	0.3	0.1	0.0
Bell Bay	53.0	50.9	35.0	35.8	10.0	12.0	2.0	1.3
Fingal	81.2	76.4	14.6	19.5	3.4	3.6	0.7	0.5
Derwent Valley Line	48.9	75.4	33.8	13.4	17.3	11.2	0.0	0.0
Network	74.1	76.0	20.3	19.5	4.8	3.9	0.9	0.5

Source: TasRail (2024), p.28.

Urban heavy rail passenger networks

Australia's urban heavy rail networks are extensive, even if the network coverage is not dense (see Table 32). The networks are mostly radial, reflecting the historical development of Australian cities, with lines branching from dense Central Business Districts (CBDs) into the surrounding, low density suburbs. In December 2024, Australia had an estimated 1,514 route kilometres of operational urban heavy railways.

Table 32 Estimate of network characteristics of urban passenger heavy railways, December 2024

	Sydney		Melbourne	Brisbane	Adelaide	Perth
Operator	Sydney Trains	Sydney Metro	Metro Trains Melbourne	Queensland Rail	Adelaide Metro	Transperth
Ownership	Public	Public	Private (government franchise)	Public	Public	Public
Dedicated urban passenger lines (km)	212.5	51.5	193.7	128	127	224.5
Shared metropolitan freight/passenger lines (km)	116	-	214.5	268	-	2
Total route length (km)	328.5	51.5	408.2	396	127	226.5
Electrified route length (km)	328.5	51.5	377.2	396	82.5	226.5
Metropolitan stations (number)	168	21	221	152	89	84
Average distance between stations (km)	1.9	2.5	1.8	2.6	1.4	2.7
Lines under construction (km)	-	47	62	10.2	-	25.5[33]
Gauge	Standard	Standard	Broad	Narrow	Broad	Narrow

Notes: Distances are an estimate of route kilometres and are subject to rounding.

Urban networks are defined by urban passenger operator boundaries. The Brisbane calculations are based on the limits of Queensland Rail's City Train network, including the privately-owned Airport line.

The Sydney Trains calculations include the Airport Link and Olympic Park lines. They exclude the inter-urban lines from Berowra to Newcastle Interchange, Emu Plains to Lithgow, and Waterfall to Bomaderry. Sydney Trains manages these lines as infrastructure manager, but NSW TrainLink provides the train services as the above-rail operator.

Does not include freight only track sections.

Sources: BITRE estimates; Data provided by Adelaide Metro; Data provided by Aurizon; Advice from Public Transport Authority of Western Australia.

Some specific characteristics of the various networks are as follows:

- Sydney has both a conventional and driverless metro network. Metro services began in May 2019 following construction of the Tallawong–Chatswood line (Sydney Metro North West). In August 2024, the newly constructed extension to Sydney Central and Sydenham (Sydney Metro City and South West) opened. Sydney Metro City and South West will be extended to Bankstown following conversion of the existing conventional line from Sydenham to Bankstown, currently underway. Construction of Sydney Metro West (Sydney Central–Parramatta) and Sydney Metro Western Sydney Airport (St Marys–Western Sydney Airport–Bradfield City Centre) is also underway.

33 This includes the eight-kilometre Byford Rail Extension, which is an extension of the (electrified) Transperth network from Armadale to Byford along the existing Bunbury line.

- Brisbane and Perth's geographical scope arguably includes inter-city traffic, in addition to purely suburban traffic. This is because the two operators, City Train and Transperth respectively operate services beyond the greater city areas. This includes services to the Gold Coast in Queensland (approximately 88 kilometres from Roma Street Station) and services to Mandurah in Western Australia (approximately 70 kilometres from Perth Underground Station). By way of comparison, these are the approximate distances from Melbourne to Geelong and Sydney to Gosford, which are served by the non-urban rail operators V/Line and TrainLink respectively.
- Perth's system is also distinctive relative to the other Australian networks due to the nature of its new railways. Table 32 shows Perth's network is more than double the length of Adelaide's, but it has five fewer stations. This station spacing facilitates significantly higher average train speeds on Perth's Mandurah line and, to a lesser extent, the Yanchep line (see Figure 32). With fewer stations, good station access is inherent to station design through rail-bus interchanges, extensive park-and-ride facilities and encouragement of (nearby) Transit Oriented Development (TOD). In 2024, the newly constructed Yanchep line extension and Morley–Ellenbrook lines began revenue operations.
- Brisbane, Melbourne, Adelaide and Perth's urban heavy railways use a different track gauge to the interstate network. This separates urban passenger traffic from almost all freight traffic operating on the standard gauge. Examples of shared track where it occurs includes the north coast intermodal freight and coal from the Toowoomba region into the Port of Brisbane (narrow gauge). In Melbourne, regional broad gauge freight trains share tracks with suburban trains in the Melbourne metropolitan area. Sydney's urban network is standard gauge throughout. It therefore shares capacity with freight traffic travelling through suburban Sydney. The Southern Sydney Freight Line provides a dedicated southern access to Sydney freight yards. This segregates freight traffic from passenger traffic along the corridor. The freight line from Chullora/Enfield to Port Botany is also mostly segregated from passenger traffic.
- Electrified services began in Sydney and Melbourne[34] from the early inter-war period using Direct Current (DC) traction power. Cities that electrified their networks later use more advanced Alternating Current (AC) traction. Perth and Brisbane electrified their networks relatively recently–Brisbane from the late 1970s and Perth from the early 1990s. In Adelaide, the Rail Revitalisation Programme electrified part of the network. Electric train operations began on the Seaford and Tonsley lines in 2014, and in 2022 on the Gawler line.

Light rail passenger networks

Australia has approximately 338.4 route kilometres of operational light rail. The technological and operational differences between tramways, light rail and heavy rail are increasingly blurred[35]. Trainline refers to Australia's light rail operations as having shared characteristics with tramways, particularly in Melbourne. Former heavy rail corridors also form parts of the networks in Melbourne, Sydney and Adelaide. By route distance, Melbourne has the world's largest light rail network. There are smaller operations in the other cities that have light rail.

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34 Only Melbourne's Frankston–Stony Point line remains un-electrified.

35 Tramways generally have short spacing between stations and operate on roads, often sharing a right-of-way with road traffic. Light rail is considered to largely have its own right-of-way with more widely spaced stations. Melbourne's extensive system, in particular, illustrates the flexibility of light rail and its consequent definitional blurring. Melbourne's light rail vehicles operate on former heavy rail lines to St Kilda and Port Melbourne, but most of the network shares right-of-way with road traffic.

Table 33 Network characteristics of light railways, December 2024

	Gold Coast	Sydney	Melbourne	Adelaide	Canberra	Newcastle
Total route length (km)	20.3	36.8	250	16.6	12	2.7
Segregated right of way	segregated	largely segregated	24% segregated	largely segregated	segregated	segregated
Routes (no.)	1	4	24	3	1	1
Number of stops (no.)	19	59	1 717	29	14	6
Route length under construction (km)	6.7	-	-	-	1.6	-

Source: Advice from Yarra Trams; G:link (2024); Canberra Metro (2024); advice from Department of Planning, Transport and Infrastructure; advice from Transport for NSW; BITRE estimates.

Melbourne's network is mostly integrated with road traffic. Most of the network shares the close-stop and on-road feature of buses, which increases travel times. Other parts of the network resemble the limited-stop, segregated railway. The lines from Southbank to Port Melbourne and St Kilda, for instance, are former heavy rail lines that were converted to light rail running in 1987.

Sydney and Adelaide had significant tramway systems prior to the middle of the 20th century. Adelaide's single remaining line runs between the Adelaide Entertainment Centre and Glenelg, via the CBD, with two short extensions from North Terrace in the CBD to Festival Plaza and to the Botanic Gardens. The majority of the route length is in a segregated light rail corridor between the edge of the CBD and Glenelg, using a former heavy-rail corridor.

Sydney has four light rail routes. The L1 line starts at Sydney Central Station and runs to Dulwich Hill via Pyrmont, and Lilyfield. The line runs along a former freight heavy rail corridor, with a small segment of on-road (largely segregated) operation between Haymarket and Central Railway Station. The L2 and L3 lines run from Circular Quay to Centennial Park, via Sydney Central Station on shared track. At Centennial Park the lines diverge. The L2 line continues to Randwick, while the L3 line continues to Kingsford. The L2 and L3 lines are largely on road segregated. Stage 1 of the Parramatta Light Rail, connecting Westmead to Carlingford via the Parramatta CBD and Camellia, opened to revenue services in December 2024.

The Gold Coast light railway runs between Helensvale and Broadbeach South. The line runs along roads but the space is generally not shared with road traffic. The line runs along a dense retail corridor. Construction of Stage 3, a 6.7-kilometre extension of the line from Broadbeach South to Burleigh Heads, is underway, with revenue services expected to start in 2025. (Gold Coast Light Rail Stage 3 2022)

Canberra's light railway runs from Canberra City to Gungahlin. Relatively long distances between stops and traffic signals priority enables Canberra's light rail to have the highest point-to-point average speed – 30 kilometres per hour. Construction of Canberra's light rail Stage 2A 1.7-kilometre extension, from the Canberra CBD to Commonwealth Park, is underway (Light Rail to Woden 2022).

Newcastle's light rail has no overhead wires. Instead, the light rail vehicles recharge at every stop, by raising the pantograph to an overhead power supply located at the stop.

Non-urban passenger networks

Non-urban passenger services are mostly integrated with other rail operations. Typically, the non-urban services share track with urban passenger and freight trains, although the June 2015 opening of the Regional Rail Link reduced this in Melbourne.

Table 34 Network coverage of non-urban passenger rail services, by operator, December 2024

	Queensland Rail	NSW TrainLink	V/Line	Transwa	Journey Beyond
Electrified route kilometres	622	461	-	-	-
Total route kilometres	**4,296**	**4,256**	**1,632**	**836**	**9,173**

Notes: Shared corridors by multiple services by the same operator are only counted once. For example, NSW TrainLink's Sydney-Brisbane estimate includes all other TrainLink services that operate anywhere on that corridor. Conversely, the Sydney-Armidale estimate only includes the section from Maitland to Armidale. Shared corridors by separate operators are counted separately. For example, NSW TrainLink's estimate includes the Albury-Melbourne corridor, which is counted separately to V/Line's estimate that also includes Albury-Melbourne.

The estimate includes the designated urban networks through which non-urban passenger rail services transit.

Diesel services run on electrified track in places. Where non-urban electrified and diesel services share electrified track (such as Rockhampton–Brisbane), the route is deemed electrified. Where non-urban diesel services share track with electrified urban trains (such as V/Line services on Melbourne's metropolitan network), the route is deemed not electrified.

The Transwa total includes the Perth–Bunbury line, which is temporarily closed due to infrastructure upgrade works.

The Journey Beyond total includes 1,931 kilometres of seasonal only rail services ('Great Southern' train, Melbourne–Sydney–Brisbane legs).

Source: Revised BITRE estimates.

New railways

Since 2014, approximately 1,140 route-kilometres of heavy railways and approximately 66 route-kilometres of light rail railways have been opened, as at December 2024. This included:

- 653 route-kilometres of iron ore railways in the Pilbara region of Western Australia.
- 293 route-kilometres of railways for coal haulage in Queensland and New South Wales. This includes the 200-kilometre Carmichael Rail Network (Galilee Basin) line, which opened in 2022, and the Olive Downs Complex spur and loop, which opened in 2023.
- 158 route-kilometres of urban heavy railways. In 2024, this included Sydney Metro City and Southwest, the Yanchep extension (Perth), the Port Dock Station extension (Adelaide), and the Morley-Ellenbrook line (Perth).
- New or extended light railways opened in the Gold Coast, Sydney, Adelaide, Canberra, and Newcastle.

Table 35 Railways opened since 2014

Traffic	Location	Year	State	Length	Project	Infrastructure owner/manager
Iron ore	Roy Hill–Port Hedland	2015	WA	344	Roy Hill	Roy Hill Holdings
Iron Ore	Western Hub (Eliwana)	2020	WA	143	Western Hub (Eliwana)	Fortescue Metals Group
Iron Ore	Gudai-Darri	2022	WA	166	Gudai-Darri	Rio Tinto
Coal	Moranbah–Caval Ridge	2014	Queensland	12	Caval Ridge Spur	Billiton Mitsubishi Alliance
Coal	Maules Creek–Werris Creek line	2015	NSW	20	Maules Creek	Whitehaven
Coal	Aldoga–Wiggins Island	2015	Queensland	13	Wiggins Island Coal Export Terminal	Aurizon
Coal	Boggabri	2016	NSW	17	Boggabri Rail Spur	Idemitsu
Coal	Byerwen	2017	Queensland	5	New branch line in GAPE system	Private and Aurizon
Coal	Baralaba	2018	Queensland	6	New branch in Moura system	Private and Aurizon
Coal	Galilee Basin	2022	Queensland	200	Carmichael Rail Network	Bravus Mining and Resources
Coal	Bowen Basin	2023	Queensland	20	Olive Downs Complex	Pembroke Resources
Intermodal	North West Connection	2019	NSW	5	Inland Rail	ARTC
Grain	Moree–Broadbent Grain facility	2017	NSW	3.5	Broadbent Grain facility- Moree connection	ARTC
Inter-Urban passenger	Deer Park–West Werribee	2015	Victoria	27	Regional Rail Link	V/Line
Urban passenger	Glenfield–Leppington	2015	NSW	12	Leppington line	RailCorp
Urban passenger	Noarlunga–Seaford	2014	SA	6	Noarlunga Line extension	Department of Planning, Transport and Infrastructure
Urban passenger	Clarkson–Butler	2014	WA	8	Joondalup Line extension	Transperth (Public Transport Authority)
Urban passenger	Petrie–Kippa–Ring	2016	Queensland	13	Moreton Bay Railway	Queensland Rail
Urban passenger	South Morang–Mernda	2018	Victoria	8	Mernda Rail Extension	Metro Trains Melbourne
Urban passenger	Sydney	2019	NSW	36	Sydney Metro Northwest	Transport for NSW
Urban passenger	Adelaide	2020	SA	.65	Flinders Link	Department for Planning, Transport and Infrastructure
Urban passenger	Perth	2022	WA	8	Forrestfield-Airport Link	Metronet
Urban passenger	Perth	2024	WA	14.5	Yanchep Extension	Metronet
Urban passenger	Adelaide	2024	SA	1	Port Dock Station Extension	Department for Planning, Transport and Infrastructure
Urban passenger	Sydney	2024	NSW	30	Sydney Metro City and Southwest	Transport for NSW
Urban passenger	Perth	2024	WA	21	Morley-Ellenbrook	Metronet

Traffic	Location	Year	State	Length	Project	Infrastructure owner/manager
Light rail	Gold Coast University Hospital – Broadbeach	2014	Queensland	13	Gold Coast Light Rail	Queensland and Australian governments; Gold Coast City Council, GoldLinQ
Light rail	Lilyfield – Dulwich Hill	2014	NSW	6	Inner West Light Rail extension	Transport for NSW
Light rail	Gold Coast University Hospital – Helensvale	2017	Queensland	7.3	Gold Coast Light Rail	Queensland and Australian governments; Gold Coast City Council, GoldLinQ
Light rail	Kind William Street – East Terrace	2018	South Australia	1	City Tram Extension Project	Department of Planning, Transport and Infrastructure
Light rail	King William Street – Festival Plaza Precinct	2018	South Australia	.350	City Tram Extension Project	Department of Planning, Transport and Infrastructure
Light rail	Gungahlin – Canberra City	2019	ACT	12	Canberra Metro	ACT government and Canberra Metro consortium
Light rail	Newcastle Interchange – Pacific Park	2019	NSW	2.7	Newcastle Light Rail	Transport for NSW
Light rail	Circular – Quay Randwick and J uniors Kingsford	2019–2020	NSW	12	CBD and South East Light Rail	Transport for NSW
Light rail	Parramatta-Carlingford	2024	NSW	12	Parramatta Stage 1	Transport for NSW

Note: Distances are route kilometres.

As Table 36, below, shows, an estimated 131.5 route-kilometres of heavy and light railways were under construction in December 2024. Of this, approximately 123.1 kilometres were heavy railways and 8.4 were light railways.

Table 36 Heavy and light railways under construction, December 2024

Traffic	Location	State/territory	Length (route kilometres)	Project
Light Rail	Gold Coast	Qld	6.7	Gold Coast Light Rail Stage 3
Light Rail	Canberra	ACT	1.7	Canberra Light Rail Stage 2A
Heavy Rail	Sydney	NSW	13.4	Sydney Metro City & Southwest[36]
Heavy Rail	Melbourne	Vic	9	Metro Tunnel
Heavy Rail	Brisbane	Qld	10.2	Cross River Rail
Heavy Rail	Perth	WA	17.5[37]	Thornlie-Cockburn Link
Heavy Rail	Melbourne	Vic	26	Suburban Rail Loop East
Heavy Rail	Sydney	NSW	24	Sydney Metro West
Heavy Rail	Sydney	NSW	23	Sydney Metro Western Sydney Airport

36 Conversion of Sydney Trains line to Metro line.

37 This is the entire project length, from the existing junction with the Armadale line, along the existing line to Thornlie, approximately 11.5 route-kilometres of new track, and upgrades from the junction with the Mandurah line to Cockburn Central Station.

Chapter 6
Rollingstock

This chapter discusses heavy and light rail rollingstock, both freight and passenger. Due to a lack of available data, Trainline is unable to report details of freight wagons.

Locomotives

Due to an ongoing lack of data provision from some above-rail operators and a scarcity of publicly available information, BITRE is unable to report a current estimate of the total number of operational locomotives in Australia. According to its previous estimate in September 2021, there were approximately 2,100 operational locomotives in Australia[38].

According to its website, TasRail has the following 27 operational locomotives:

- 17 TR Class;
- Eight 2000 (DQ) Class; and
- Two 2050 Class (TasRail undated).

According to its website, Pacific National has approximately 564 active locomotives (without elaboration) (and approximately 11,400 active wagons) (Pacific National Finance 2025, p.120).

Urban passenger rollingstock

The levels of rollingstock needed are governed by:

- Traffic levels;
- Network size and length of individual lines;
- The range of services on each part of the network (such as offering stopping, semi-fast, and express services on a given line); and
- The average speed of services (with faster operations requiring fewer train sets).

Heavy rail rollingstock

Most urban heavy rail rollingstock operate as permanently coupled multiple-unit sets, and this coupling varies between the cities. Adelaide's rollingstock, with large numbers of one and two-car units, enables Adelaide Metro to cater for modest traffic levels with a broad range of configurations. While Melbourne's sets traditionally operate as three or six-car sets, the new HCMT rollingstock operate as seven-car sets, to provide greater capacity.

38 For details of the September 2021 estimate, see BITRE (2022), pp. 61-63.

Sydney is the only city to use double-deck carriages, which it began introducing in 1964, to increase passenger capacity on the existing network. Its double-deck trains may have longer dwell times, however, due to passengers from the upper and lower decks converging at the carriage doors and fewer doors per carriage than single deck trains. The new metro sets are single-level only, to enhance the flow of passengers exiting and entering the trains and thus reducing dwell times.

Adelaide has converted its fleet of diesel-powered sets into diesel hybrid operations, primarily for reliability purposes. According to advice from Adelaide Metro, the train sets' regenerative braking also enables them to reduce fuel consumption by up to 35 per cent and provide a more comfortable ride.

Table 37 Operational urban heavy rail rollingstock, July 2024

	Brisbane	Sydney	Melbourne	Adelaide	Perth
Vehicles (no.)	867	1970	1681	154	354
Carriage format	Single-deck	Double-deck and single-deck	Single-deck	Single-deck	Single-deck
Multiple-unit format	75 six-car 139 three-car	45 six-car (Sydney Metro) 186.5 four-car (Sydney Trains) 119.25 eight-car (Sydney Trains)	198.5 six-car 70 seven-car	34 three-car 26 two-car	48 two-car 78 three-car 4 six-car

Sources: Data provided by Queensland Rail, Transport for NSW, Public Transport Victoria, and Adelaide Metro; and Public Transport Authority WA.

BITRE estimates that in July 2024 Australia had 5 026 urban heavy rail cars (electric, diesel, and diesel hybrid, formed into multiple unit sets). Compared to 2023 there were the following changes:

- Melbourne had an additional 224 newly built HCMT cars;
- Sydney had 138 additional newly built Sydney Metro cars that had entered service but no changes to the Sydney Trains fleet;
- Brisbane had 12 fewer ageing EMU class vehicles;
- Adelaide had 24 additional newly built 4000 class EMU vehicles and all 3000/3100 class cars have re-entered service following conversion to diesel hybrid running; and
- In Perth, there were 24 newly built C-series EMU vehicles that had entered service.

Light rail rollingstock

BITRE estimates there were 632 operational light rail vehicles in Australia in July 2024. Approximately 77 per cent of the fleet operated in Melbourne, which reflects the size of the Melbourne light rail network relative to the other cities.

As operations have expanded and as Melbourne has updated its fleet, longer, higher capacity vehicles have entered service. Most use vehicle articulation rather than the coupling of vehicles, although all of Sydney's Citadis X05 vehicles operate as coupled two car sets. Melbourne's E class vehicle, introduced from 2013, is more than twice the length of Melbourne's older Z and A classes. Victoria is also developing a new G class light rail vehicle, to replace the Z and A class vehicles. The G class vehicles are to be built locally at the Alstom plant in Dandenong. The vehicles will be low floor and able to accommodate up to 150 passengers. 100 vehicles are scheduled to be built, with the first to enter service in 2025 (Infrastructure Magazine 2023).

The new vehicles are a mix of imported and locally built vehicles. Alstom manufactures the Australian built E class vehicles at its Dandenong plant in Victoria. Imported vehicles are made in Spain, Germany, and France.

Table 38 Operational light rail rollingstock, July 2024

City	Vehicle type	Length (metres)	No. vehicles
Gold Coast	Flexity 2	43	18
Sydney	Urbos 3	33	12
	Citadis X05	33	60
Sydney total			**72**
Melbourne	A1 class	15	27
	A2 class	15	42
	B2 class	23.6	130
	C1 class	23	36
	C2 class	32.5	5
	D1 class	20	38
	D2 Class (Combino)	29.9	21
	E Class	33.5	100
	Z3 class	16.6	87
	W class	14.2	12
Melbourne total			**498**
Adelaide	100 Flexity Classic	30	15
	200 Citadis	32	9
Adelaide total			**24**
Canberra	Urbos 3	32.9	14
Newcastle	Urbos 100	32.9	6

Notes: Fleet numbers are based on rollingstock estimated to be in current revenue service.
Adelaide retains two heritage H class trams for tourist trips and special events.

Sources: Advice from G:Link, Adelaide Metro, Transdev NSW, and Transport for Victoria.

Non-urban passenger rollingstock

Like urban rail rollingstock, and reflecting historical acquisitions, the composition of the non-urban passenger stock is a function of:

- Traffic levels;
- Service frequency;
- The size of the network and the length of individual lines;
- The range of services on each part of the network (such as offering all stopping, semi-fast, and express services on a given line);
- The average speed of services (with faster operations requiring fewer train sets);
- Electrification, where in place; and
- Modernisation and replacement.

There is a wide range of non-urban rail passenger services in Australia. Thus, rollingstock, designed for individual markets and service types, vary. Table 39 shows the estimated number of operational individual vehicles/cars, by type and operator in July 2024. This includes 1098 cars/carriages in service and 90 locomotives (including those used for shunting duties).

Table 39 Operational non-urban rollingstock, by type and operator, July 2024

	Queensland Rail	NSW TrainLink	V/Line	Transwa
Electric multiple unit cars (no.)	12	425	-	-
Diesel multiple unit cars (no.)	5	65	375	9
Locomotives (no.)	38	19	33	-
Carriages (no.)	90	58	59	-
Total cars/vehicles	**145**	**567**	**467**	**9**

Notes: The V/Line carriages total includes four power vans and one flat wagon. While the number of V/Line locomotives has not declined, their usage is declining as new VLocity sets take over previous locomotive-hauled services. Some of the V/Line locomotives included in this table have been leased to third party freight train operators. The locomotive total also includes four Y Class locomotives that are only used for shunting duties.

Some rollingstock may also be used in urban operations. NSW TrainLink EMUs, for example, are also used as semi-express services when inside the Sydney suburban network.

Transwa's fleet in 2024 had declined by five because of the suspension of the Australind service due to infrastructure upgrade works. New Australind cars will operate when the line re-opens.

The above lists individual vehicles rather than sets.

No data is available for Journey Beyond's trains.

Sources: Data provided by Transport for NSW, Queensland Rail, and Public Transport Victoria; Public Transport Authority WA (2024), p25.

NSW TrainLink uses its EMU fleet for Sydney–Newcastle, Sydney–Lithgow and Sydney–Kiama (via Wollongong) services. Queensland Rail's 12 non-urban EMU cars form the Brisbane–Rockhampton electric Tilt Train sets. Victoria and Western Australia have no EMU non-urban trains. Other medium-distance regional/inter-city services are increasingly DMU operated. Transwa uses DMUs for all its rail services.

The use of traditional locomotive hauled passenger trains in Australia continues to decline. In Victoria, the expanding fleet of VLocity DMU sets has now replaced almost all locomotive hauled trains. Some Queensland Rail long-distance services are still locomotive hauled.

A unique passenger rollingstock is Queensland Rail's electric and diesel tilt train (fixed-formation) sets. The electric tilt trains are used on Brisbane–Rockhampton services, while the diesel tilt trains are used for the Brisbane–Cairns services. While the diesel tilt train is technically locomotive hauled, it differs from traditional locomotive hauled trains by virtue that the power cars (locomotives) are in a fixed format setting as part of a single train set, with one power car at each end of the trains. This arguably gives them the appearance of a DMU train. (BITRE 2014b, p. 60 and pp. 161–162, discusses the nature of the tilt train services and the principles of tilt trains.)

New South Wales TrainLink's XPT sets are of the same fixed format structure as Queensland's diesel tilt trains. The New South Wales Government is replacing the XPT and (DMU) Xplorer and Endeavour fleets. The first trains are expected to enter service in the mid to late 2020s.

Most modern medium and long-distance DMU passenger trains in Australia are capable of and are timetabled in places to travel at speeds of 130-160 km/h. The XPT and tilt trains (both electric and diesel) also operate at these speeds. Such operations are only possible where the infrastructure used can facilitate such speeds.

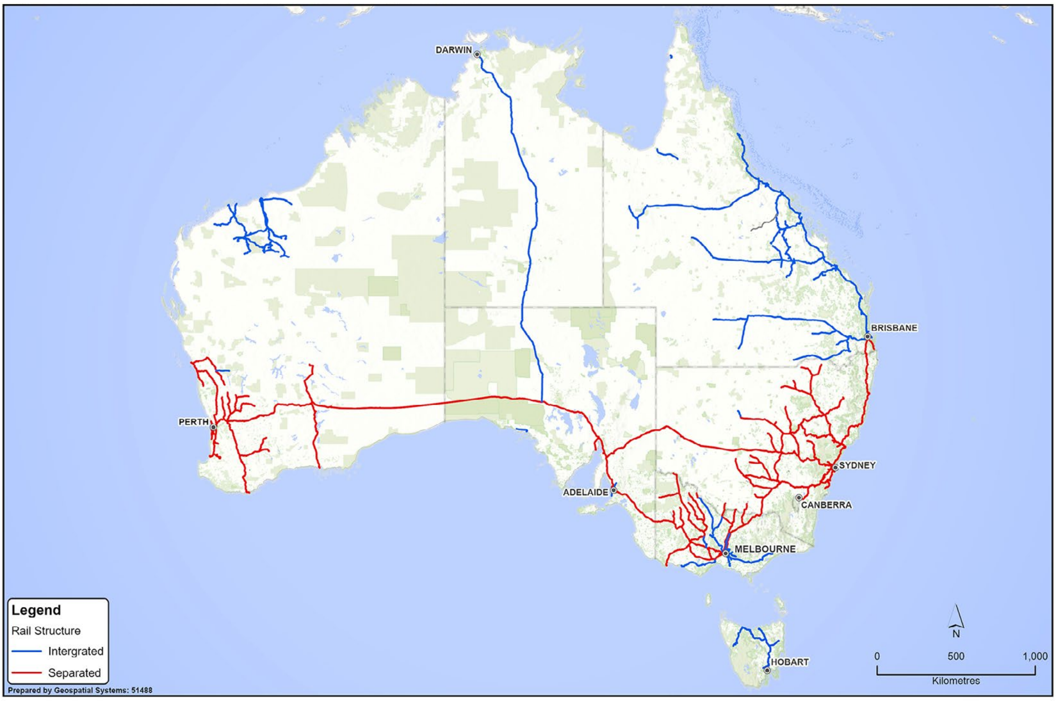
Figure 58 NSW TrainLink XPlorer DMU set

Notes: The image above shows a NSW TrainLink Canberra to Sydney XPlorer DMU set waiting to depart Canberra in October 2024. Photo courtesy of Rodney Avery.

Chapter 7
Industry structure

The Australian rail industry consists of vertically-separated and vertically-integrated railways. In vertically-separated railways, the railway infrastructure manager does not operate revenue earning services. Instead, it sells track access to train operators under an open access regime. In vertically-integrated railways the infrastructure manager both manages the infrastructure and runs revenue earning services on it. Vertically-integrated railway managers may also provide third-party access to (other) train operators, such as in the Central Queensland Coal Network.

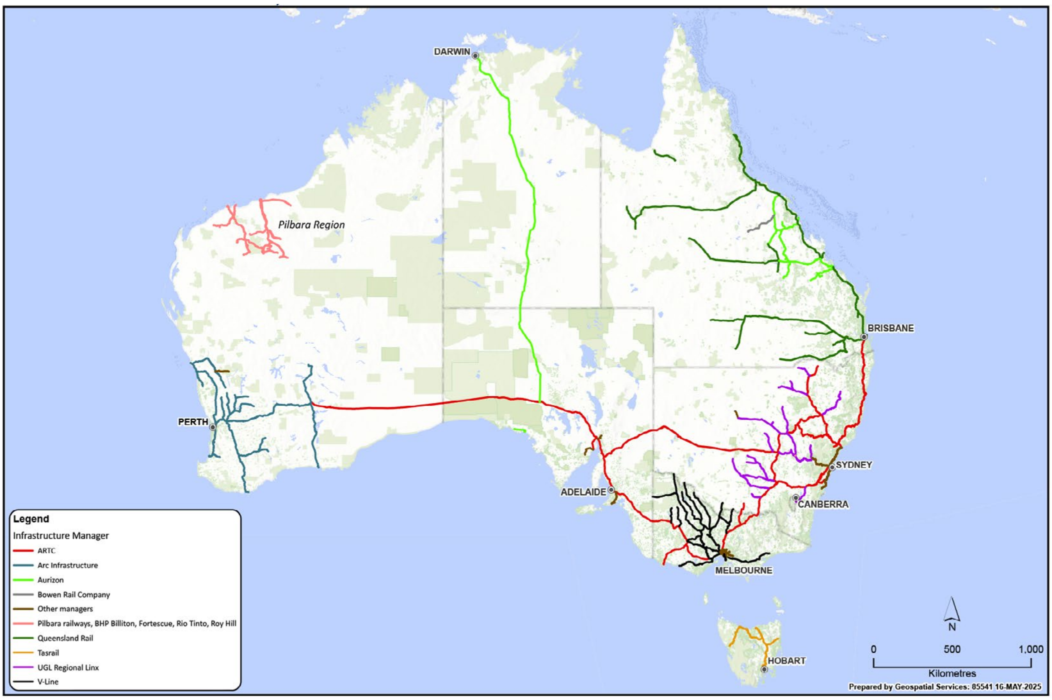
Figure 59 Australian rail industry structure, December 2024



Infrastructure management

Australia's infrastructure managers are diverse in structure and operation. Figure 60 shows Australia's railway system by network manager.

Figure 60 Australian railways, by network manager, December 2024



Note: The BHP Goldsworthy line in the Pilbara is shown but it was mothballed in 2014.

The pattern of the network management is, by traffic type:

- **Interstate.** ARTC manages most of the interstate network. Arc Infrastructure manages the interstate line between Kalgoorlie and Perth. Aurizon owns (long lease) the Tarcoola–Darwin line as a vertically-integrated railway. UGL Regional Linx manages the line between Marrangaroo (Lithgow) and Parkes.
- **Iron ore – Pilbara.** These lines are vertically-integrated operations, with lines owned by BHP, Rio Tinto, Fortescue Metals Group and Roy Hill.
- **Coal.** Coal railways in the Central Queensland Coal Network are vertically-integrated. Aurizon manages most of the infrastructure and operates trains in the network. Aurizon also provides third-party access to the network. In 2022, the Carmichael venture commenced operations in Queensland, using its own 200-kilometre vertically-integrated railway that adjoins Aurizon's network. Coal railways in New South Wales are vertically separated. ARTC manages the Hunter Valley coal network with UGL Regional Linx managing some other New South Wales coal lines.
- **Mixed.** Tasmania's railways are vertically-integrated. TasRail manages the system and operates the trains, hauling a variety of freight types.

- **Grain.** Grain railways are vertically-separated in Queensland (Queensland Rail), New South Wales (ARTC, UGL Regional Linx, Sydney Trains), Victoria (V/Line and ARTC) and Western Australia (Arc Infrastructure). Aurizon operates as a vertically-integrated operator in parts of South Australia.
- **Passenger.** Urban systems are vertically-integrated. Non-urban passenger operations are a mix of vertical-integration and separation.

Table 40 Principal infrastructure managers of Australian heavy railways, December 2024

Infrastructure manager	Structure	Primary usage
Interstate		
Australian Rail Track Corporation (ARTC)	Separated	Intermodal, grain, ores, steel, passenger
Arc Infrastructure	Separated	Intermodal, grain, ores, steel, passenger
Aurizon	Integrated	Intermodal, ores, passenger
UGL Regional Linx	Separated	Intermodal, steel, grain, coal, passenger
Intrastate		
Aurizon (Queensland)	Integrated	Coal
Bravus Mining and Resources/Bowen Rail Company	Integrated	Coal
Queensland Rail	Integrated and Separated	Passenger (integrated), grain, coal, cattle, ores, intermodal (separated)
UGL Regional Linx	Separated	Intermodal, grain, ores, passenger
ARTC (New South Wales regional and Hunter Valley)	Separated	Intermodal, coal, grain, other agricultural produce, passenger
V/Line	Integrated (passenger); Separated (freight)	Passenger, grains, other agricultural produce, quarry products, intermodal
ARTC (Victoria, Maroona-Portland)	Separated	Grain
TasRail	Integrated	Intermodal, coal, ores, timber
Aurizon (South Australia)	Integrated	Grain, gypsum, ores
Arc Infrastructure Rail (Western Australia)	Separated	Grain, ores
BHP	Integrated	Iron ore
Rio Tinto	Integrated	Iron ore
Fortescue Metals Group	Integrated	Iron ore
Roy Hill Holdings	Integrated	Iron ore
MTM (Metro Trains Melbourne)	Separated	Passenger, freight
Sydney Trains	Separated	Passenger, freight
Urban		
Queensland Rail (Brisbane, Gold Coast, Sunshine Coast)	Integrated	Passenger
Airtrain CityLink Limited	Integrated	Passenger
Sydney Trains	Integrated	Passenger
Sydney Metro	Integrated	Passenger
MTM (Metro Trains Melbourne)	Integrated	Passenger
Adelaide Metro	Integrated	Passenger
Transperth	Integrated	Passenger

Above-rail operators

Heavy rail urban passenger operators are vertically-integrated. Most are publicly-owned entities, with the exception of Metro Trains Melbourne, which is a privately-owned joint venture that operates trains and manages the network on behalf of the Victorian Government under a franchise agreement. Non-urban passenger services are government operated except Journey Beyond, which operates the long-distance Ghan, Indian Pacific and Overland trains.

National rail freight operators include Pacific National, SCT Logistics, QUBE Logistics, Aurizon, and Southern Shorthaul Railroad. Regional rail freight operators include Pacific National, SCT Logistics, QUBE Logistics, Aurizon, Southern Shorthaul Railroad, TasRail, and Watco.

Logistics companies – notably SCT Logistics, QUBE Logistics, and Linfox – operate intermodal services for their own logistics chains. They also operate a small number of bulk services. SCT Logistics has a diverse portfolio of rail and road activities. QUBE also has a diverse intermodal and bulk portfolio, with a primary focus on local and regional port-based operations. Fletcher International provides agricultural product rail services from Dubbo to Port Botany in New South Wales. (Other logistics companies, such as Toll, Sadleirs Logistics and Ettamogah Rail Hub, use rail freight operators to undertake their rail haulage.)

Mining companies, Rio Tinto, BHP, Fortescue Metals Group and Roy Hill operate trains on their own railways.

Table 41 Principal above-rail operators, December 2024

Train operator	Infrastructure network used	Primary tasks
Aurizon	Aurizon, Queensland Rail, ARTC, Arc Infrastructure, Sydney Trains	Coal, ores, minerals, cattle, grain, mixed bulk, agricultural produce, intermodal
Pacific National	Aurizon, Queensland Rail, ARTC, V/Line, UGL Regional Linx, Sydney Trains, Arc Infrastructure, Metro Trains Melbourne	Coal, ores, intermodal, steel, grain, mixed bulk
SCT Logistics/Specialised Bulk Rail	ARTC, Arc Infrastructure, Sydney Trains	Intermodal, steel, grain, iron ore
QUBE Holdings	ARTC, V/Line, Sydney Trains, UGL Regional Linx, Metro Trains Melbourne	Intermodal, steel, grain, mixed bulk
Watco	Aurizon, Queensland Rail	Grain, livestock
Southern Shorthaul Railroad	ARTC, Sydney Trains, UGL Regional Linx, V/Line, Metro Trains Melbourne	Coal, grain, intermodal, infrastructure works
TasRail	TasRail	Intermodal, coal, ores, timber
Fletcher International	ARTC, UGL Regional Linx, Sydney Trains	Agricultural produce
Linfox	Queensland Rail	Queensland intrastate intermodal
Rio Tinto	Rio Tinto	Iron ore
BHP	BHP	Iron ore
Fortescue Metals Group	Fortescue Metals Group	Iron ore
Roy Hill Holdings	Roy Hill Holdings	Iron ore
Bowen Rail Company	Bravus Mining and Resources/Bowen Rail Company, Aurizon, Queensland Rail	Coal
Magnetic Rail Group	Aurizon, ARTC, Queensland Rail	Coal
Crawfords Freightlines	ARTC, UGL Regional Linx, Sydney Trains	General freight, agricultural products, forestry products
Queensland Rail	Queensland Rail, AirTrain CityLink Limited	Heavy rail passenger (urban, intercity, and long distance)
NSW TrainLink	Sydney Trains, ARTC, UGL Regional Linx, V/Line, Queensland Rail	Heavy rail passenger (long distance, interstate, intrastate, urban, intercity)
V/Line	V/Line, ARTC, Metro Trains Melbourne	Heavy rail passenger (intercity and non-urban)
Transwa	Transperth, Arc Infrastructure	Heavy rail passenger (non-urban)
Journey Beyond Rail Expeditions	Sydney Trains, UGL Regional Linx, ARTC, Arc Infrastructure, Aurizon, V/Line	Heavy rail passenger (interstate premium tourist oriented)
Sydney Trains	Sydney Trains	Heavy rail passenger (urban
Metro Trains Melbourne	Metro Trains Melbourne	Heavy rail passenger (urban)
Adelaide Metro	Adelaide Metro	Heavy rail passenger
Transperth	Transperth	Heavy rail passenger
GoldLinQ	GoldLinQ	Light rail passenger
Transdev	Transport for NSW	Light rail passenger
Yarra Trams	Yarra Trams	Light rail passenger
Adelaide Metro	Adelaide Metro	Light rail passenger
Canberra Metro	Canberra Metro	Light rail passenger
Newcastle Transport	Newcastle Transport	Light rail passenger
Sydney Metro	Sydney Metro	Fully automated rapid transit passenger

Chapter 8

Safety and environment

Safety

The Office of the National Rail Safety Regulator (ONRSR) has regulatory safety oversight for rail transport operations in Australia[39]. ONRSR reports rail safety related data annually in its Rail Safety Report (ONRSR 2025). In 2023–24, there were 82 rail related fatalities in Australia. This compares to 84 for the previous financial year. Table 42, below, shows details of rail related fatalities for 2023–24[40].

Table 42 Rail related fatalities 2023–24

Person/ train interface	Rail worker level crossing collisions	Rail worker medical episode	Members of public level crossing collisions	Member of public misadventure	Trespasser collisions with trains	Suspected suicide	Total
1	2	1	5	1	6	66	82

Source: ONRSR (2025), p.15.

National rail safety laws oblige rail transport operators to report occurrences. A notifiable occurrence is an accident or incident associated with railway operations that has, or could have, caused significant property damage, serious injury or death. Category A occurrences must be reported immediately. Category B occurrences must be reported within 72 hours of the occurrence[41]. Details of Category A and Category B incidents for 2022–23 and 2023–24 are shown in Table 43 below. There was an approximate 22 per cent increase in Category A occurrences in 2023–24 compared to the previous financial year. According to ONRSR the increase was due to '…a rise in proceed authorities exceeded by trams and a rise in person/ train interface occurrences where a train door was open with the train in motion' (ONRSR 2025, p.10). Category B occurrences declined by approximately six per cent, while serious injuries increased by approximately 87 per cent.

Table 43 Category A and Category B occurrences, fatalities, and serious injuries, 2022–23 and 2023–24

State/Territory	Category A	Category B	Fatalities	Serious Injuries[42]
2022–23	784	5,722	84	78
2023–24	960	5,371	82	89

Source: ONRSR (2025), pp. 10–11; ONRSR (2023), p.16.

39 Each Australian state and territory has legislated nationally consistent rail safety law, which ONRSR administers.

40 Details for the previous financial year are not shown because ONRSR has changed the categorization of how it reports rail related fatalities. The 2023–24 figures are also not itemized by state/territory, unlike the previous financial year. Details for 2023–24 are thus not comparable to the previous financial year.

41 For definitions of what constitutes a Category A and Category B event see ONRSR (2022), p.7.

42 For the definitions of serious injury, see ONRSR (2024), pp.17–18. The definition for such occurrences affecting railway workers differs to that affecting members of the public.

Environmental performance

The measurement of the rail industry's emissions is complicated by the need to allocate upstream emissions from power generation sources to downstream energy uses, such as powering electric trains. Emissions data are therefore an approximation and subject to revision.

Changing requirements, such as higher performance and, for passenger rail, air-conditioning and on-board electronics, may increase emissions intensity. Table 44, below, shows BITRE's revised estimate of full fuel cycle carbon dioxide equivalent emissions estimate by transport mode[43].

According to the latest estimate, rail transport's estimated emissions in 2023–24 grew by less than one per cent. Road vehicle's estimated emissions grew by almost two percent, while domestic maritime transport's emissions decreased by approximately 4.5 per cent. Overall, total estimated emissions grew by approximately 1.5 per cent. Figure 61, below, expresses the emissions by each transport mode shown in Table 44 as a percentage of total emissions. On average, rail transport has been the source of approximately five per cent of total emissions over the 10-year period until 2023–24, while road vehicles have been the source of approximately 84 per cent of emissions.

Table 44 Transport full fuel cycle greenhouse gas (carbon dioxide equivalent) emissions, including recreational vehicles, by transport mode

	gigagrams of CO_2 equivalent				
Financial year	**Road vehicles[44]**	**Rail (all)**	**Domestic maritime**	**Domestic aviation**	**Total**
2013–14	100,636	5,898	2,956	11,289	120,779
2014–15	101,174	6,149	3,006	11,286	121,616
2015–16	102,821	6,346	3,101	11,474	123,741
2016–17	103,974	6,474	3,108	11,555	125,111
2017–18	105,422	6,600	3,158	11,708	126,887
2018–19	105,674	6,605	3,112	11,116	126,507
2019–20	101,545	6,519	3,016	8,722	119,802
2020–21	102,385	6,662	2,860	5,955	117,862
2021–22	101,439	6,520	2,954	7,609	118,522
2022–23	106,352	6,465	3,163	11,784	127,765
2023–24	108,410	6,484	3,020	11,831	129,745
Change (2022–23 to 2023–24)	+1.93%	+0.29%	-4.52%	+0.40%	+1.55%

Notes: Updated Global Warming Potentials have been used in this estimate, slightly altering previously estimated levels.

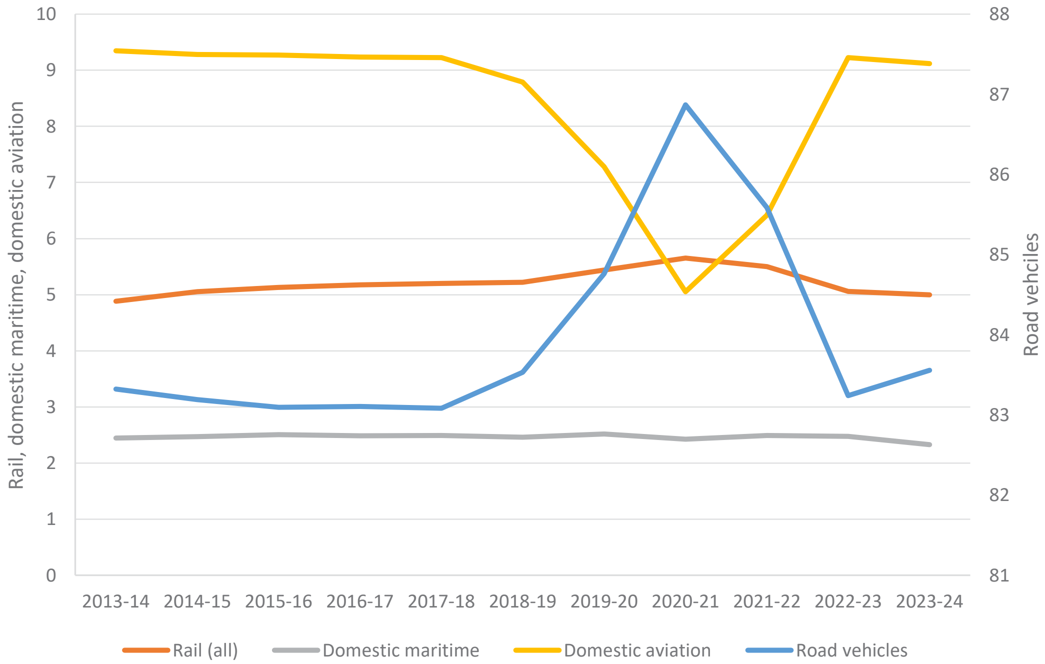
The carbon dioxide equivalent values include the effects of carbon dioxide, methane, and nitrous oxide emissions.

Source: BITRE (2025), Table 11.9.

43 BITRE (2025), shows full estimates dating back to 1974–75.

44 Includes off-road vehicles such as trail bikes.

Figure 61 Percentage of greenhouse gas emissions by transport mode – full fuel cycle



Source: Derived from BITRE (2025), Table 11.9.

Chapter 9

Case study: Rollingstock manufacturing in Victoria

Greater onshore manufacturing of rollingstock and rail transport components – both for local requirements and export – is a current government priority, at both the Commonwealth and state government levels[45].

This case study examines the current, recent, and impending manufacturing of passenger heavy and light rail rollingstock in Victoria as procured by the Victorian Government. This includes fleets delivered by Alstom (including the former Bombardier, which it acquired in 2021); and Downer Rail and Transit Systems (as part of the 'Evolution Rail' consortium).

Alstom

The French multinational corporation Alstom has been in the Australian infrastructure sector for over 100 years (via predecessors). It employs approximately 2,500 people across more than 25 sites in Australia, including manufacturing facilities, engineering centres, project delivery offices, and maintenance depots and workshops.

In Victoria, these sites are delivering:

- Manufacturing and assembly of VLocity DMU sets for use across the V/Line regional network;
- Manufacturing and assembly of new X'Trapolis 2.0[46] EMU sets for use on the Metro Trains Melbourne urban heavy rail network;
- Manufacturing, assembly, and maintenance of G Class light rail vehicles, for use on the Yarra Trams network[47]; and
- Maintenance of the entire V/Line fleet under a new ten-year contract that commenced in 2024.

Alstom manufactures heavy and light rail vehicles in Victoria at its Dandenong South and Ballarat facilities.

Alstom purchased Bombardier's global rail division in 2021. Bombardier's Dandenong South site and the wider Bombardier Transportation Australia business unit were transferred to Alstom after the acquisition.

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45 At the Commonwealth Government level, the Office of National Rail Industry Coordination (ONRIC) within the Department of Industry, Science and Resources is the lead agency for this priority. For a background overview, and details of the associated National Rail Manufacturing Plan and the National Rail Procurement and Manufacturing Strategy, see Department of Industry, Science and Resources (2024).

46 Alstom also built and currently maintains the X'Trapolis 100 EMU sets used on the Metro Trains Melbourne network. These sets progressively entered service from 2002 to 2020. As production of these sets was completed in 2020, they lay outside the scope of this case study.

47 Metro Trains Melbourne and Yarra Trams are brand/organisation names owned by the state, run by private operators who provide rail transport services in Melbourne as franchise operations. They operate and maintain rollingstock owned by the Victorian Government.

VLocity

The first VLocity sets, designed to run at up to 160 kilometres per hour, entered service in 2005, predominantly for use on the newly built Regional Fast Rail Network. All production of the VLocity sets has been at the Dandenong South facility, first by Bombardier, then Alstom, which has continued after the global acquisition.

As of 2024, VLocities remain in production, but their role has expanded. This includes replacing locomotive hauled sets throughout the state and a series of six standard gauge trainsets designed specifically for use on the Melbourne–Albury line.

In July 2024, 354 VLocity cars were in service, all operating in three-car sets (frequently combined into six-car consists, with selected services on the busiest corridors operating with nine-car consists and serving stations with longer platforms).

Alstom is manufacturing 69 cars (23 three-car sets) in the last extension option of its current contract with the Victorian Government. This will provide for a total fleet of 423 cars (141 sets) in service.

Throughout the VLocity project, the Victorian Government has supported delivery of incremental improvements to the VLocity fleet. This includes:

- New braking technologies;
- Power-train refinement;
- Auxiliary power supply system efficiencies;
- Enhanced cab aesthetics;
- Crashworthiness and vehicle weight improvements; and
- Passenger experience improvements, including seating changes, CCTV, and an increased fitment of tray tables at each seat on sets delivered since 2019.

By value, over 60 per cent of the VLocity build is local content.

Figure 62 In production VLocity sets at Dandenong South

Note: The image above shows three VLocity trains undergoing final fit-out and static testing at Alstom's Dandenong South facility. Photo courtesy of Rodney Avery.

X'Trapolis 2.0

In early 2024, Alstom began production of 25 6-car X'Trapolis 2.0 EMU sets, which will replace the longest-serving Comeng EMU sets on the Metro Trains Melbourne network. The first set was completed in late 2024 and transported to Melbourne. This will be tested extensively throughout 2025 and will enter passenger service once this process is complete. Alstom assembles the X'Trapolis 2.0 sets at its Ballarat site in regional Victoria.

Alstom previously used the Ballarat site to assemble much of Melbourne's X'Trapolis 100 series fleet. In preparation for the production of the X'Trapolis 2.0 sets, significant investments were made to upgrade the site to meet the latest safety and production requirements.

According to the Victorian Government, the X'Trapolis 2.0 sets will have the following new features and innovations:

- Space for about 1,225 passengers;
- Wider doors to make boarding and alighting easier, helping maintain on-time running;
- Advanced air suspension systems, enabling a smoother ride;
- Advanced passenger information systems that provide more journey details in real-time;
- A more energy-efficient design configured for Melbourne's rail network;
- New interior designs to improve accessibility for passengers with hearing, vision, and mobility impairments, including 20 wheelchair spaces;
- More mobility spaces;
- Semi-automated boarding ramps;
- Hearing loops;
- A continuous walkway throughout each six-car train set;
- Clearer, more informative passenger displays; and
- Designated 'mixed-use' onboard spaces for bicycle and pram storage, and dedicated wheelchair spaces (Victorian Government 2024).

Alstom's contract with the Victorian Government requires 60 percent local content by value. Body shell panels and some components are being fabricated at Dandenong, supported by components from various Australian and overseas suppliers. Many local suppliers have been engaged to provide components for the train sets, including bogies, glazing, electrics, pantographs, seats, and grab poles.

Alstom and the Victorian Department of Transport and Planning held passenger, accessibility, technical, operational and safety engagement sessions on a life-sized mock-up of the train set. The project considered stakeholder feedback, which has led to various design improvements, including additional hanging straps, improvements to the wheelchair ramp design, bike storage space refinement, and adjustments to the driver's cab to improve driver experience.

Figure 63 X'Trapolis 2.0 at Ballarat

Note: The image above shows a brand new blue X'Trapolis 2.0 train at the Ballarat Alstom Workshops. Photo courtesy of Lachlan Smith / Victorian Department of Transport and Planning.

E Class light rail vehicles

In July 2024, Melbourne had 100 E Class light rail vehicles in service. All were built at the Dandenong South facility, then operated by Bombardier. They first entered service in mid-2013. The 100th vehicle was completed in 2021, at the conclusion of its contract with the Victorian Government.

The E Class vehicle was adjusted for Melbourne's specific network requirements. As the world's largest and one of the longest continually operating tram networks, Melbourne has a mix of legacy and modern track geometry, from tight curves through inner city streets set in mass concrete, to converted heavy rail and modern light rail vehicle-standard lines.

The E Class vehicles are based on the Flexity Swift light rail vehicle design, with several customisations to meet local needs and conditions. This includes using a swivelling bogie design (FLEXX Urban 3000) with a conventional solid axle, providing more robust running characteristics than previous Melbourne low-floor trams that used stub axles.

The Victorian Government ordered the fleet of 100 vehicles through the implementation of various contract options, with several iterative improvements made to the fleet from the 51st vehicle onwards. This included revising the cab design to improve driver visibility and changing the configuration of passenger handholds and handrails.

The interior changes were later rolled out across the entire fleet. At the same time, the modular cab units on the first 50 vehicles are gradually being replaced with the updated "E2" cab design as and when they require replacement.

The Victorian Government has also used the lessons learnt from the E Class project to inform the comprehensive contract requirements for the G Class project.

G Class light rail vehicles

Following delivery of the final E Class vehicles, and after a competitive tender process, in April 2022 the Victorian Government awarded Alstom a contract to design, build, and maintain 100 next-generation G Class light rail vehicles.

Manufacturing is underway at Dandenong South. The first trams are expected to arrive for testing on the network in 2025, and once that process is complete, they will enter passenger service.

Similar to the process followed for the X'Trapolis 2.0 train design, Alstom and the Victorian Department of Transport and Planning held more than 100 engagement sessions with almost 900 accessibility, passenger, driver, and technical stakeholders using a life-sized mock-up of the proposed G Class vehicle.

This helped ensure that the final design specifically meets Melbourne's needs and the state's comprehensive requirements. The G Class vehicles will have the following features:

- Up to double the capacity of Melbourne's existing high-floor trams, with space for up to 150 passengers;
- Improved accessibility for people with disabilities or mobility aids, as well as those travelling with prams;
- Onboard energy storage to limit current draw at peak times and reduce power use. This will reduce network costs and the need for expensive infrastructure upgrades, such as new or upgraded substations. The G Class vehicles are expected to use 30–40 per cent less energy per passenger compared to an E Class vehicle, by using onboard energy storage technology and regenerative braking; and
- Modern cooling and heating to improve passenger comfort (Victorian Government 2024a).

Alstom's contract with the Victorian Government requires a 65 per cent local content, the highest for any modern rollingstock project in Victoria. The contract also provides opportunities for the local supply chain for specific components, including glazing, upholstery, and internal body components (such as seat shells).

Some foreign-sourced components include traction equipment, the control system, and specialised subsystems like passenger information displays. The contract also supports research and development opportunities and partnerships with local research institutions.

In implementing its heavy and light rail vehicle manufacturing at Dandenong South and Ballarat, Alstom employs people in its local communities, supported by its global network of offices and experts. Alstom also has intern and apprenticeship programs to develop its local talent pipeline and uses local subcontractors when required. Alstom uses skilled employment categories, including electrical fitters, fitters and turners, coach fitters, electricians, welders/ boiler makers, and a variety of engineers, project managers, and production specialists.

Figure 64 Mock-up G Class light rail vehicle

Note: The image above shows the evaluation mock-up for the new next-generation Melbourne G Class tram in 2023. Photo courtesy of Adam Chandler/Victorian Department of Transport and Planning.

Evolution Rail

Evolution Rail built the HCMT heavy rail passenger vehicles, under contract to the Victorian Government.

Evolution Rail is a consortium comprising Downer, CRRC Changchun, and Plenary.

The Victorian Government ordered the HCMT sets to serve the Pakenham, Cranbourne, and Sunbury lines, and as part of the Melbourne Metro Tunnel project[48]. The Victorian Government initially ordered 65 sets, with five additional sets subsequently ordered. Construction and ongoing maintenance of the 65 sets cost $2.3 billion, and the five additional sets cost $123 million.

Production of the HCMT sets began in early 2018, and the 70th set was made available for passenger services in mid-2024. The first sets entered service in December 2020, operating on the Pakenham line. Services later expanded to the Cranbourne line as more sets became available, and selected services are now also operated on the Sunbury line. When the Metro Tunnel opens, trains will be through-routed from the Sunbury to Pakenham and Cranbourne lines in both directions via the project's five new stations and twin 9-kilometre tunnels.

The sets were manufactured at the special-purpose facility established by Evolution Rail for the project in the Newport Workshops. This production line assembled the trains from body shells, sub-assemblies, and other components, unifying elements sourced from overseas and the local supply chain into the finished vehicles.

At Newport, the carriages in each set passed through eight static build stations and three test stations before being coupled together. The completed sets were then sent to the dedicated HCMT Pakenham East Depot in Melbourne's outer southeast for static testing, test track dynamic testing, and mainline dynamic testing. The sets then underwent inspections by the independent reviewer (Mott MacDonald) prior to provisional acceptance into revenue service. Approximately 65 per cent of content used for assembly at Newport is locally sourced.

The baseline configuration for the HCMT train sets is seven cars. Melbourne's urban heavy rail train sets typically consist of three cars, often combined into six-car sets. The Victorian Government chose the seven-car configuration for the HCMT sets as part of the Metro Tunnel project (which is being built to accommodate the seven-car sets) and the desire to increase capacity on the Pakenham/Cranbourne and Sunbury corridors, which are two of the busiest and fastest growing corridors in Melbourne.

Completed seven-car sets have the following features:

- 20 per cent more capacity than previous Melbourne train fleets;
- 28 allocated spaces for wheelchairs and other mobility devices (14 allocated spaces in each direction of travel);
- Priority seating throughout the train sets, located close to doorways and windows;
- Improved real-time information through dynamic route maps and passenger information displays;
- Multiple types of grab handles;
- Clearance under seats for assistance animals/guide dogs;
- External inter-car gap barriers to prevent passengers from falling between carriages when boarding;
- An easy-to-use passenger intercom system;
- Internal and external cameras providing CCTV to the driver's desk, for greater passenger safety;

48 For more information on the Metro Tunnel project, see Victoria's Big Build (2024).

- New high capacity signalling;
- A careful selection of materials and fabrics to minimise graffiti;
- Selective door control[49];
- Stopping aid cameras;
- Semi-automatic wheelchair ramps; and
- Proven cleaning systems and processes.

According to Evolution Rail, many elements associated with the HCMT's suspension and electronics are optimised for the dynamics of the Melbourne metropolitan rail network which is a complex, historical network with a variable mix of track configuration and signalling.

As part of the HCMT project, Evolution Rail consortium partner Downer also constructed a 118-hectare train maintenance facility at Pakenham East, which is now operational and will be used for ongoing maintenance, testing, and support for the fleet's life. In addition to providing train maintenance, the facility has:

- A stabling yard for 30 train sets (which can also be used for other Melbourne train types);
- An underfloor wheel lathe;
- Bio and graffiti cleaning;
- A test track; and
- A train washing facility.

A light maintenance facility at Calder Park is currently under construction. The facility will be a two-road facility for light maintenance and cleaning. All major maintenance will continue to be done at Pakenham East.

The HCMT project supported 1,100 jobs and an investment of $800 million into the Victorian supply chain. At Newport, the skilled workforce included mechanical and electrical trades and trades assistants, many of whom previously worked in the automotive and aerospace industries (which experienced downturns during various stages of the project). At least 15 per cent of the workforce were apprentices, cadets, and trainees.

Figure 65 HCMT train

Note: The image above shows a Melbourne HCMT at the Pakenham East Depot in 2023. Photo courtesy of Adam Chandler/Victorian Department of Transport and Planning.

49 The HCMTs are able to prevent selected doors from opening when at a platform when the driver has pressed the door release button. This may be: where the train detects particular train door/s are not aligned with a platform area (short platform); or – when the Metro Tunnel opens – if the platform screen door (paired with a specific train door) is not in service.

Appendix A

Urban heavy rail networks – December 2024

Figure 66 **Adelaide urban heavy rail network**

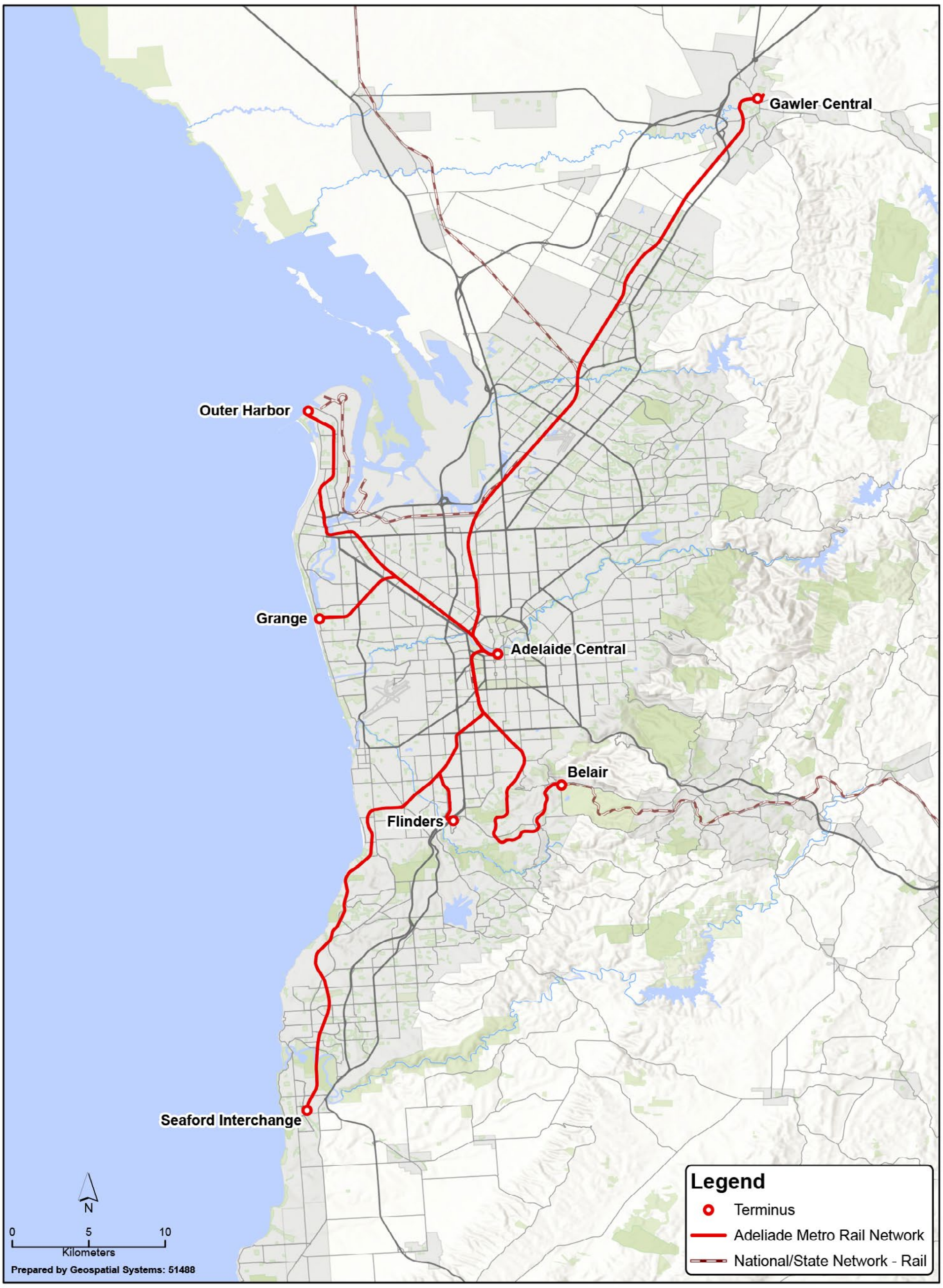


Figure 67 Brisbane urban heavy rail network

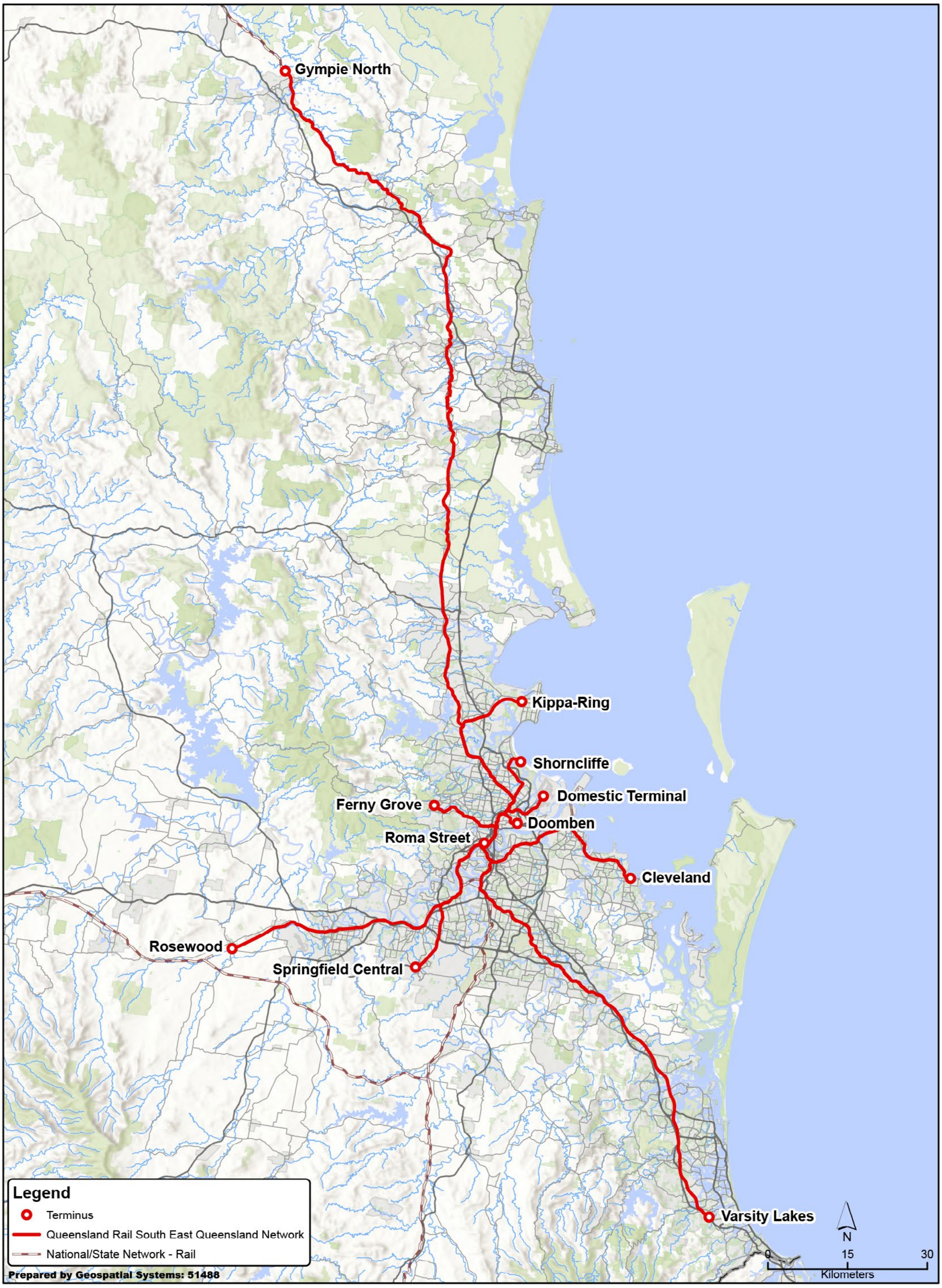


Figure 68 Melbourne urban heavy rail network

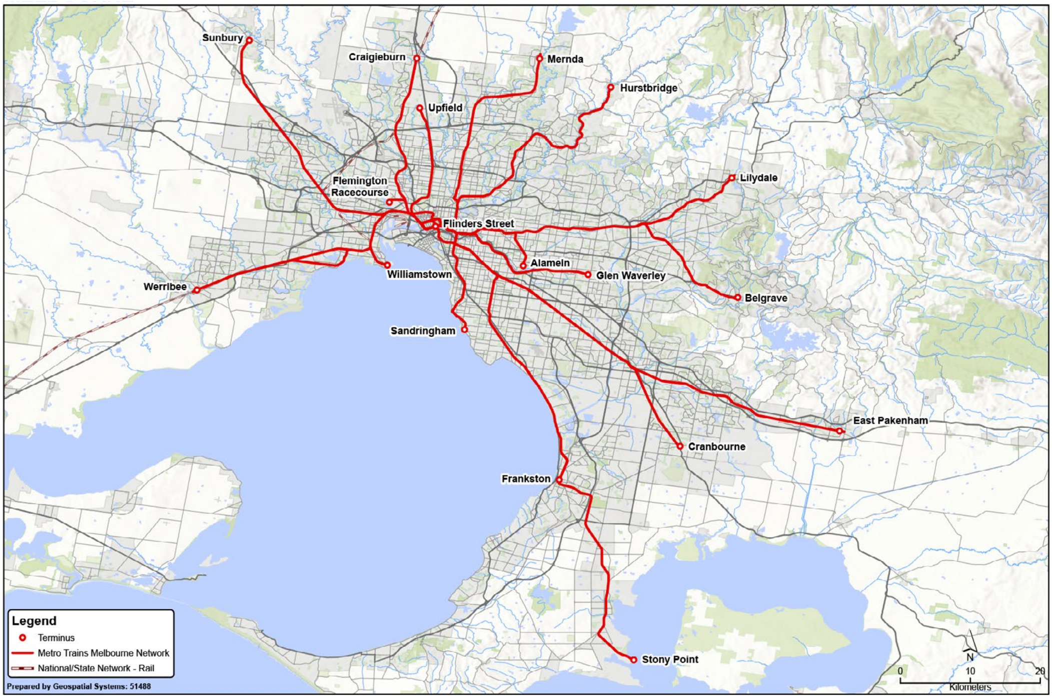


Figure 69 Perth urban heavy rail network

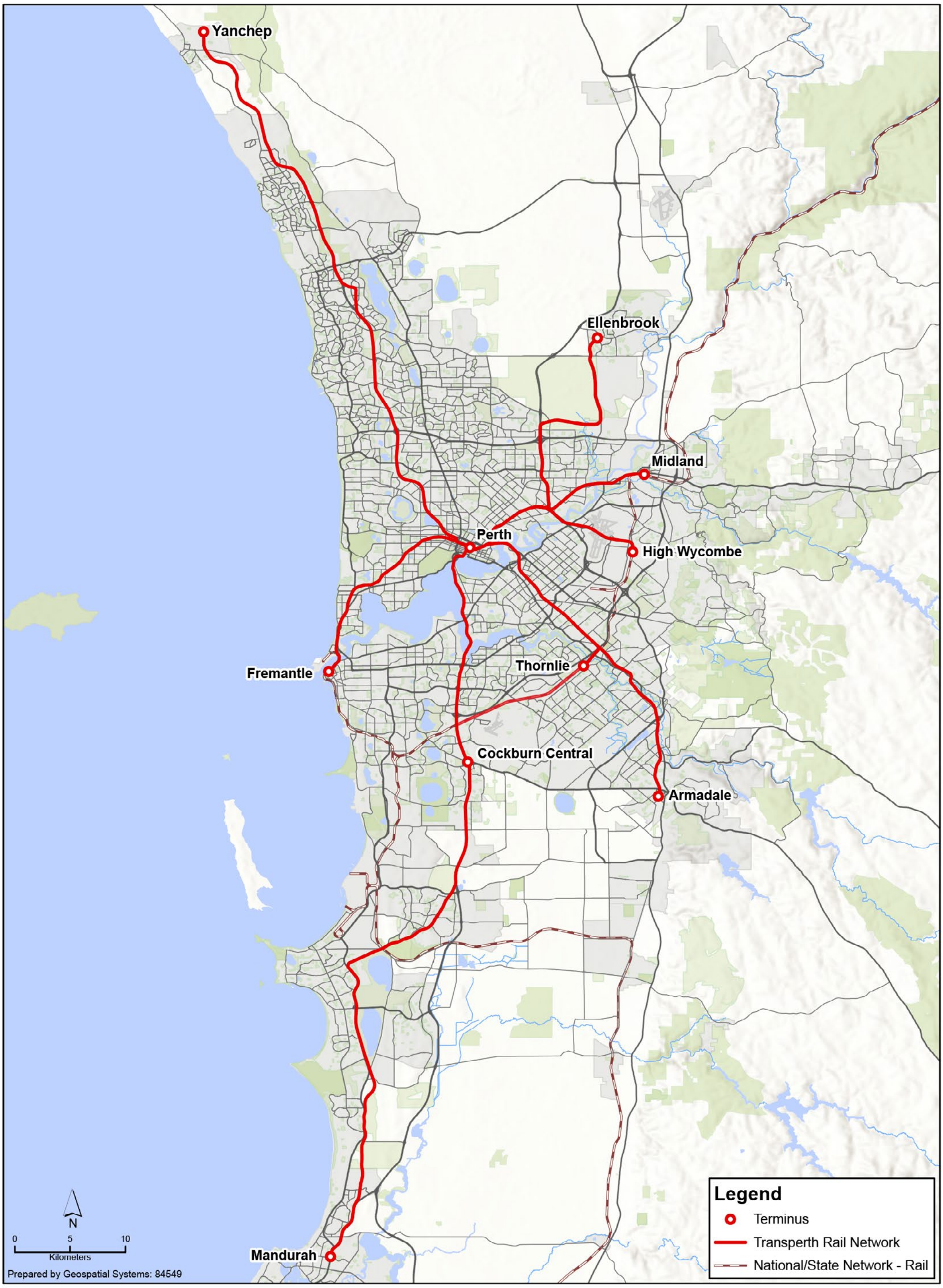
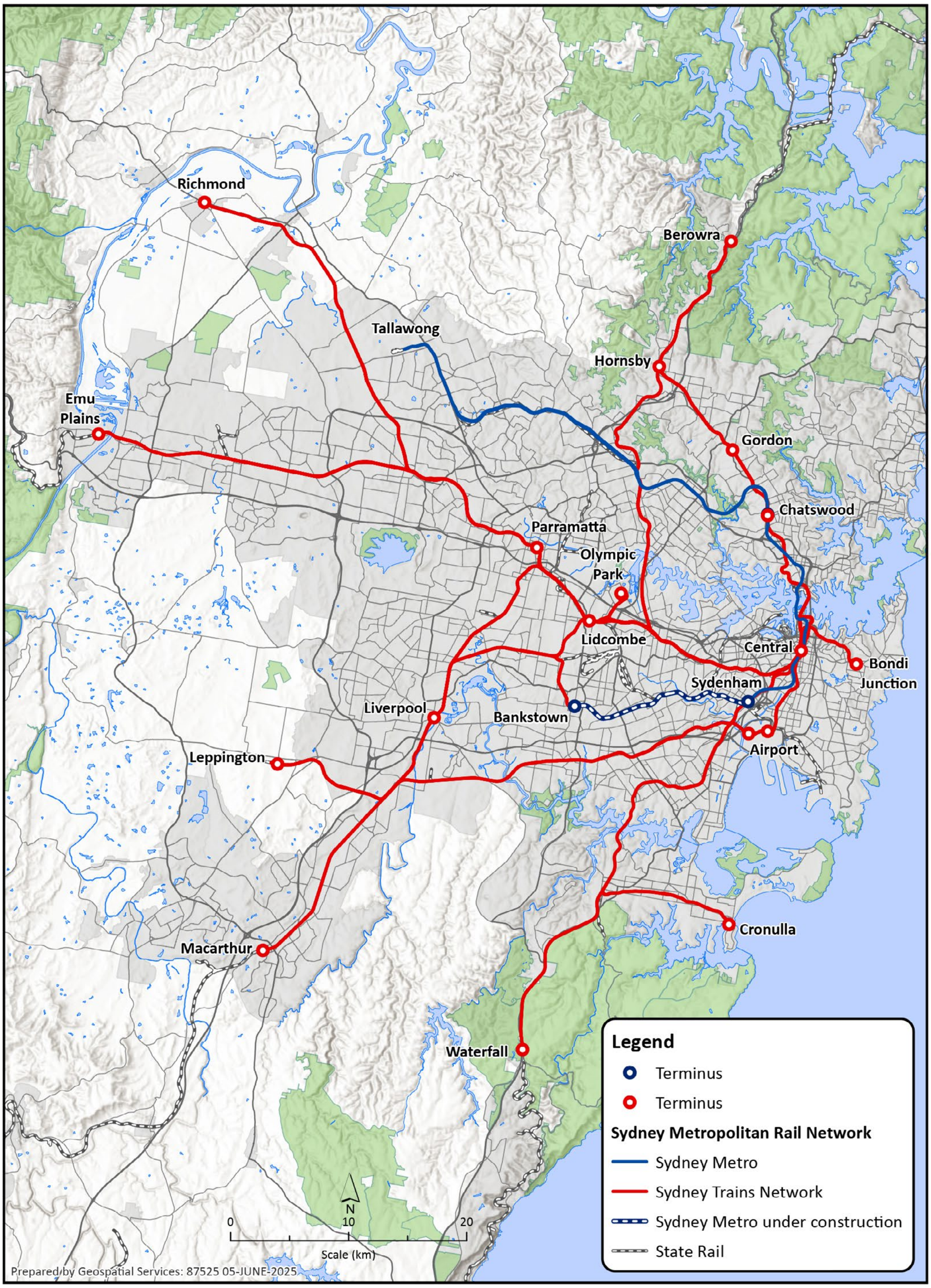


Figure 70 **Sydney urban heavy rail network**



Appendix B

Light rail networks – December 2024

Figure 71 Adelaide light rail network

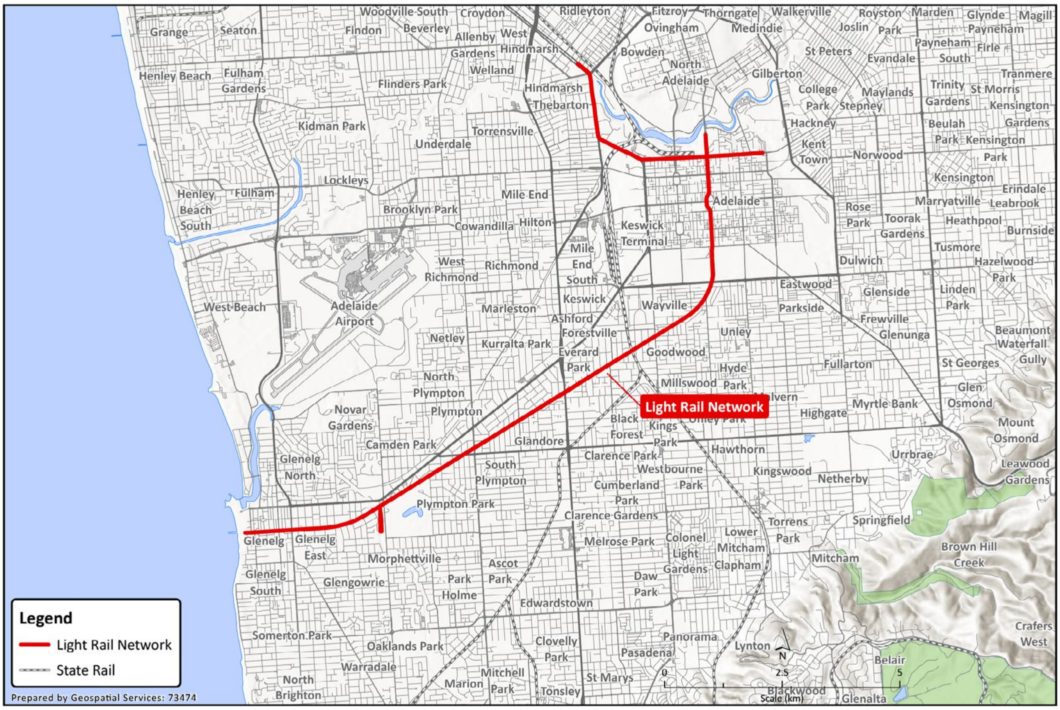


Figure 72 Canberra light rail network

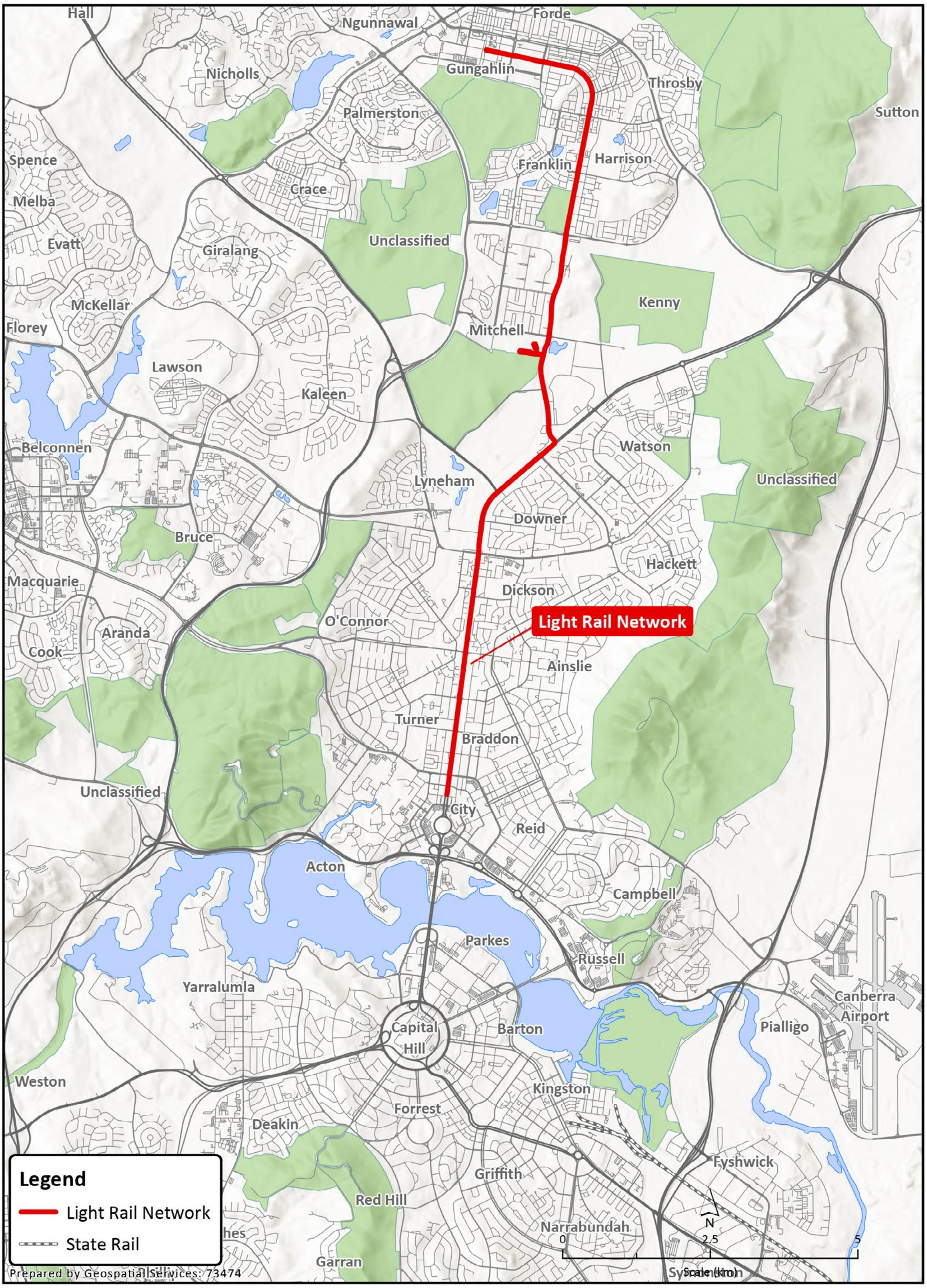


Figure 73 Gold Coast light rail network

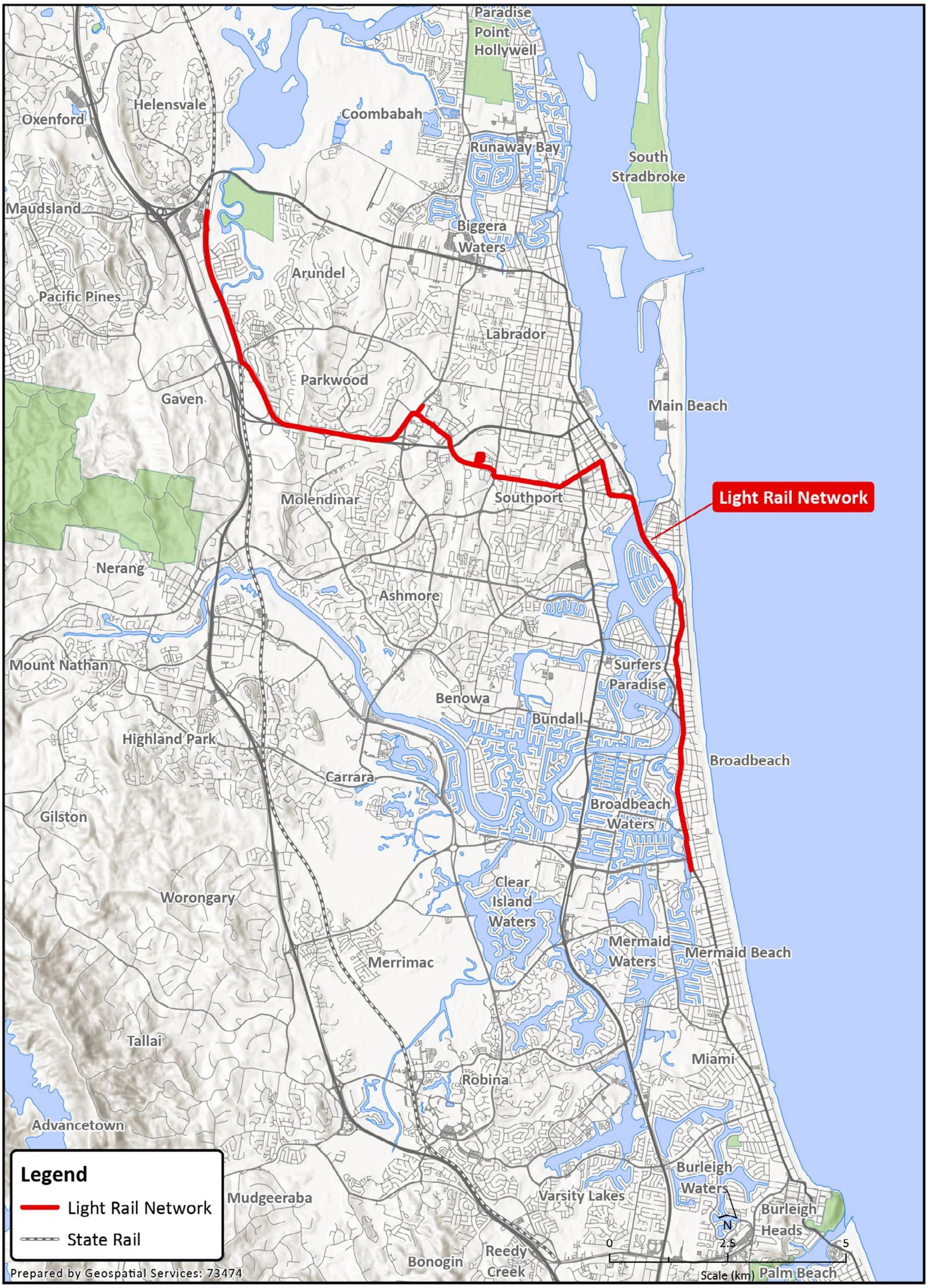


Figure 74 Melbourne light rail network

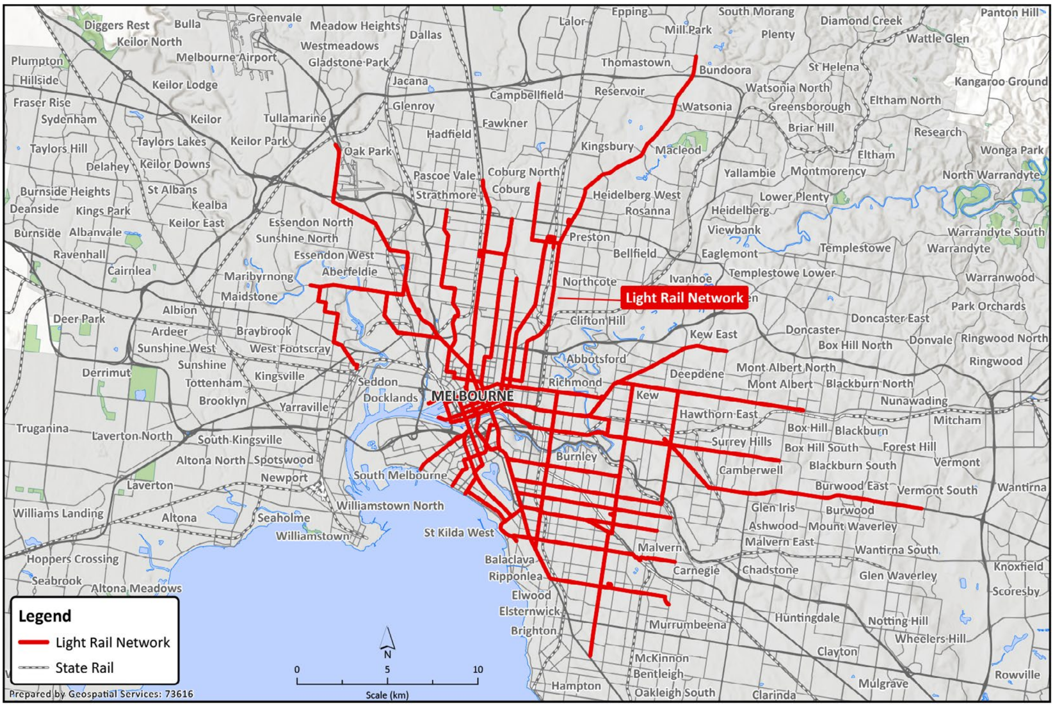
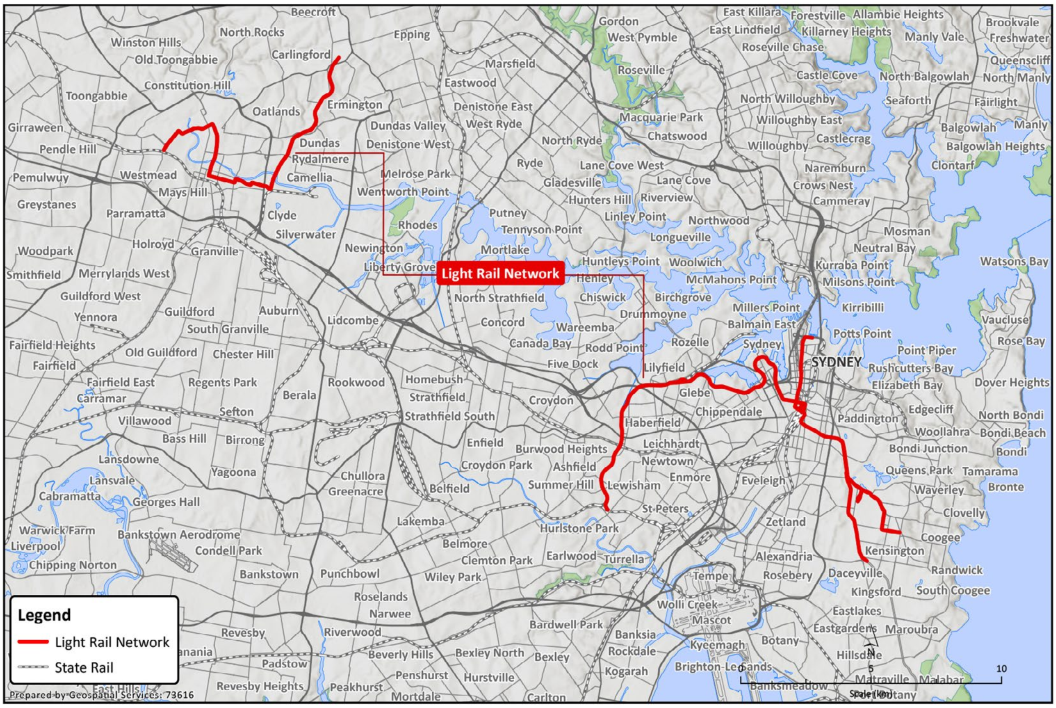


Figure 75 Newcastle light rail network

Figure 76 Sydney light rail network



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