

Roads

Review outcomes

- The following changes were made to the assessment.
 - Regional costs will use the Rawlinsons national construction cost gradient because the drivers of road maintenance costs are more related to construction costs than to service delivery. It will be applied with a 25% discount (as the general regional cost gradient was previously).
 - The split between urban and rural traffic and heavy vehicle use will be held constant until the next methodology review. This is due to the discontinuation of the ABS Survey of Motor Vehicle Use.
 - A low (12.5%) discount will be applied across the assessment. This is due to uncertainty with the use of proxy data for rural road length, the discontinuation of the Survey of Motor Vehicle Use (and hence the ageing of the data being used), and uncertainty surrounding the National Transport Commission's estimates of the relative importance of road length, heavy and light vehicle traffic as drivers of expense needs.
- The Commission considered but did not change the following.
 - The rural road network will continue to include routes to mines, gas wells, ports and national parks, as there was insufficient evidence to remove them.
 - Traffic volume and heavy vehicle use data will continue to be sourced from the Bureau of Infrastructure and Transport Research Economics and the National Transport Commission. These agencies remain the leading authorities for this data.
 - The population in urban centres of over 40,000 people will continue to be used as a proxy for the length of urban roads.
 - Bridges and tunnel lengths will continue to be assessed using state data, updated once during the review period. Culvert and floodway crossing lengths will not be included in the bridges and tunnels assessment.
 - Additional cost drivers will not be included in the urban roads assessment due to the lack of comparable data.
 - Additional drivers will not be added to reflect the impact of soil type and climate on road maintenance and capital costs due to the lack of comparable data.
- The Commission will investigate the suitability of the National Service Level Standards for Roads data when they become available, with a view to using them in the next methodology review.

Introduction

- 1 On 6 July 2024, the Commission published the [Draft Report](#) for the 2025 Methodology Review.
- 2 The Draft Report included a detailed analysis and response to issues raised by states and territories (states) in their [submissions](#) on the Commission's [consultation paper](#).
- 3 State submissions on the Draft Report can be viewed [here](#).
- 4 The decision to include roads to mines, gas wells, ports and national parks was made after the release of the Draft Report. The Commission's consideration of these issues can be viewed in [Significant changes since the Draft Report](#).
- 5 This chapter includes:
 - an overview of the issues considered throughout the review
 - the Commission's response and decision on each issue
 - GST impacts of method changes.
- 6 A description of the assessment method, incorporating changes made in the 2025 Review, can be found in the roads chapter of the *Commission's Assessment Methodology*.

Issues considered

Rural road length

- 7 In the 2020 Review, the Commission developed a synthetic road network as a proxy for roads that are typically state roads. These included:
 - the quickest road distance between adjacent towns of at least 1,000 people¹
 - 2 roads between towns of 200 to 999 people to the nearest 2 towns
 - roads from major mines, gas wells, ports and national parks to the network.
- 8 Since the 2020 Review, some towns have grown above the 1,000 population threshold, or fallen below it, and some mines, gas wells, ports and national parks have closed while others have opened. New South Wales observed that the synthetic rural road network was not always reflective of travel patterns on rural roads, and some routes were out of date.
- 9 The Commission considered whether to exclude routes to mines, gas wells, ports and national parks, as they complicated the model and some mining roads are

¹ Note that in the Commission's [consultation paper](#) and [Draft Report](#), this route was described as forming the shortest distance between towns, but should have been described as using the quickest assessed route. The routing mechanism allocated all minor roads such as access, local and collector roads to have an assessed speed limit of 80 kilometres per hour and used actual speed limits for national roads and highways to calculate the quickest assessed driving route.

owned and maintained by the private sector. Removing these routes would have reduced the rural road network by 43,000 lane kilometres, or 13%.

State views

- 10 Some states supported removing routes to mines, gas wells, ports and national parks. New South Wales said these routes are often the responsibility of the private sector or local governments, and roads to national parks are also often maintained at a lower standard to other state roads. It also identified several examples of routes it considered to be incorrect, such as using a sub-optimal route or not terminating at the correct junction. It estimated around 5,000 lane kilometres were affected (1.5% of the 2020 Review rural road network).
- 11 Queensland, Western Australia and South Australia disagreed with removing all routes to mines, gas wells, ports and national parks. Queensland said its routes to national parks were maintained at a similar standard to intra-urban state-type roads. Queensland also recommended including routes to all protected areas such as Indigenous Protected Areas, state forests and nature refuges. It preferred all routes within these areas and within national parks to be included in the network.
- 12 Western Australia said there was not sufficient evidence that roads to national parks were maintained at a lower standard and did not support removing roads to mines without sufficient information on their private ownership. It also raised issues with the expenses allocated to road length, discussed further in the section Using National Transport Commission data to apportion expenses.
- 13 States expressed differing views on when the rural road network should be comprehensively updated, with some states preferring the network to be updated when National Service Standards for Roads data become available, and some states preferring to wait until the next methodology review at the earliest.

Commission response

- 14 Of the routes to mines, gas wells, ports and national parks in the synthetic rural road network, 52% are sealed, which is less than the 83% of sealed rural roads between towns (Table 1).

Table 1 Proportion of sealed roads on the rural road network

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Total
	%	%	%	%	%	%	%	%	%
Roads to mines, gas wells, ports and national parks	40	61	76	36	27	44	69	32	52
Rural roads between towns	86	92	95	76	79	91	98	45	83

Source: Commonwealth Grants Commission, 2020 Review method for the synthetic rural road network and Geoscience Australia, [National Roads](#) [ESRI ARC geodatabase file format], Digital Atlas website, 2023, accessed 27 July 2023.

- 15 In proposing the removal of roads to mines, gas wells, ports and national parks, the Commission noted the potential to simplify the model, given the prospect of the

private sector contributing to the costs of maintaining these roads and the lower likelihood of them being sealed.

- 16 However, more than half of these roads are sealed. The Commission does not have information on the private funding of roads to mines, gas wells, ports and national parks.
- 17 On balance, the Commission decided to retain the routes to mines, gas wells, ports and national parks in the rural roads assessment as there was insufficient evidence to remove them.
- 18 This assessment uses a proxy measure for the length of road each state requires (regardless of whether roads to mines, gas wells, ports and national parks are included). Data from the National Service Level Standards, when available, may provide a better reflection of the actual length required.

Commission decision

- 19 The Commission will retain the 2020 Review method for the synthetic rural road network, including routes to mines, gas wells, ports and national parks.
- 20 The Commission will investigate the suitability of the National Service Level Standards for Roads data when they become available, with a view to using them in the next methodology review.

Urban road length

- 21 The urban roads assessment treats all large urban centres as having the same per capita needs for urban roads. The Commission found some evidence that road length per capita declined with increasing population size for the capital cities, but this relationship was not evident among the other cities.

State views

- 22 Some states supported using population as the driver for urban road length. Although the ACT supported the proposed assessment if no alternative was available, it also supported allowing for higher road lengths in smaller capital cities due to different levels of dispersion in small capitals compared to similarly sized non-capitals. New South Wales supported the proposed assessment using population but considered that other geographical factors such as topography also affected costs.
- 23 Most states did not support using urban populations as a proxy for road length in urban areas. They said there is a strong inverse relationship between population density and road length in capital cities, mirroring the relationship the Commission relies upon in its transport assessment. They said that this makes conceptual sense as larger public transport provision reduces the need for road length.

- 24 South Australia presented findings from international literature and an analysis of Commission data to argue that population-weighted density increases public transport needs and decreases road length by comparable amounts. Although the relationship between population density and road length was not seen in non-capital cities, South Australia said there may be other factors not currently assessed and recommended further work as more data become available.
- 25 Western Australia and Tasmania supported splitting the assessment of urban road length for large non-capital cities and capital cities.

Commission response

- 26 While the Commission observed that there is some evidence that road lengths per capita decline with increasing population size for the capital cities, this relationship was not evident among the other cities. This suggested there may be factors other than the size of the capital city influencing road lengths.
- 27 Sydney has fewer kilometres of major urban roads per capita than other cities, but this may reflect the urban form and historical development of the city. While roads with high traffic volumes in other cities are almost universally arterial roads, Sydney has many suburban streets that attract large traffic volumes. Roads classified as arterials or other major roads form 13% of the total road network in Sydney. This is the lowest proportion in any city, and well below the 17% average across capital cities, or 24% in Canberra and 22% in Darwin. In the absence of a nationally comparable classification of roads, it was not clear that the pattern of arterial road lengths per capita for capital cities was sufficiently reliable for the Commission's purposes.
- 28 Academic papers from international literature found conflicting evidence of any relationship between road expenses and population density in the United States.²
- 29 Infrastructure Australia is working with states to publish the National Service Level Standards for Roads, which will classify roads on a consistent basis. The Commission will investigate using this dataset in its assessments when it becomes available.

Commission decision

- 30 The Commission will retain population as the driver for urban road lengths in towns of over 40,000 people and investigate the suitability of using the National Service Level Standards for Roads data when they become available.

² For example, see R G Holcombe and D W Williams, 'Urban Sprawl and Transportation Externalities', *The Review of Regional Studies*, 2010, 40(3):257-273.

Unrecognised urban road cost drivers

- 31 New South Wales proposed that the urban road component should also assess:
- older networks
 - high mean slope
 - densely populated and congested urban areas.
- 32 New South Wales noted that congestion in the Greater Sydney area added to costs by requiring all road maintenance to be conducted at night.

State views

- 33 Other states did not comment on these cost drivers.

Commission response

- 34 Historical factors such as age of network are not typically assessed across any category. The investment assessment gives states the capacity to replace fully depreciated assets.
- 35 Slope is one of the factors that affects the cost of road maintenance. While data are available to calculate slope across the national road network, the Commission did not find datasets suitable to quantify the additional expenses related to slope.
- 36 Congestion affects maintenance and safety costs, with more congested cities requiring strategies, such as scheduling night works, to reduce the impact of road works on traffic. Based on New South Wales' cost estimates, a driver for congestion effects on nightworks maintenance would not be material.

Commission decision

- 37 The Commission will not add additional cost drivers to the urban roads component.

Influence of rainfall and soil composition

- 38 In response to state comments, the Commission considered whether it could assess the effect of environmental factors on road construction and maintenance costs. Water weakens the supports underlying road pavements, increasing maintenance costs, and increasing safety costs to maintain landscaping and remove vegetation hazards. States experience different rainfall levels. Soil type also affects maintenance and construction costs. Clay soils, more common in the eastern states, are the weakest soil types.

State views

- 39 New South Wales provided data showing that both soil type and climate affected road construction costs, with soil type having a higher impact.
- 40 Victoria noted that the National Transport Commission considers soil and rainfall to drive expense needs, although it does not quantify these needs in its datasets.

Queensland noted these issues and recommended further investigation as part of the next methodology review.

41 Other states did not comment on these issues.

Commission response

42 The Commission agrees there is a conceptual case that rainfall and soil type could affect recurrent and capital costs. While national rainfall and soil type information is available, the Commission would require evidence of the relationship between soil type, rainfall and road maintenance or construction costs. It would also potentially need to explore other related drivers.

43 Although the data from New South Wales supported that rainfall and soil type affect road costs, the data was only for New South Wales. The Commission is not aware of data that would support an assessment of the impact of soil type and climate on road maintenance and capital costs for all states.

44 While the Commission recognises that environmental factors play a role in determining costs, the relationship between environmental variables and expenses is complex. Several national agencies such as Infrastructure Australia and the Bureau of Infrastructure and Transport Research Economics have concluded there are issues with data availability when assessing the impact of climate on the need for road asset maintenance.³

Commission decision

45 The Commission will not add additional cost drivers to reflect rainfall and soil composition due to lack of data.

Using National Transport Commission data to apportion expenses

46 In response to state comments, the Commission considered the appropriateness of using National Transport Commission data to apportion expenses between subcomponents in the roads assessment.

State views

47 Western Australia said that the National Transport Commission data do not reflect road expenses, as the purpose of this collection is to allocate costs between light vehicle and heavy vehicle users. It said the National Transport Commission cost allocation matrix should be adjusted to allocate more expenses to road length.

³ Infrastructure Australia, [An Assessment of Australia's Future Infrastructure Needs: The Australian Infrastructure Audit 2019](#), Infrastructure Australia, Australian Government, 2019, accessed 11 April 2024; Bureau of Infrastructure and Transport Research Economics (BITRE), [Road and Rail Supply Chain Resilience Review](#): Phase One report, BITRE, Australian Government, 2023, accessed 11/04/2024.

Commission response

- 48 As noted by Western Australia, the National Transport Commission's cost allocation matrix was developed to apportion costs for heavy vehicle users, and not necessarily to split costs between states. However, the National Transport Commission is the leading authority for these data, and therefore the Commission does not consider it has the data to make changes to the cost allocation matrix.

Commission decision

- 49 The Commission will continue to use the National Transport Commission data as they are the best available.

Sourcing traffic volume data and holding constant the split between urban and rural traffic

- 50 The ABS Survey of Motor Vehicle Use was the major source of traffic data, but the survey has been discontinued. The Bureau of Infrastructure and Transport Research Economics and the National Transport Commission both incorporated data from the Survey of Motor Vehicle Use in their traffic and trend data provided to the Commission. However, due to the survey's discontinuation, the National Transport Commission no longer provides disaggregated traffic volume data. This dataset was used to split heavy and light traffic volumes between rural and urban areas.

State views

- 51 All states supported using Bureau of Infrastructure and Transport Research Economics and the National Transport Commission data as an interim measure.
- 52 Victoria recommended applying a medium (25%) discount to affected assessments (heavy vehicle use and traffic volume).
- 53 Western Australia and the ACT encouraged the Commission to explore alternative data sources.

Commission response

- 54 The Commission considered using the following alternative sources for traffic volume data, but neither was reliable.
- Phone GPS data, sourced from a mobile phone carrier, could not be split by heavy and light vehicles. Mobile phone coverage in more remote areas was likely also to create data accuracy problems.
 - State traffic count data, used as an inflator against 2018–19 ABS Survey of Motor Vehicle Use data (the last year of the ABS data prior to COVID-19 lockdowns) would provide disaggregated light/heavy vehicle data, but not end-to-end trip information. Further, the number and location of traffic counters differed widely between states, capturing a very small percentage of the road network overall, with some states being unable to provide long-term trend data.

- 55 The Bureau of Infrastructure and Transport Research Economics provides data split by capital city/non-capital city and state. However, using these data as a proxy for urban/rural traffic would greatly understate urban traffic volume and misidentify urban traffic as rural traffic.

Commission decision

- 56 The Commission will continue to use traffic volume data from the Bureau of Infrastructure and Transport Research Economics and the National Transport Commission. It will hold the current shares of urban/rural traffic for light vehicles and heavy vehicles constant until a suitable more contemporaneous data source is found.

Culverts and floodways

- 57 In response to state comments, the Commission considered whether it should assess the length of culverts and floodway crossings.

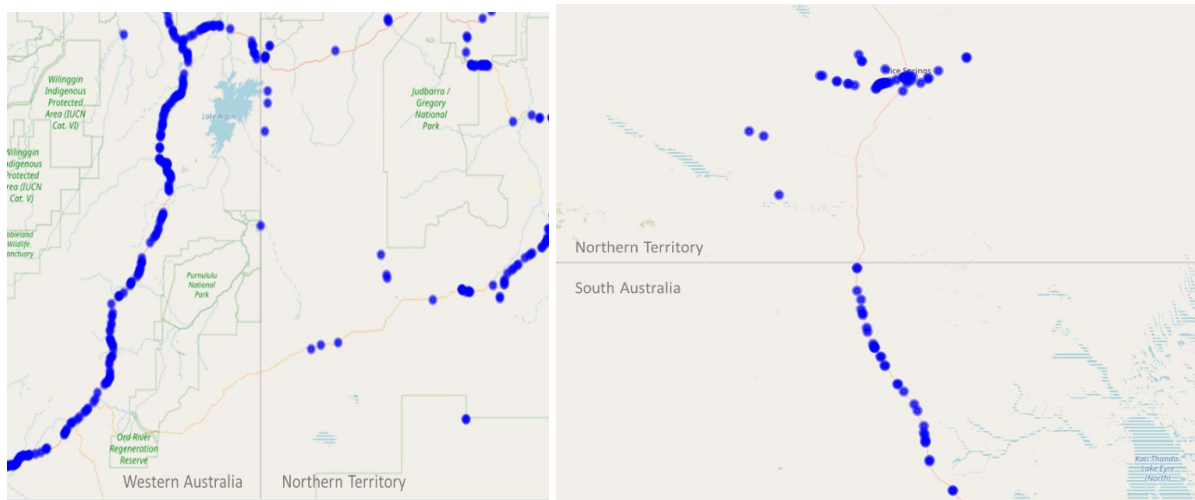
State views

- 58 Western Australia said the bridges and tunnels component was incomplete due to not assessing the length of culverts and floodway crossings.

Commission response

- 59 Based on National Transport Commission classifications, the Commission assesses culvert expenses within the bridges and tunnels component and floodway crossings in the rural roads and urban roads components. Culverts and floodway crossings have lower costs per kilometre than bridges and tunnels, but higher costs than standard roads.
- 60 The Commission requested data from states on the lengths, and recurrent and capital costs for floodway crossings and culverts. For most states, at least some of these data were not available, and the Commission had concerns about the comparability of the available data.
- 61 There is some evidence that the location of culverts is policy-driven, or that the recording of culverts varies between states. Figure 1 compares state data on culvert placement along state borders for the Northern Territory/South Australia, and Western Australia/the Northern Territory. Despite comparable environmental conditions along borders, there are clear differences in culvert density between states, reflecting either data classification issues or policy choice in the decision to construct culverts. Any potential assessment of culvert lengths would use actual lengths sourced from state data (as per the bridges and tunnel length assessment), so policy or data comparability issues would have a direct effect on the assessment.

Figure 1 Culvert placement along the Northern Territory/South Australia and Western Australia/Northern Territory state borders



Note: Similar differences can be seen along other state borders, such as along the New South Wales/Victoria border.

Source: State treasuries, *Roads - bridges, tunnels, culverts and floodway crossings lengths and expenses* [unpublished data sets], state treasuries, 2024.

Commission decision

62 The Commission will not include culverts or floodways in its assessment of bridges and tunnels.

Regional costs

63 The cost of providing roads can differ across remoteness areas. The 2020 Review roads assessment applied the general regional cost gradient to rural road lengths and bridge and tunnel lengths. In response to state comments, the Commission considered whether Rawlinsons costs indices could replace the general regional cost gradient.

State views

64 Some states said that Rawlinsons cost indices should not be used to assess regional costs in the roads assessment. New South Wales and Victoria said that Rawlinsons was not appropriate because local sourcing of materials was more common in road construction than in building construction. New South Wales suggested implementing a 50% discount should the Rawlinsons cost indices be introduced.

65 Victoria said that regional costs are already captured by the urban/rural split of the roads assessment and that a regional cost adjustment was not necessary.

66 Queensland and Western Australia supported the use of Rawlinsons cost indices for measuring regional costs in the roads assessment. Western Australia suggested using the individual state indices rather than national indices.

Commission response

- 67 During the 2020 Review, the Commission used a general regional cost gradient (based on the costs of service delivery for schools and hospitals) to assess the impact of remoteness on rural road lengths and bridge and tunnel lengths. Rawlinsons measures the construction costs of various types of buildings. The Commission agrees with Western Australia that while the impact of remoteness on the cost of maintaining roads differs from the costs of constructing a building, it is likely to provide a better indication of costs than the costs of service delivery.
- 68 Although road maintenance and construction may source some materials locally, specifically quarry materials, these materials only contribute around 13% of road construction and maintenance costs.⁴
- 69 The general regional cost gradient was discounted by 25% in the 2020 Review because it generalised costs for schools and hospitals to road costs. Similarly, the Rawlinsons gradient will be discounted by 25% in recognition that construction costs for buildings and roads differ from maintenance costs for roads. As discussed below, the whole roads assessment will be discounted by 12.5%, and this will be applied to the assessment before the discounted regional costs (and wage costs) adjustments are applied.

Commission decision

- 70 The Commission will replace the general regional cost gradient with the Rawlinsons construction cost gradient, which will be applied with a 25% discount in addition to the whole-of-assessment 12.5% discount.

Commonwealth infrastructure payments

- 71 In response to state comments, the Commission considered the treatment of Commonwealth infrastructure payments. Half of Commonwealth payments for national road and rail networks are treated as having no impact on the GST distribution. This is because roads and transport infrastructure projects can have national objectives relating to the efficient movement of people and goods, which the Commission's assessments do not capture.

State views

- 72 Queensland supported continuing to include 50% of National Road Network Commonwealth payments, noting the selection of national road and rail network projects is largely determined by the Commonwealth.

⁴ Bureau of Infrastructure and Transport Research Economics (BITRE), [Modelled Road Construction and Maintenance Price Index](#), Information Sheet no. 83, BITRE, Australian Government, 2017, accessed 25 August 2024, p. 1.

Commission response

- 73 Roads of national significance are a driver of state spending need that the Commission does not otherwise assess. The best available proxy for state needs to spend on such roads is 50% of the Commonwealth payments for such roads. This is because these roads are also of state significance. Under this treatment, 50% of national network payments and their related expenditure are removed from the adjusted budget. The remaining 50% are assessed under the investment category, applying state needs for roads (for road network payments) and transport (for rail network payments).
- 74 The Commission considers that nothing has changed since the 2020 Review that would warrant a change to this assessment. However, for the next review, the Commission will consider whether the forthcoming National Service Level Standards for Roads dataset provides a reliable measure of overall state needs for roads.

Commission decision

- 75 The Commission will retain the 50:50 no impact/impact blended treatment of national road and rail network Commonwealth payments and continue monitoring the development of the National Service Level Standards for Roads.

Overall validity of the assessment and discounting

- 76 The Commission considered whether the uncertainty around aspects of the roads assessment meant it warranted a discount.

State views

- 77 New South Wales and Victoria supported a 25% discount.
- 78 Queensland and Western Australia did not support discounting the assessment. Queensland said the assessment does not meet the Commission's criteria for a discount and Western Australia said a discount would be inconsistent with other non-discounted assessments with incomplete or missing data, such as mining, housing and welfare.
- 79 South Australia supported discounting the traffic volume and heavy vehicle data only, which are based on the discontinued Survey of Motor Vehicle Use.

Commission response

- 80 The Commission considers that the assessment of road expenditure is not as robust as some other assessments. There are uncertainties with the reliability of:
- the synthetic rural road network as a reflection of state rural road length needs
 - heavy and light vehicle traffic volume data
 - the relative importance of road length, heavy and light vehicle traffic as drivers of expense needs
 - the comprehensiveness of major drivers of differences in spending needs.

- 81 Given the range of uncertainties related to both data and method issues, the Commission considers a discount of the assessment is warranted. The level of discount is subject to judgement. In the Commission’s other assessments, low (12.5%) discounts are used to recognise proxy data in the health assessment, and concerns with interstate comparability of the value of taxable land holdings in the land tax assessment.
- 82 Similar magnitudes of uncertainty apply for the roads assessment as for other assessments with a low discount. While the Commission retains its view that the assessment is largely fit for purpose, given concerns with some aspects of the assessment, it considers a low discount of 12.5% is appropriate.

Commission decision

- 83 The Commission will discount the roads assessment by 12.5%. This discount will be applied to the assessment before regional costs and wage costs are applied.

GST impacts of method changes

- 84 The impact on the GST distribution from the method changes is shown in Table 2.

Table 2 Impact on GST distribution of method changes, roads, 2024-25 to 2025-26

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Total effect
	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m
Use of Rawlinsons to measure regional costs	-9	-9	6	7	0	-1	-1	6	20
Discounting of assessment	30	51	-34	-29	-15	-2	14	-15	95
Total	21	42	-28	-21	-14	-3	13	-10	76
	\$pc	\$pc	\$pc	\$pc	\$pc	\$pc	\$pc	\$pc	\$pc
Use of Rawlinsons to measure regional costs	-1	-1	1	2	0	-1	-1	23	1
Discounting of assessment	3	7	-6	-9	-8	-3	29	-60	3
Total	2	6	-5	-7	-7	-5	27	-37	3

Note: Changes to the wage costs assessment are not included. They are shown in the wage costs chapter in *Review Outcomes*.

- 85 The use of Rawlinsons to measure regional costs increased the assessed GST needs of states with more rural roads in remote and very remote locations (Queensland, Western Australia, and the Northern Territory). South Australia has close to the average share of remote and very remote roads and its GST needs remained the same. The assessed GST needs of states with fewer remote and very remote roads (New South Wales, Victoria, Tasmania and the ACT) decreased.
- 86 The 12.5% discount reduces the effect of the assessment. This increased the assessed GST needs of states with below-average needs for roads expenses (New South Wales, Victoria and the ACT), and decreased the assessed GST needs of states with above-average needs (Queensland, Western Australia, South Australia, Tasmania and the Northern Territory).