



COMMONWEALTH GRANTS COMMISSION

DRAFT ASSESSMENT PAPER CGC 2003/58

DEPRECIATION

Prepared for the Commission's 2003 Conferences on Draft Assessments

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NOTE

Included in this paper are the results of preliminary calculations based on the methods proposed throughout the paper and using the data currently available. Those results are indicative only and should be seen as work in progress. Ongoing changes are being made to standards and factor calculations as new data come to hand. Moreover, the calculations have been done using a prototype assessment system and are subject to ongoing revision as checking processes proceed.

CONTENTS

INTRODUCTION	1
THE 1999 REVIEW ASSESSMENT	1
Structure of the assessment	2
2004 REVIEW PROPOSED ASSESSMENT	4
CATEGORY DEFINITION AND STRUCTURE	4
Commission proposals	4
State views	5
Commission decisions	5
Proposed assessment structure for the 2004 Review	6
FIXED COSTS COMPONENT	8
1999 Review	8
State views	8
Commission proposal	8
Further State views	8
Commission decisions	8
Reality check and updateability	9
BUILDINGS COMPONENT	9
PHYSICAL ENVIRONMENT — CLIMATE AND NATURAL HAZARDS	10
Climate	10
Natural hazards	14
Proposed method	18
Commission decisions — physical environment	19
SERVICE DELIVERY SCALE	20
1999 Review	20
Preliminary State views	21
Commission proposal	21
Further State views	22
Commission decisions	22
Proposed method and results	23
Reality check and updateability	24

URBAN INFLUENCES	24
1999 Review	24
State views	24
Commission proposal	25
Further State views	25
Analysis	26
Commission decisions	26
CONSTRUCTION COSTS	27
1999 Review	27
Preliminary State views	27
Commission proposals	28
Further State views	28
Analysis	29
Commission decisions	32
Proposed method and results	32
Reality check and updateability	33
SOCIO-DEMOGRAPHIC COMPOSITION	34
1999 Review	34
Preliminary State views	34
Commission proposal	34
Further State views	35
Commission decisions	35
Proposed method and results	36
Reality check and updateability	37
SUMMARY OF FACTORS TO BE APPLIED	38
PLANT AND EQUIPMENT COMPONENT	39
PHYSICAL ENVIRONMENT	39
SERVICE DELIVERY SCALE	39
1999 Review	39
State views	39
Commission decisions	40
URBAN INFLUENCES	40
DISPERSION	40
1999 Review	40

State views	40
Commission proposal	40
Further State views	41
Commission decisions	41
Proposed method and results	41
Reality check and updateability	41
SOCIO-DEMOGRAPHIC COMPOSITION	42
SUMMARY OF FACTORS	42
OTHER CONSTRUCTION COMPONENT	43
SUMMARY OF FACTORS TO BE APPLIED	43
OTHER ISSUES	44
Use of non-capital related disability factors	44
Declining populations and intrastate migration	45
Age of assets	46
PROPOSED ASSESSMENT FOR THE 2004 REVIEW	47
Summary of assessment structure	49
Calculating the category factor	49
Calculation Formula	51
Standardised expenses	51
Effect of assessment on grants	52
ATTACHMENT A: PROPOSED CLIMATE ASSESSMENT METHODOLOGY	55
CSIRO analysis	55
Quantification	55
Example — pollution in New South Wales	59
Factors	59

INTRODUCTION

1. This paper presents a draft assessment for the Depreciation category for the 2004 Review. It builds on the Commission proposals in *Discussion Paper 2002/25 Depreciation* and considers the views of the States presented at the 2002 Conferences and in rejoinder submissions.

2. Depreciation allocates the cost of an asset over its useful life. The Depreciation assessment allows States to fund annual depreciation of a standardised capital stock in the assessment period at a standardised cost of provision. It was introduced in the 1999 Review because the separation between recurrent and capital transactions had become blurred and accrual accounting had been adopted by States. The Commission concluded that fiscal equalisation was not being achieved while it did not consider depreciation needs.

3. Submissions to the 2004 Review Depreciation and Debt Charges Working Party¹ made it apparent that States accepted the conceptual approach to the assessment, but saw a need to refine the disability factors and to ground them more securely in the available evidence. The proposals in this draft assessment paper have been developed to address these concerns.

4. Table 4 provides a summary of the proposed draft assessment for the 2004 Review.

THE 1999 REVIEW ASSESSMENT

5. In the 1999 Review, this category included estimated depreciation expenses associated with the provision of all State services included in the equalisation budget. It excluded those involved with the restoration of road pavements.

6. The standard expenditure on depreciation did not rely on State-reported data, but on a Commission estimate. This estimate was based on ABS data on capital expenditures for functions within the scope of the equalisation budget, and on other ABS capital data.

7. Table 1 shows the gross standard expenses for six financial years. In 2001-02, this category represented 6.59 per cent of total standard gross expenses.

¹ The working party consisted of Commission and State Treasury staff. It was convened to progress the Depreciation and Debt Charges assessments. It provided its report to the Commission in June 2002.

Table 1 DEPRECIATION — GROSS STANDARD EXPENSES, 2003 UPDATE

	1996-97	1997-98	1998-99	1999-2000	2000-01	2001-02
\$pc	289.11	297.01	299.24	313.68	321.60	329.96
% of total gross standard expenses	7.86	7.69	6.57	6.77	6.63	6.59

8. Compared with an equal per capita assessment, in the 2003 Update, the Depreciation assessment redistributed \$219.6 million in grants towards New South Wales and the Northern Territory from the other States (particularly Queensland).

Structure of the assessment

9. Assets were grouped into several classes — buildings, other construction, plant and equipment, housing, urban transit construction and urban transit plant and equipment. Each of these was treated as an expense component, with a different mix of disabilities applied to it. There was also a small component for isolation. The scope of the assessment was the same as the scope of the equalisation budget except that roads depreciation expenses were considered in the Roads category. Depreciation relating to assets owned by public trading enterprises (PTEs) was not included because their operational expenses were not included in the equalisation budget. The relevant categories were assessed for their net impact on States' budgets.

10. The asset life disability captured factors that might affect the *rate* of depreciation. The construction costs disability captured *cost* drivers of depreciation expenses. Other disabilities captured the States' different use of assets driven by *demand* factors.

11. Table 2 provides a summary of the assessment in the 1999 Review.

Table 2 1999 REVIEW ASSESSMENT STRUCTURE

Expenditure component	Component weight	Factors	Basis of calculation
	%		
Buildings	34.10	Asset life	Populations above the Tropic of Capricorn (by statistical sub-division for the Northern Territory, by statistical division for other States) weighted by 120 per cent.
		Construction costs	State regional Rawlinsons indices weighted by regional populations multiplied by State inter-capital indices, discounted by 50 per cent.
		Population concentration	Combined urbanisation and service delivery scale factor from other expenditure categories added to the administrative scale factor from other expenditure categories (re-weighted to apply to total expenditure and discounted by 50 per cent).
		Socio-demographic composition	Composite of disabilities from functional groups: Education 25 per cent; Health 15 per cent; Law and order 10 per cent; and Other 50 per cent.
Other construction ²	22.79	Asset life	As for the buildings component.
		Construction costs	As for the buildings component.
		Population concentration	Combined urbanisation and service delivery scale factor from other categories (excluding administrative scale).
		Socio-demographic composition	Equal per capita.
Plant and equipment	18.09	Asset life	As for buildings component, but using a weight of 115 per cent.
		Dispersion	Assessed under the general method.
		Population concentration	As for the other construction component.
		Socio-demographic composition	As for the buildings component.
Housing	9.43	Construction costs	As for the buildings component.
		Physical environment	Eligible populations plus 50 per cent of remote Indigenous populations.

² Other construction included general government expenses on railways and subways; waterways and harbours; long distance pipelines, communication and power lines; local pipelines and cables; and sporting and recreational constructions. It also included historic monuments which could not be identified as buildings. It excluded major improvements to land such as dams and dykes for flood control. Staff are investigating the appropriate scope of the component for the 2004 Review.

Expenditure component	Component weight	Factors	Basis of calculation
	%		
		factor for public housing	
		Socio-demographic composition	Housing socio-demographic factor multiplied by implied Indigeneity factor within the Housing category, weighted by 50 per cent.
Urban Transit construction	7.43	Asset life	As for the buildings component, but using population in centres above 50 000 residents.
		Construction costs	Urban populations weighted by standard costs per unit and standard level of provision. The standard costs is assumed and the standard level of provision results from weighting major transport types (rail, light rail and bus) by the estimated quantity of infrastructure (track or roads, stations and depots).
		Capital requirement factors for urban transit	Based on the capital assets needed to provide the standardised level of service in the urban transit assessment. Capital assets are measured in seat-kilometres. Allowances are made for economies of scale and differences in capital costs.
Urban Transit plant and equipment	7.78	Asset life	As for the plant and equipment component, but using population in centres larger than 50 000 residents.
		Capital requirement factors for urban transit	As for the urban transit construction component.
Isolation	0.38	Isolation	Assessed under the general method.

2004 REVIEW PROPOSED ASSESSMENT

CATEGORY DEFINITION AND STRUCTURE

Commission proposals

12. *Discussion Paper 2002/25 Depreciation* proposed:

- (i) the reallocation of housing and urban transit depreciation to those categories and the re-weighting of components in the Depreciation category accordingly;
- (ii) the calculation of the standard using GFS operating statement data; and
- (iii) the application of administrative scale disabilities, but not in a separate fixed costs component.

State views

13. Working Party members agreed with the proposal to consider depreciation needs for housing and urban transit in their respective categories. They also agreed that the standard should be based on GFS operating statement data.

14. South Australia said that, as capital grants were to be brought into the scope of the equalisation budget, it would be necessary to deduct the standard amount of capital grants treated by inclusion from the Depreciation standard.

15. The proposed use of administrative scale disabilities was broadly supported.

Commission decisions

16. The Commission notes the broad support for considering housing and urban transit depreciation needs in those categories. It has decided to reallocate depreciation expenses for housing and urban transit to the relevant categories and to re-weight the components accordingly.

17. The Commission notes the broad support for calculating the Depreciation standard using GFS operating statement data. It has decided to use these data to derive a standard for the Depreciation assessment.

18. The Commission does not accept that the standard amount of capital grants treated by inclusion should be deducted from the Depreciation standard. This would be inconsistent with the treatment of SPPs in other expenditure categories and would not reflect the depreciation expenses that States are required to fund. States hold assets funded by SPPs on their asset registers and depreciate them accordingly. We see no reason to adopt a practice different from that followed by States.

19. The Commission is satisfied that a State which experiences administrative scale disabilities for its non-capital related expenses also experiences such disabilities for depreciation expenses associated with minimum head office fixed costs (such as office space). The Commission has reconsidered the way in which these needs will be assessed. We have decided that it is more appropriate to identify needs for head office minimum fixed costs as a separate component and to apply a composite of the administrative scale factors. This issue is discussed further in the discussion of the fixed costs component.

Table 3 COMMISSION DECISIONS ON SCOPE AND STRUCTURE OF THE DEPRECIATION CATEGORY — 2004 REVIEW

Decision	Reason
Apply the depreciation disability factors to a standard derived from GFS data	The Commission accepts the view of the working party that GFS depreciation data are of a sufficiently high quality to support the assessment.
Remove depreciation expenses for housing and urban transit	Housing and urban transit expenses will be dealt with in the relevant categories. This will facilitate a more accurate assessment of needs within those categories.
Re-weight components as follows: <ul style="list-style-type: none"> • Buildings: 60.81% • Other construction: 15% • Plant and equipment: 23% • Fixed costs: 1.19% 	These weights are based on GFS data and reflect the proportion of States' depreciation allocated to each type of asset. The re-weighting is required as a result of the removal of housing and urban transit needs and the addition of fixed costs.
Add fixed costs component	This would make the assessment of minimum head office fixed costs consistent between the Depreciation and non-capital related expenses categories.

Proposed assessment structure for the 2004 Review

20. Table 4 outlines the proposed approach for the 2004 Review, based on the decisions reported in this paper.

21. The rest of the paper explains the Commission's proposed approach for each component:

- (i) fixed costs;
- (ii) buildings;
- (iii) plant and equipment; and
- (iv) other construction.

22. Most of the issues are covered in the discussion of the buildings component. Where different issues or views were raised in relation to plant and equipment or other construction, they are covered in the discussion of the relevant component.

Table 4 2004 REVIEW — PROPOSED ASSESSMENT STRUCTURE

Expenditure component	Component weight %	Factors	Basis of calculation
Buildings	60.81	Physical environment	Climate — assessment based on CSIRO analysis of the impact of climate on materials
			Natural hazards — assessment based on Risk Frontiers' relative risk rating for each State
		Service delivery scale	Composite of factors applied to government education and police
		Urban influences	Composite of recurrent factors for police and national parks and wildlife
		Construction costs	Dispersion assessment relating to freight — 2% Wages input costs factor and locality allowances — 25% EPC — 73%
Plant and equipment	23	Physical environment	Climate — assessment based on CSIRO analysis of the impact of climate on materials
			Natural hazards — assessment based on Risk Frontiers' relative risk rating for each State
		Service delivery scale	Composite of factors applied to government education and police
		Urban influences	Composite of recurrent factors for police and national parks and wildlife
		Dispersion	Based on the general method with needs assessed for freight (2%)
Other construction	15	Socio-demographic composition	Composite of demand factors applied to government education, health, and law and order plus EPC element
Other construction	15	Physical environment	Climate — assessment based on CSIRO analysis of the impact of climate on materials
			Natural hazards — assessment based on Risk Frontiers' relative risk rating for each State
		Urban influences	Composite of recurrent factors for police and national parks and wildlife
		Construction costs	Dispersion assessment relating to freight — 2% Wages input costs factor and locality allowances — 25% EPC — 73%
Fixed costs	1.19	Administrative scale	Composite of factors applied to other categories

FIXED COSTS COMPONENT

1999 Review

23. An administrative scale assessment was included in the population concentration assessment that was applied to the buildings component.

State views

24. The States were very critical of the population concentration assessment. However, the issue of administrative scale did not attract a lot of attention in its own right.

Commission proposal

25. *Discussion Paper 2002/25 Depreciation* proposed applying administrative scale factors to buildings (discounted by 20 per cent) and plant and equipment (discounted by 60 per cent).

Further State views

26. The proposed approach was broadly supported, although there were different views about discounting. Victoria supported a discounting of 80 per cent for the administrative scale disability, arguing that small States could implement administrative functions efficiently. Western Australia, South Australia, Tasmania, the ACT and the Northern Territory supported the proposed approach, but Tasmania did not support discounting being applied to administrative scale factors as proposed. The ACT argued against discounting the factors for buildings. For plant and equipment, it felt that some discounting of the recurrent scale factors was plausible but that 60 per cent was excessive.

Commission decisions

27. As noted in the discussion of the scope and structure of the category, the Commission is satisfied that a State which experiences an administrative scale disability for its non-capital related expenses also experiences such a disability for depreciation expenses associated with minimum head office fixed costs (such as office space). The Commission has decided to identify needs for head office minimum fixed costs as a separate component and to apply a composite of the administrative scale factors.

28. Under the proposed administrative scale assessment for non-capital related expenditure, the minimum fixed costs are estimated to be 1.2 per cent of total expenditure. Therefore, we propose that 1.2 per cent of the Depreciation standard be considered to be the base level of depreciation incurred in providing such support. A composite of

administrative scale disabilities calculated for other categories would be applied to this separate component.³ This has the benefit of not requiring discounting.

29. Table 5 shows the proposed administrative scale factors to be applied to the fixed costs component.

Table 5 ADMINISTRATIVE SCALE FACTORS (2004 REVIEW METHOD)

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
1997-98	0.36082	0.49321	0.66595	1.25960	1.53511	4.82194	6.97282	14.78077
1998-99	0.36077	0.49384	0.66341	1.25401	1.54474	4.88966	7.00463	14.69713
1999-2000	0.36079	0.49416	0.66058	1.25146	1.55487	4.95137	7.01842	14.63108
2000-01	0.36070	0.49427	0.65747	1.25078	1.56773	5.01421	7.02298	14.61057
2001-02	0.36114	0.49399	0.65341	1.25029	1.57925	5.06853	7.03713	14.69671

Reality check and updateability

30. Due to the method of calculation, the factors are consistent with the Commission's findings on the costs associated with providing minimum head office services.

31. The factors will be updated annually.

BUILDINGS COMPONENT

32. The buildings component is the largest component in the Depreciation category, accounting for over 60 per cent of the value of assets considered in this assessment. The factors to be applied to this component in the 2004 Review are:

- (i) physical environment;
- (ii) service delivery scale;
- (iii) urban influences;
- (iv) construction costs; and
- (v) socio-demographic composition.

³ See *Draft Assessment Paper 2003/60 Administrative Scale* for discussion of the method used to assess needs for administrative scale.

PHYSICAL ENVIRONMENT — CLIMATE AND NATURAL HAZARDS

33. **1999 Review.** The asset life disability factor applied in the 1999 Review assessed needs for differences in the physical environment that caused asset lives to differ across Australia. It was applied to depreciation on buildings, other construction and plant and equipment. Assets located above the Tropic of Capricorn were judged to have a shorter life than those located elsewhere. This was due to the effects of the tropical climate and cyclones. The weighting for asset life in northern Australia varied between components. Buildings and other construction had a weighting of 120 per cent, and plant and equipment had a weighting of 115 per cent.⁴ This meant that they were considered to deteriorate 20 per cent and 15 per cent more quickly respectively than similar assets in southern areas.

34. **State views.** This approach was criticised for ignoring physical environment issues affecting southern States and for being only loosely supported by evidence.⁵ Queensland, Western Australia and the Northern Territory broadly supported the approach adopted in the 1999 Review, while Victoria, South Australia and Tasmania viewed it as flawed.

35. **Staff proposal.** *Discussion Paper 2002/25 Depreciation* proposed that the impact of climate and natural hazards be analysed separately so that a more rigorous analysis could be undertaken of States' needs. The discussion in this paper is divided into two parts — climate and natural hazards.

Climate

36. **Preliminary State views.** The States provided a range of evidence to show the impact of climate on asset life and that the issue was not confined to northern Australia.

37. **Staff proposal.** Staff commissioned a report from CSIRO on the occurrence of climatic conditions in different parts of Australia and the impact of these conditions on building materials. CSIRO provided data identifying the impact of eight conditions (temperature, salt, condensation, relative humidity, wetness, biological agents, pollution and ultra violet light) on different regions. These data were used to quantify the impact of climate on different parts of Australia. By matching this information to population distribution, staff established a measure of vulnerability for each State's assets and developed the factors shown in Table 6. These were presented to the States by staff in November 2002.

⁴ While this discussion concerns the buildings component, some references to other components have been included to streamline the discussion.

⁵ For further background information, readers are referred to *Discussion Paper CGC 2002/25 Depreciation*, pp. 12–22.

Table 6 PROPOSED CLIMATE FACTORS — 2002 STAFF LEVEL CONFERENCE

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
Climate factor	0.99072	1.11312	0.98433	1.04968	0.98652	0.93438	0.99861	0.94262

38. A complete explanation of the methodology behind these factors is provided in Attachment A. Briefly, the methodology involved:

- (i) applying a weight to each climatic condition depending on CSIRO's view of its relative significance (for example, pollution was considered to be more damaging than temperature);
- (ii) quantifying high, medium and low impacts (for example, ultraviolet light was considered to have a higher impact in inland Australia than other areas);
- (iii) for each condition, calculating the proportion of each State's population living in high, medium and low impact areas; and
- (iv) calculating a measure of vulnerability for each State's assets by combining the significance of the conditions with the proportion of the population affected.

39. Judgment was used to construct the assessment in the following ways:

- (i) staff rated each climatic condition as having a strong, moderate or weak impact on building materials — strong = 1.8, moderate = 1.5, and low = 1.1;
- (ii) staff rated each region as having a high, medium or low vulnerability to each climatic condition — high = 1.8, medium = 1.5, low = 1.1 and none = 1; and
- (iii) it was assumed that the same mix of materials was used across the country and materials were used in equal quantities.

40. The weights were estimated using evidence provided by the States. Where States quantified the effect of physical environment, the estimates varied widely. Some climatic conditions were said to shorten the life of some assets to one-third of what they would be in another region. Other estimates were less extreme. For example:

- (i) life factors for chain mesh fencing in South Australia were 1.7, 1.3 and 1 (typical of many life factor ranges provided by South Australia) — meaning that fencing would last 1.7 times longer in some areas than others;

- (ii) life factors for downpipes in South Australia were 2 in arid areas and 1 in other areas;
- (iii) hard water from the Artesian Basin reduced the life of some plumbing components by two-thirds;
- (iv) cyclone-proofing increased costs by approximately ten per cent; and
- (v) roofing tiles in the Northern Territory were said to last twice as long in some areas than in others.

41. The weights selected by staff, for the impact of particular climatic conditions and the impact in particular regions, were more conservative than the highest differentials reported by States, and higher than the smallest.

42. **Further State views.** The States expressed mixed views on the proposed climate assessment at the November Conference and in their rejoinder submissions. There were some concerns over CSIRO's data. The option of an EPC assessment was supported by some States.

43. New South Wales, Victoria and Western Australia supported the proposed climate assessment. Queensland, South Australia, Tasmania, the ACT and the Northern Territory had reservations.

44. New South Wales noted that there was some arbitrariness in relation to the construction of the climate assessment but also acknowledged that the judgments were reasonable and could be justified. It said that climate should be weighted much more heavily than natural hazards in the overall physical environment assessment.

45. Victoria considered the work to be comprehensive and said the use of CSIRO's findings removed a significant reliance on judgement in the assessment. It highlighted the climatic factors that impacted on the southern States.

46. Western Australia said that the climate component was based on good CSIRO data. Although it made assumptions about the importance of each climate influence, Western Australia said these could be tested through a sensitivity analysis. It also argued that the influences of torrential rain, hard water, Singapore Ants and red dust should also be assessed because of their cost impacts on services provided in remote areas.

47. Queensland suggested that the climate factor should be discounted by the same proportion as the raw natural hazards factor was discounted. If this could not be done, Queensland supported an EPC climate factor. Queensland considered that the proposed assessment of the climate factor was too reliant on arbitrary weights to be effective.

48. South Australia argued that the climate factor had more credibility than the natural hazards factor. However, it did not consider that the proposed physical environment factors were tied in any way to the actual impacts of the physical environment on (depreciable) costs incurred by State governments. Therefore, South Australia supported an EPC assessment.

49. Tasmania supported the redevelopment of the asset life disability to reflect the diversity of conditions facing different parts of Australia. It was concerned with aspects of the climate factor, such as the limited number of climatic conditions and CSIRO's determination of the relative impact of the conditions. At the November Conference, Tasmania did not support the use of a climate component in isolation. However, it supported it in conjunction with the proposed natural hazards assessment.

50. The ACT supported using the climate factor and discounting it to overcome limitations, such as broad assumptions. The ACT said that an EPC assessment would be defensible. It also argued that the proposed assessment failed to take into account the effect of altitude in relation to the climatic influence on a State.

51. The Northern Territory supported the proposal in principle, while noting concerns with the CSIRO report. It was concerned that the reduced level of data available in the Territory may have impacted on CSIRO's final analysis. Other arguments included that the monsoonal pattern of rainfall and the interaction of different factors were ignored, and that soil issues were not discussed comprehensively.

52. **Commission decisions.** The Commission is satisfied that a conceptual basis exists for an assessment for the effect of climate on asset lives. The conceptual case is supported by evidence from CSIRO. The Commission is satisfied that the CSIRO data are comparable and representative, and provide a strong basis for an assessment. The evidence indicates that climate has a material effect on asset life.

53. The approach outlined in this paper involves significant judgment and the Commission has some reservations about the direction of some of the factors, which appear to be counter-intuitive (such as the low needs assessed for the Northern Territory). We also note that some conditions, such as dust and soil, have not been included in the assessment, and that the Northern Territory has some reservations about CSIRO's analysis.

54. However, we note that the factors follow broadly from CSIRO's analysis. Because of the judgment required, we consider that caution is warranted and have reduced the weights initially recommended by staff to apply to the conditions and the different regional effects from 1.8, 1.5 and 1.1 to 1.5, 1.3 and 1.1 respectively.

55. We propose to apply the factors outlined below.

56. **Proposed method and results.** The climate factors for this category, shown in Table 7, have been calculated according to the approach outlined above and in Attachment A, and discussed with the States in 2002. However, the weights used to recognise the needs of each State in relation to the different regional effects are more conservative.

Table 7 CLIMATE FACTORS — 2004 REVIEW

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
2001-02	0.97854	1.05579	0.97512	1.01573	0.97799	0.95081	0.98996	0.96026

Natural hazards

57. **1999 Review.** Some allowance was made for the cost of ‘cyclone-proofing’ assets in the asset life factor.

58. **Preliminary State views.** There was disagreement about States’ vulnerability to natural hazards, with several States citing particular hazards that affected them.

59. **Staff proposal.** In November 2002, Commission staff developed an assessment based on the Damage Index developed by the Natural Hazards Research Centre⁶. This index showed the percentage of building damage suffered by each State from 1900 to 1999. To measure each State’s vulnerability, staff used the percentage of building damage suffered by each State from 1900 to 1999 and divided it by the percentage of Australia’s population living in that State in 2002. The thinking behind this approach was that natural hazards reduced asset lives, increased repairs and maintenance expenses and encouraged higher preventive expenditure. This had an impact on State budgets.

60. The following factors were derived by dividing share of building damage by share of population. They were presented to the States in *Discussion Paper 2002/25 Depreciation*.

Table 8 PROPOSED NATURAL HAZARDS FACTORS — 2002 STAFF LEVEL CONFERENCE

	NSW	Vic	Qld	WA	SA	TAS	ACT	NT
Natural hazards factor	0.87731	0.58284	1.39660	0.61013	0.34538	1.62900	0.06164	16.75625

61. **Further State views.** Concerns were raised by the States, in their rejoinder submissions and at the November Conference, regarding the use of the Damage Index.

62. New South Wales said that the Damage Index was reliant on arbitrary assumptions and that these assumptions reduced the statistical reliability of the data and therefore its use. At the November Conference, New South Wales supported the 1999 Review approach. It indicated that it might support a 90 per cent discount or an EPC assessment for natural hazards because these would have less impact than climate on assets.

63. Victoria said that the natural hazards factor should be removed from the Depreciation assessment. It argued that equalisation of natural hazards was unnecessary as there were already Commonwealth mechanisms in place to share the costs of natural hazards damage. Victoria argued that an assessment based on the Damage Index or the Bureau of Transport Economics Index would also be inappropriate because:

- (i) costs incurred through natural disasters were likely to be lower than in the past;

⁶ The Natural Hazards Research Centre is now known as Risk Frontiers.

- (ii) the randomness of natural hazards made the index less useful as a predictor;
- (iii) natural hazards were more likely to affect private property than public infrastructure; and
- (iv) the Rawlinsons Index, on which the Damage Index is based, was policy contaminated.

64. At the November Conference, Victoria questioned the role of the Commission in equalising the impact of natural hazards. It argued that natural hazards were relatively rare and infrequent events that would have much less impact than everyday climatic effects. Victoria said that, due to their rarity and randomness, it would not be sound to use the past as a basis to predict the future. Victoria also questioned the large differences between the resulting factors, particularly between the ACT and the Northern Territory (see Table 8), and suggested discounting natural hazards to around 10 per cent to take into account the arbitrariness of the natural hazards component. It noted that depreciation rates in Victoria and the Northern Territory were very similar, as outlined in Table 9 and observed that the Northern Territory’s asset life was, at worst, 20 per cent less than that of other States.

Table 9 COMPARISON OF DEPRECIATION GUIDELINES

Asset Class	NSW	Vic	WA	NT
	Years	Years	Years	Years
Dwellings	10-50	40-50	40-50	25-50
Other buildings	40-80	30-60	-	20-100
Plant and equipment	-	3-10	5-15	1-15

Source: Victorian Treasury.

65. Queensland said that while States were eligible for Natural Disaster Relief Arrangements (NDRA) grants, not all damage fell within the NDRA guidelines. It said that reducing the discount to 30 per cent would recognise that that natural hazards index acts as both a measure of past damage, and a proxy for further damage. At the November Conference, it supported the natural hazards component, citing the long timeframe of the data.

66. Western Australia strongly opposed the proposed natural hazards assessment. It said that if no better substitute was found it would support an EPC assessment for that component. If a natural hazards factor were to be used, Western Australia proposed that it be discounted to reflect the national proportion of depreciation on State stock that was due to natural hazard effects.

67. Western Australia said that the proposed factor was questionable because:

- (i) it produced results that were intuitively too disparate;
- (ii) it was based on only a fraction of the historical hazard events;

- (iii) the period of time may not have been long enough to adequately reflect the average frequency in each State of rare or less frequent events;
- (iv) it did not take into account changing population distribution between States over the century;
- (v) it did not take into account the expansion of capital stock over time;
- (vi) it did not take into account the changing intrastate distribution of capital stock over time;
- (vii) it was affected by policy influences (such as building codes and fire prevention measures); and
- (viii) it used data on all buildings, which were unlikely to be relevant to State government owned stock.

68. South Australia said that the physical environment factor should be assessed EPC. It was concerned that the factors were not based on the actual costs incurred by State governments. It argued that additional costs due to natural hazards consisted primarily of cyclone proofing buildings in tropical areas, which on average added less than 15 per cent to construction costs; and argued that this figure was in stark contrast to the proposed factor which assessed such high needs for the Northern Territory and Queensland. South Australia suggested that, if the Commission was unwilling to introduce an EPC assessment, it should implement an allowance for cyclone-proofing, diluted to reflect the costs of non-tropical climates.

69. Tasmania supported the inclusion of a natural hazards factor. It said that the time span over which the factor was calculated should overcome concerns that rare events were given undue weighting.

70. The ACT did not support a natural hazards factor. It expressed little confidence with the natural hazards component and considered the proposed damage index to be a poor measure. The use of the index was not supported for the following reasons:

- (i) the link between potential natural hazards and costs was not established;
- (ii) catastrophe insurance should mitigate the impact of hazards;
- (iii) the index was based on estimated building losses over the past 100 years and did not measure the prevalence of natural hazards, but rather the damage they caused — therefore it was affected by the relative population of jurisdictions throughout that period; and
- (iv) the index was volatile as a single event could change it.

71. At the November Conference, the ACT considered it implausible that the figures for the Northern Territory would be so high. The ACT emphasised that Cyclone Tracy was a one-off event.

72. The Northern Territory argued that natural hazards significantly affected asset life and consequently should be taken into account. It supported the data used by the Commission in the natural hazards assessment, noting that it was an extensive and good representation of the natural hazards risks faced by the State.

73. *Analysis.* The Commission accepts some of the criticisms made of its proposed natural hazards factor. It is very difficult to measure such cost impacts accurately and to ensure that other forms of Commonwealth assistance are fully taken into account.⁷

74. However, the Commission is satisfied that there is a conceptual case for assessing needs for the effects of vulnerability to natural hazards on States' depreciation expenses — whether through preventive expenditure and/or compensation, or a risk profile. Evidence from the Natural Hazards Research Centre and the Bureau of Transport Economics shows that natural hazards have a significant impact on States' expenses and that differences between the States are material. The question is whether the Commission can implement an assessment with an acceptably small margin of error. The Commission accepts that the proposal presented in 2002 did not meet this test — both for some of the reasons identified by States and because the factors were incorrectly applied to all depreciation expenses. However, the Commission does not accept that it is inappropriate to use a proxy, such as the Damage Index, as an indicator of the likely impact of natural hazards on State assets.

75. In assessing needs for vulnerability to natural hazards, the Commission's purpose can be seen as giving the States the capacity to manage the *risk* to their assets presented by natural hazards. We are investigating the use of the PerilAusII model developed by Risk Frontiers (applied to the proportion of depreciation expenses affected by preventive, restoration or replacement needs). This approach would be more appropriate than the Damage Index because it is weighted towards potential damage (70%), although it is still influenced by past events. Risk Frontiers can provide the Commission with a relative risk rating for each State. This would be tailored to meet the Commission's requirements. The effect of NDRA would be taken into account.

76. PerilAusII is a searchable database (including mapping software) of natural perils in Australia. It contains the most comprehensive collection of Australian natural hazard data available. The data are compiled from information collected by Risk Frontiers supplemented with data from the Bureau of Meteorology and the Australian Geological Survey Organisation. There are nine perils covered in the database — bushfires, tropical cyclones, floods, earthquakes, landslides, gusts, hail, tornadoes and tsunamis.

⁷ The Commonwealth's Natural Disaster Relief Arrangements provide States with assistance to replace or restore assets after natural disasters. To be eligible, States must reach a threshold of expenditure, after which fifty per cent of further expenses is reimbursed. The proportion rises to seventy-five per cent after a second threshold is reached.

77. PerilAusII is principally used by the insurance industry to determine risk according to location. Relative risk ratings can be determined for individual postcodes.

78. PerilAusII was constructed using potential and historical data on natural perils. The potential magnitude for events was identified and placed into postcode boundaries. The areas were given potential risk ratings ranging from low risk to extreme risk. Historical data were gathered on the number of affected locations, the magnitude or intensity and the frequency of the event. The data were then used to develop a damage index. The potential and historical components of PerilAusII were combined and given weightings of 70 per cent and 30 per cent, respectively. This resulted in the final relative risk ratings.

79. PerilAusII was sponsored by the Insurance Council of Australia and its updateability relies on continued sponsorship. While Risk Frontiers has indicated a likelihood of PerilAusII being updated, this is not certain.

80. The Commission has some concerns about using this approach as we note that it still makes use of the Damage Index. It will become out of date as events (particularly unexpected events such as the ACT firestorm) occur. However, if the impact of natural hazards on State finances is to be taken into account, this index is the best source of data available.

81. ***Commission decisions.*** The Commission supports the States' desire for greater evidence and transparency in its assessment of needs relating to depreciation expenses. For this reason, it proposes to ask Risk Frontiers to develop a relative risk rating for each State. These ratings would be used to develop a factor that would be applied to the proportion of depreciation expenses affected by prevention, restoration or replacement expenses caused by natural hazards. The benefits of such an approach are that the data can be tailored to the Commission's needs, and the assessment would be comprehensive and scientifically-based. While the factors resulting from such an assessment could be expected to vary significantly between the States, they would be applied to only a small proportion of depreciation expenses.

Proposed method

82. Because the Risk Frontiers ratings are not yet available, the Commission is not presently able to present the factors to be based on them. For illustrative purposes only, this paper retains the factors in Table 10 that were proposed in the 2002 discussion paper (adjusted to apply to the relevant proportion of capital stock — approximately half a per cent). They have been included in the draft factor calculation because they are likely to be closer to the final factor than an EPC assessment would be and should therefore result in less distortion to the draft Depreciation category factors.

Table 10 PROXY NATURAL HAZARDS FACTORS — 2004 REVIEW

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
2001-02	0.99994	0.99980	1.00019	0.99982	0.99969	1.00030	0.99956	1.00745

Commission decisions — physical environment

83. Table 11 provides a summary of the Commission's decisions concerning the physical environment factor.

Table 11 COMMISSION DECISIONS — PHYSICAL ENVIRONMENT

Decision	Reason
Assess needs for the effect of climate on capital stock using the factors based on CSIRO analysis	The factors are based on independent and rigorous analysis.
Equalise the capacity of States to manage the risk to assets presented by natural hazards through the use of relative risk ratings derived by Risk Frontiers	Natural hazards occur more frequently in some States. The capital costs associated with natural hazards impact on a State's capacity to provide services. Such costs are only partially addressed through the Commonwealth's Natural Disaster Relief Arrangements program. Risk Frontiers is a well respected and independent research body. The PerilAusII model would provide a soundly based measure of each State's risk.
Apply natural hazards factor to the average proportion of capital stock affected by preventive measures, replacement or restoration due to natural hazards	It is logical to apply this factor only to the proportion of capital stock that is affected by natural hazards, whether through prevention, restoration or replacement.

84. Table 12 compares the combined physical environment factors for the 2004 Review with those of the asset life disability applied in the 2003 Update.

Table 12 PHYSICAL ENVIRONMENT FACTORS — 2004 REVIEW AND 2003 UPDATE

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
2001-02 (2004 Review)	0.97854	1.05579	0.97512	1.01573	0.97799	0.95081	0.98996	0.96026
2001-02 (2003 Update)	0.99167	0.99167	1.02485	0.99918	0.99167	0.99167	0.99167	1.15031

85. ***Reality check and updateability.*** As noted above, the Commission has some reservations about the direction of the **climate** factors. However, it notes CSIRO's research on the relative impact of the different conditions, and also that natural hazards (including cyclones) are covered in a separate assessment. The two sets of factors outlined above measure different effects. The proposed **natural hazards** assessment for the 2004 Review attempts to give States the capacity to manage the risk to assets presented by a range of natural hazards, whereas the 1999 Review approach focused on the costs associated with a tropical climate. Both involved significant judgement. Therefore, comparisons of the two sets of factors should be made cautiously.

86. The assessment would not be updated between Reviews because it is based on Census geographical population distribution.

SERVICE DELIVERY SCALE

1999 Review

87. The population concentration disability was intended to recognise the different quantities of capital required due to administrative scale, service delivery scale and urbanisation. Cost weights for education, health, law and order, and other functions were applied to the populations of communities of different sizes as shown in For example, a large city was judged to face some extra (per capita) capital costs in the areas of education and law and order, and significant extra capital costs in the provision of health services. In contrast, a small town was judged to face higher capital costs in education, and law and order, but not in health.

88. Table 13. Significant judgment was used in constructing these weights.

89. For example, a large city was judged to face some extra (per capita) capital costs in the areas of education and law and order, and significant extra capital costs in the provision of health services. In contrast, a small town was judged to face higher capital costs in education, and law and order, but not in health.

Table 13 POPULATION BANDS FOR POPULATION CONCENTRATION ASSESSMENT — 1999 REVIEW

Population Band	Education	Health	Law and Order	Other
0–9 999	1.40	1.00	1.25	1.00
10 000–99 999	1.00	1.00	1.00	1.00
100 000–749 999	1.05	1.50	1.10	1.00
750 000–1 999 999	1.10	1.75	1.20	1.00
2 million and above	1.10	2.00	1.20	1.00

Preliminary State views

90. There was disagreement about the application of service delivery scale needs to the Depreciation assessment, but broad agreement that it should be based firmly on evidence. Victoria questioned the relevance of the factor to depreciation expenses. Queensland, Tasmania and the Northern Territory thought that the population concentration factor did not fully capture the extra costs associated with a scattered population. Western Australia proposed the use of a separate factor to capture needs for service delivery scale. South Australia supported greater use of quantitative data in calculating needs.

Commission proposal

91. *Discussion Paper 2002/25 Depreciation* proposed that the population concentration disability factor be replaced by factors for service delivery scale, administrative scale and urbanisation in each component as follows.

Table 14 PROPOSED REPLACEMENT OF POPULATION CONCENTRATION ASSESSMENT — 2002 DISCUSSION PAPER

Component	Factor	Basis for calculation
Buildings	Service delivery scale	Composite of non-capital related factors for: Education Health Law and order Aboriginal Community Services Other
	Urbanisation	May relate to capital needs for law and order and hospitals
	Administrative scale	General method discounted by 60%
Plant and equipment	Service delivery scale	Composite of non-capital related factors for: Education Health Law and order Other
	Urbanisation	May relate to capital needs for law and order and hospitals
Other construction	Urbanisation	Combined service delivery scale and urbanisation factor from other expenditure categories

Note: Discounting for administrative scale was based on judgment.

Further State views⁸

92. No State disagreed with the proposed approach.

Commission decisions

93. As already discussed, the Commission has decided to introduce a fixed costs component to the category.

94. The Commission accepts that a conceptual basis exists for the application of service delivery scale factors to depreciation expenses. States that need to provide services to small communities are likely to find that assets have excess capacity and are therefore used less efficiently than they would be in more highly populated areas (although some assets may have a longer useful life as a result). On the basis of this conceptual case, the Commission has decided to apply the factors used to assess service delivery scale needs in

⁸ Because of the proposal to introduce a fixed costs component, State views on, and further discussion of, administrative scale were covered in the sections on the structure of the assessment and the fixed costs component. Similarly, the discussion of urban complexity is discussed under that heading.

the government education and Police categories.⁹ These have been weighted to reflect the functional use of States' assets, and an EPC component has been added to account for assets that are not related to these areas of expenditure. The materiality of this assessment is in line with its impact on non-capital related expenses. Similarly, we are confident that the margin of error is no greater than for the assessments on which it is based.

95. The case for an urban influences assessment is considered below.

96. The Commission has decided to replace the population concentration disability with disabilities for service delivery scale, administrative scale and possibly urban influences as outlined in Table 15.

Proposed method and results

97. The proposed method can be seen below in Table 15.

Table 15 REPLACEMENT OF POPULATION CONCENTRATION ASSESSMENT

Component	Factor	Basis for calculation
Buildings	Service delivery scale	Composite of recurrent factors for: government education Police
	Urban influences	Composite of recurrent factors for: Police National Parks and Wildlife
Plant and equipment	Service delivery scale	Composite of recurrent factors for: government education Police
	Urban influences	Composite of recurrent factors for: Police National Parks and Wildlife
Other construction	Urban influences	Composite of recurrent factors for: Police National Parks and Wildlife
Fixed costs	Administrative scale	Composite of other categories

(a) Urban influences for other categories may be included if the Commission decides to assess them for non-capital related expenses.

98. Table 16 shows the service delivery scale composite factors.

⁹ The Services to Indigenous Communities assessment has not been incorporated because assets relating to this category are not depreciated by the Northern Territory Government.

Table 16 SERVICE DELIVERY SCALE FACTORS

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
1997-98	0.997980	0.998648	1.001242	0.999991	1.004730	1.010410	0.989302	1.023306
1998-99	0.997980	0.998648	1.001242	0.999991	1.004730	1.010410	0.989302	1.023306
1999-2000	0.997980	0.998648	1.001242	0.999991	1.004730	1.010410	0.989302	1.023306
2000-01	0.997980	0.998648	1.001242	0.999991	1.004730	1.010410	0.989302	1.023306
2001-02	0.997980	0.998648	1.001242	0.999991	1.004730	1.010410	0.989302	1.023306

Reality check and updateability

99. These factors have been tailored to be relevant to the Depreciation assessment. They cannot be meaningfully compared with the approach used in the 1999 Review because they only capture service delivery scale needs.

100. The factors will not be updated annually.

URBAN INFLUENCES***1999 Review***

101. As noted above, urbanisation¹⁰ needs were assessed as part of the population concentration factor.

State views

102. Urbanisation was a controversial aspect of this factor. New South Wales and Victoria supported a strong urbanisation assessment while the other States were concerned that urbanisation was over-emphasised. New South Wales and Victoria maintained that the size of Sydney and Melbourne resulted in higher per capita capital costs for those States. The evidence provided to support this related to the cost of land and the impact on roads and urban transit. Victoria also argued that wear and tear would be higher in large cities, requiring buildings to be more rapidly depreciated.

¹⁰ The term 'urbanisation' has been used when referring to discussions that took place prior to the adoption of the term 'urban influences'.

Commission proposal

103. *Discussion Paper 2002/25 Depreciation* noted that urbanisation strongly influenced the direction of the population concentration factor. It proposed that a separate urbanisation assessment be introduced and asked States to provide evidence of its impact on depreciation expenses. It also flagged the possibility of non-capital related disabilities being used to assess needs. The paper noted that land prices, roads and urban transit were not relevant to this category — land prices because land is not depreciated, and roads and urban transit because their depreciation needs are not assessed in this category.

Further State views

104. No State provided direct evidence of the impact of urbanisation on depreciation expenses.

105. Victoria opposed the proposed use of non-capital related urbanisation disabilities, noting that capital expenses and recurrent expenses were not substitutable in this context. It supported maintaining a high urbanisation disability, arguing that large urban centres can benefit more from economies of scale for non-capital expenses than for capital expenses.

106. Queensland argued that an urbanisation disability would be inappropriate for the Depreciation assessment if it were based on the (unsupported) assumption that Sydney and Melbourne bear higher per capita costs because they play a national role in the provision of services. It said that an inappropriate emphasis was placed on the supposedly high capital costs associated with urbanisation.

107. Western Australia generally supported the replacement of the current population concentration factor with relevant non-capital related assessments (which should not be adjusted without very good reason). However, it was not convinced that urbanisation was a valid non-capital related factor.

108. South Australia supported the proposed assessment. It cited the arbitrariness of the urban size weights as a key shortcoming with the current assessment, and considered that the additional costs associated with urban size would be better reflected by the relevant non-capital related disabilities.

109. Tasmania was opposed to the proposed urbanisation assessment, citing lack of statistical evidence.

110. The ACT did not support the inclusion of an urbanisation factor. It said higher needs in larger cities, due to greater demand for services, are already taken into account in the relevant socio-demographic composition factors. The ACT also disputed that larger cities should be expected to provide a higher level of service because of their size. Given that the principle of fiscal equalisation is that all States should be given the capacity to provide standard services, the ACT considered that this meant that States should have the capacity to provide residents of the larger capital cities with access to the same level of service.

111. The Northern Territory argued that the population concentration factor used in the 2003 Update gave undue weight to the urbanisation disability, without adequately assessing the scale disabilities faced by States.

Analysis

112. As discussed in *Draft Assessment Paper, CGC 2003/64, Assessing Urban Influences*, available evidence does not support the view that large cities incur higher per capita costs, except in a few areas. OECD officials have said that ‘research in the United States and Canada indicates that the cost per capita of about 80 per cent of local services does not increase with size. For large infrastructure services and local network industries cost actually decreases. These findings suggest that a negative density or agglomeration effect is unlikely.’¹¹

113. New South Wales has made a case that providing transport infrastructure in Sydney is much more expensive when retrofitting, or dealing with other constraints, such as pollution. However, depreciation relating to roads and urban transit is not included in the Depreciation category.

114. Costs relating to building or other assets which are driven by non-capital needs to be considered. For example, urban influences can result in a need for additional space in police stations because more police officers must be provided or more class rooms in schools because post compulsory enrolments are higher.

Commission decisions

115. The Commission considers that a conceptual case has not been made that urban influences cause greater depreciation needs across the board. No evidence has been provided which would enable the development of a capital-specific factor. However, we believe that large cities have higher per capita capital needs than smaller cities for some functions. The factors derived in this paper reflect the use of urban influences assessments from the following categories:

- (i) Police; and
- (ii) National Parks and Wildlife.

¹¹ Email, 13/6/03, and pers. comm. 19/6/03, Hansjoerg Bloechliger, OECD Economics Directorate, Paris.

CONSTRUCTION COSTS

1999 Review

116. The 1999 Review approach applied a construction cost factor to the buildings and other construction expenditure components. It considered differences in building costs across Australia within and between States. Differences were measured using data from Rawlinsons Australian Construction Handbook which is published annually. Rawlinsons provides a series of indexes relating the construction costs in major regional towns to the costs in the capital city in each State (with each capital equal to 1.00). They also provide a spatial series relating the costs of the capitals to each other. The Commission used Census populations to derive a regional weighted cost index for each State, with the result expressed relative to the Australian average. A construction cost index was used because the Commission considered it to be a more accurate reflection of the variation in capital costs than the recurrent measure of dispersion. The factors were discounted by 50 per cent due to ambivalence about the appropriateness of the Index for equalisation purposes. A small national capital adjustment was also made to the factors applied to the buildings and other construction components to acknowledge the ACT's lack of policy influence over some of its assets. Its capital city index was increased by 0.005.

117. Needs were also assessed for the impact of isolation on construction costs to recognise the costs of moving goods from sources of supply in the south-eastern States to other States. To avoid double-counting, isolation was assessed as a separate component. However, because isolation relates to the cost of construction, it is discussed in this section.

Preliminary State views

118. The use of the Rawlinsons Index was controversial for several reasons, particularly the possibility of double-counting with other disabilities and policy contamination. Working Party discussions indicated a broad agreement among the States that this measure of construction cost differences was inappropriate for our purposes.

119. The States said that Rawlinsons was a poor basis for the assessment. They supported the development of a new assessment based on dispersion and input costs. The main areas of concern with the 1999 Review assessment related to:

- (i) the possibility of policy contamination (especially through the use of the Rawlinsons index);
- (ii) the volatility of the assessment and the cyclical nature of the building industry and building cycle; and
- (iii) the possibility of double counting.

120. Queensland, South Australia, and the ACT supported the removal of the isolation component. However, Western Australia and the Northern Territory strongly supported its retention.

121. Western Australia considered the isolation component as important for assessing needs for plant hire and equipment, and doubted the usefulness of undertaking a special isolation data request for depreciation. It suggested that it would be sufficiently accurate to use the general method.

122. The Northern Territory maintained that isolation was a disability that should be accounted for in the Depreciation assessment due to the limited availability of construction materials produced in the Territory. It suggested that the Commission examine the size and structure of each State’s manufacturing industry to determine a jurisdiction’s capacity to produce construction materials. The Territory then suggested that from this, the Commission could use its judgement to determine the isolation component of the assessment based on a jurisdiction’s construction material capacity and its need to import materials from other jurisdictions.

123. While Tasmania considered isolation to be a relevant disability, it acknowledged difficulties with the assessment especially where information was required about the main sources of supply of material and equipment. Tasmania said that isolation affects the demand for capital, as well as its cost because isolated communities may need services to be provided locally. The State felt that, due to its isolation, it must maintain infrastructure for such things as major health problems or disasters, because it could not share resources or workloads quickly with other States.

Commission proposals

124. *Discussion Paper 2002/25, Depreciation* proposed that the construction cost assessment used for the 1999 Review be replaced with assessments for construction-related wages and dispersion (freight, locality allowances and plant hire).

Table 17 PROPOSED CONSTRUCTION COST ASSESSMENT — 2002
DISCUSSION PAPER

Component	Factor	Basis for calculation
Buildings	Dispersion	Dispersion assessments relating to freight and locality allowances New assessment for plant hire if data are available
	Input costs	Construction-related wages

125. It was proposed that the isolation component be abolished.

Further State views

126. The States supported the proposed assessment of dispersion and input costs to replace the Rawlinsons index.

127. Queensland said that the input costs assessment should be limited to the wages and salaries for tradespersons, plant/machinery operators, labourers and related workers. It suggested that plant hire costs might relate to a combination of freight and the availability of a supply of materials and plant.

128. Tasmania argued that the use of construction-related wages, as a measure of input costs, be adjusted to reflect the differential impact on states of managerial positions within the construction factor.

Analysis

129. The following items have been identified as possible drivers of construction costs:

- (i) labour costs — wages and locality allowances;
- (ii) the effect of population dispersion on freight costs;
- (iii) plant hire costs; and
- (iv) isolation from the south-east corner of Australia.

130. ***Labour costs.*** The Commission is satisfied that there is a conceptual basis to assess wage differences between States. Analysis of private sector wages indicates that the difference is supported by evidence and is material. The most appropriate mechanism to measure needs is the wages input costs factor. It is based on a large amount of data and has been developed to capture differences in wages due to location. We consider the margin of error to be acceptably small. The Commission proposes to apply the wages input costs factor to the buildings and other construction components.

131. Using data on wages in the construction industry as the basis for a factor is not favoured. The data are based on a much smaller sample and have not been adjusted to exclude the effects of variables such as level of experience. We are not convinced that the error margin would be acceptably small. In addition, the Commission's approach to the calculation of the input costs factor is to measure the difference for all industry sectors and to apply the same factor in all assessments, adjusted for the proportion of wages and salaries in each category.

132. The Commission is satisfied that a conceptual case has been made and that evidence exists that construction costs will also be affected by locality allowances. On the basis of the locality allowance factor developed as part of the Dispersion assessment, it judges the tests of evidence, materiality and margin of error to be met. It has decided to apply this locality allowance factor to the buildings and other construction components.

133. Studies by the Industry Commission (now the Productivity Commission) indicate that labour represents approximately 25 per cent of capital costs.¹² This is consistent with anecdotal evidence within the building industry. Therefore, we propose that labour costs (input costs and locality allowances) be weighted by 25 per cent.

134. **Freight costs.** Dispersion disabilities relate to intrastate costs necessarily incurred in providing services to dispersed populations. In the 1999 Review Depreciation assessment, the impact of dispersion on freight costs for plant and equipment was assessed. The factor was calculated to apply to one per cent of expenses in that component.

135. The Commission is satisfied that there is a conceptual basis for dispersion to have an impact on the cost of construction through its effect on freight costs. The dispersion factor developed to measure freight cost differentials indicates that the tests of evidence, materiality and margin of error have been met. The Commission has decided to apply this factor to two per cent of expenses in the buildings, other construction and plant and equipment components. This is consistent with data provided by the States for the impact of dispersion on housing costs.

136. **Plant hire.** The purpose of this analysis is to identify any regional differences in the cost of hiring construction equipment. The data in Table 18 were supplied by Kennards Hire and Cordells building index. The most expensive locations for plant hire were Sydney and New South Wales generally. After this, the two sources were not always consistent, with Western Australia ranked as relatively more expensive by Cordells than by Kennards. South Australia was also ranked highly, but was only mentioned by Cordells. Victoria was ranked highly by Kennards but not by Cordells. Queensland's rankings were also inconsistent.

¹² Industry Commission, 'Construction Costs of Major Projects', Australian Government Publishing Service, Canberra, Report 8, 11 March 1991, p. 36.

Table 18 COST OF PLANT HIRE

Location	Total cost of hiring a bundle of items	
	Kennards Hire	Cordells
Sydney	1905.00	
Newcastle	1883.00	
Goulburn	1843.00	
Wagga	1855.00	
Wollongong	1818.00	
Gosford	1843.00	
New South Wales		13 463.53
Victoria	1849.00	12 662.40
Queensland	1752.00	12 195.49
Western Australia	1627.00	12 917.49
Adelaide	1625.00	
South Australia		12 917.49
ACT	1855.00	
Average for above locations	1805.00	12 831.28

Sources: Kennards Hire August 2002 and Cordell's Building Cost Index: Commercial and Industrial 2003.

137. Not all plant hire companies were willing to provide their hire rates. One representative told Commission staff that equipment prices would vary according to demand, so one type of equipment might be more expensive in one region while another would be cheaper. However, he agreed that prices in the Northern Territory would usually be higher.

138. The Commission accepts that a conceptual basis exists for assessing different plant hire rates. However, the available evidence does not support the conceptual case. Specifically, the difficulties are:

- (i) the available evidence does not show the expected pattern and is at times contradictory;
- (ii) at any point in time, relative prices will be influenced by factors such as the building cycle; and
- (iii) data are not available for the Northern Territory, making it difficult to develop an accurate factor for that State.

Therefore, the Commission has decided to assess plant hire rates on an EPC basis.

139. **Isolation.** Table 19 shows data provided by the Australian Bureau of Statistics (not including the ACT or the Northern Territory) which indicates that distance from the south-east corner of Australia does not result in higher construction costs. Sydney and Melbourne were the cheapest locations for purchasing materials. However, Perth was the next cheapest city, suggesting that isolation was not a significant driver of costs, at least for Perth. Overall, the differences between these cities are quite small, supporting the proposal that the component and factor be removed. The Commission notes that, in the absence of data from the Northern Territory, it is not clear that costs in that State would be significantly different from those identified in the table.

Table 19 ABS PRICE INDEX: MATERIAL USED IN BUILDING OTHER THAN HOUSING — DECEMBER 2002

	Sydney	Melbourne	Brisbane	Perth	Adelaide	Hobart
Building material prices	122.1	121.8	126.1	122.4	123.3	123.7

Source: ABS, Producer Price Indexes, December Quarter 2002.

140. While the Commission was open to the possibility that a conceptual case existed, the evidence available has not supported this hypothesis. The Commission has decided to remove this component.

Commission decisions

141. The Commission proposes to apply the wages input costs factor to the buildings and other construction components, comprising 25 per cent of the construction costs factor.

142. The Commission proposes to apply depreciation needs to two per cent of expenses in the buildings, other construction and plant and equipment components.

143. The Commission proposes to assess plant hire rates on an EPC basis.

144. The Commission has decided not to assess needs for isolation.

Proposed method and results

145. The proposed method and the weights can be seen in Table 20. The resulting factor would be applied to the buildings and other construction components.

Table 20 PROPOSED WEIGHTS AND METHOD FOR CONSTRUCTION COST FACTOR — BUILDINGS COMPONENT

Driver	Weighting	Method
Freight	2	Dispersion general method
Input costs	25	Wages and locality allowances
Other	73	EPC

146. Table 21 shows the construction cost factors to be applied to the buildings component. The factors have been developed using the proposed methods for the 2004 Review.

Table 21 CONSTRUCTION COST FACTORS — BUILDINGS COMPONENT — 2004 REVIEW

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
1997-98	1.008862	0.996138	0.996287	0.993943	0.990021	0.978103	0.994999	1.060780
1998-99	1.007870	0.995790	0.997599	0.994964	0.990438	0.980316	0.993396	1.063267
1999-2000	1.008428	0.996098	0.996990	0.994349	0.989355	0.979553	0.994724	1.061781
2000-01	1.009293	0.995825	0.996083	0.993227	0.989969	0.977476	0.996085	1.060282
2001-02	1.009477	0.996264	0.995497	0.992859	0.989957	0.976592	0.995855	1.059422

147. For comparison, Table 22 shows the factors that were applied in the 2003 Update using the 1999 Review method.

Table 22 CONSTRUCTION COST FACTORS — BUILDINGS COMPONENT — 1999 REVIEW

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
2001-02	1.04029	0.99363	0.94897	0.98336	0.97453	0.98247	1.01070	1.12369

148. The change in method has resulted in higher factors for Victoria, Queensland, Western Australia and South Australia.

Reality check and updateability

149. The proposed approach would assess positive needs for New South Wales and the Northern Territory. This is consistent with the Rawlinsons Index. However, their needs are reduced under the proposed method.

150. The factors will be updated annually.

SOCIO-DEMOGRAPHIC COMPOSITION

151. The socio-demographic composition (SDC) factor is intended to recognise the impact on a State's capital needs of population 'mix' (age, sex, Indigeneity and socio-economic status).

1999 Review

152. SDC needs for the other construction component were assessed on an EPC basis. For buildings and plant and equipment, the SDC assessment was applied as per Table 23. Factors relating to the government-education, health and law and order assessments were used because a significant proportion of States' assets are associated with these expenditure categories.

Table 23 APPLICATION OF SDC DISABILITIES TO THE BUILDINGS AND PLANT AND EQUIPMENT COMPONENTS

Component factor applied	Component weight	Factor applied
	%	
Education	25	SDC factor for government education
Health	15	Composite of SDC factors for Hospitals and Community Health
Law and order	10	Composite of SDC factors for Police, Administration of Justice and Corrective Services
Other	50	EPC

Preliminary State views

153. Several States criticised the application of this disability in the Depreciation assessment. Underlying the States' comments was a desire for greater transparency and evidence with respect to the Commission's application of disabilities to depreciation.

Commission proposal

154. *Discussion Paper 2002/25 Depreciation* proposed the following assessment as the mechanism for applying SDC considerations to depreciation. It proposed adjusting parts of the assessment to make it more relevant to depreciation, and using weights more closely reflecting the deployment of capital by States. For example, the paper proposed using a factor which reflected only the use made of hospital and community health services

by different socio-demographic groups, and weighting this by the Australian proportion of State assets which were health related.

Table 24 PROPOSED SOCIO-DEMOGRAPHIC COMPOSITION ASSESSMENT – 2002 DISCUSSION PAPER

Component	Function	Weight	Basis for calculation
		%	
Buildings	Health	23	New assessment reflecting the use made by different socio-demographic groups of hospitals and community health services
	Education	21	Age component of recurrent government-education disabilities only
	Law and order	6	Police and administration of justice and corrective services demand factors (excluding cultural and linguistic diversity component)
	Other	50	EPC

Further State views

155. Queensland, South Australia, Tasmania and the Northern Territory indicated support for the proposed changes in their rejoinder submissions. New South Wales, Victoria, Western Australia and the ACT did not express a view.

Commission decisions

156. The Commission accepts that there is a conceptual case that a State’s SDC profile will affect its depreciation expenses because of its impact on use made of facilities. As with scale disabilities, it is logical that a SDC disability will impact on capital as well as non-capital related expenses (for example, the more students, the more classrooms needed). Based on the evidence presented to support the latter, the Commission is prepared to accept the materiality of such an assessment, and that in using non-capital use factors, the margin of error is acceptable.

157. The Commission is satisfied that the proposal outlined above is more relevant than the approach used in the 1999 Review and it notes the broad support for this proposal. The Commission’s decisions are summarised in Table 25.

Table 25 COMMISSION DECISIONS – SOCIO-DEMOGRAPHIC COMPOSITION

Decision	Reason
Composite SDC disability factors to be constructed so as to be more relevant to depreciation, as per Table 26	By adjusting the recurrent factors to remove most cost disabilities, they can more accurately reflect capital needs.
Disability factors to be applied to re-weighted components, as per Table 26	These will reflect the proportion of States’ assets used for these types of services.

Proposed method and results

158. The proposed method and weights are shown in Table 26. For law and order, the SDC factors were used without adjustment because they mainly reflect demand influences. For health, the unit cost weights were removed. For government-education, the relevant population factors can be used without adjustment because they reflect student numbers. Cost weights should not be reflected because these are unlikely to influence depreciation expenses. For example, the cost of interpreter services for a court would not affect the quantity of court space required. The weights applied to health, education and law and order were based on the proportion of State assets used for these purposes.

Table 26 PROPOSED SOCIO-DEMOGRAPHIC COMPOSITION ASSESSMENT — BUILDINGS COMPONENT

Component	Factor	Weight	Basis for calculation
Buildings	Health	23	SDC factors from Inpatient Services and Non-inpatient Services, with unit cost weights removed
	Education	21	Composite of relevant population factors from government education assessments
	Law and order	6	SDC factors from Police, Administration of Justice and Corrective Services assessments
	Other	50	EPC

159. Table 27 shows the SDC factors to be applied to the buildings component. The factors have been constructed using the weights derived from the 2004 Review but are built from SDC factors from the other relevant categories that were developed for the 2003 Update.

Table 27 SDC FACTORS - 2004 REVIEW WEIGHTS

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
1997-98	0.9934	0.9695	1.0156	1.0227	1.0033	1.0421	0.9523	1.3941
1998-99	0.9929	0.9688	1.0168	1.0225	1.0019	1.0443	0.9494	1.4180
1999-2000	0.9920	0.9706	1.0176	1.0202	1.0019	1.0456	0.9490	1.4041
2000-01	0.9913	0.9714	1.0182	1.0194	1.0015	1.0468	0.9469	1.4068
2001-02	0.9903	0.9708	1.0194	1.0193	1.0043	1.0472	0.9467	1.4140

Table 28 SDC FACTORS - 2003 UPDATE

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
1997-98	0.99904	0.98398	1.00817	1.01183	0.99722	1.02231	0.98301	1.15813
1998-99	0.99827	0.98415	1.00920	1.01108	0.99717	1.02385	0.98210	1.16529
1999-2000	0.99784	0.98484	1.00938	1.01049	0.99695	1.02468	0.98088	1.16592
2000-01	0.99719	0.98456	1.01007	1.01059	0.99794	1.02513	0.98043	1.17261
2001-02	0.99721	0.98479	1.01108	1.00965	0.99548	1.02672	0.97804	1.17559

Reality check and updateability

160. The factors are consistent with the Commission's findings on SDC needs, with positive needs being assessed for Queensland, Western Australia, South Australia, Tasmania and the Northern Territory. Logically, States with higher needs in these areas will also have higher depreciation expenses in this area (other things being equal).

161. The SDC measure used for depreciation will be updated annually because elements of the SDC factors to be used will be updated annually.

SUMMARY OF FACTORS TO BE APPLIED

Table 29 BUILDINGS — 2004 REVIEW

Component weight	Factor	Method of calculation
60.81 %	Physical environment	Climate — assessment based on CSIRO analysis of the impact of climate on materials Natural hazards — assessment based on Risk Frontiers' relative risk rating for each State
	Service delivery scale	Composite of factors applied to government education and Police
	Construction costs	Dispersion assessment relating to freight — 2% Wages input costs factor and locality allowances — 25% EPC — 73%
	Socio-demographic composition	Composite of demand factors applied to government education, health, and law and order, plus EPC element
	Urban influences	Composite of recurrent factors for: Police National Parks and Wildlife

PLANT AND EQUIPMENT COMPONENT

162. Plant and equipment account for 23 per cent of the assets covered in this assessment. The following factors are proposed for the 2004 Review:

- (i) physical environment;
- (ii) service delivery scale;
- (iii) dispersion costs associated with freight;
- (iv) socio-demographic composition; and
- (v) urban influences.

PHYSICAL ENVIRONMENT

163. The Commission proposes to apply the same factor as that applied to the buildings component. This is because climate and natural hazards can affect plant and equipment as well as assets.

SERVICE DELIVERY SCALE

1999 Review

164. The population concentration factor described above was applied to plant and equipment.

State views

165. Tasmania raised the issue of the need for small States to provide expensive equipment, citing the need for a neonatal unit, a hyperbaric chamber and a police helicopter. It argued that the depreciation assessment should consider:

- (i) capital needs associated with administration and State-wide services that did not vary with population size;
- (ii) the impact of small rural communities on capital needs; and
- (iii) the indivisibility of capital stock.

Commission decisions

166. In *DAP 2003/28 Inpatient Services*, the Commission considered a similar argument from the ACT relating to the cost of its neo-natal unit. It concluded that there was not sufficient evidence to enable it to estimate, and therefore introduce, a service delivery scale disability for the ACT's specialty units. The issue raised in the context of the Depreciation assessment is similar. There may be a conceptual case for assessing needs. However, at this point, the degree of judgment required to develop a factor would render the potential margin of error too great. The Commission does not propose to assess scale needs for depreciation expenses associated with State-wide service delivery.

167. The Commission proposes to apply the same factor as that applied to the buildings component. This is because we consider that a conceptual case exists that service delivery scale disabilities will influence depreciation of plant and equipment in the same way as non-capital disabilities because there is unused capacity in plant and equipment also. The effect is judged to be material and the approach proposed to measure the disabilities will give a result with an acceptable margin of error.

URBAN INFLUENCES

168. The Commission proposes to apply the factor used in the buildings component. This is because higher per capita capital-related costs in urban areas could be expected to be relevant to plant and equipment as well as buildings.

DISPERSION

1999 Review

169. The impact of dispersion on freight costs for plant and equipment was assessed by the application of the freight-related dispersion assessment to one per cent of plant and equipment depreciation expenses.

State views

170. This issue was not raised by States.

Commission proposal

171. The Commission proposed to continue to apply the dispersion assessment to plant and equipment.

Further State views

172. This issue was not raised by States.

Commission decisions

173. The Commission is satisfied that there is a conceptual basis for dispersion to have an impact on the cost of plant and equipment through its effect on freight costs. The dispersion factor developed to measure freight cost differentials indicates that the tests of evidence, materiality and margin of error have been met. The Commission has decided to apply this factor to two per cent of expenses in the plant and equipment component. This is consistent with data provided by the States for the impact of dispersion on housing costs.

Proposed method and results

Table 30 PROPOSED DISPERSION FACTOR — PLANT AND EQUIPMENT

Driver	Method
Freight	Dispersion (general method) applied to 2% of the component

174. Table 31 shows the factors to be applied to the plant and equipment component.

Table 31 DISPERSION FACTORS — PLANT AND EQUIPMENT (2004 REVIEW METHOD)

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
1997-98	1.00055	0.99824	1.00550	1.00080	0.99079	0.99880	0.98164	1.02445
1998-99	1.00055	0.99824	1.00550	1.00080	0.99079	0.99880	0.98164	1.02445
1999-2000	1.00055	0.99824	1.00550	1.00080	0.99079	0.99880	0.98164	1.02445
2000-01	1.00055	0.99824	1.00550	1.00080	0.99079	0.99880	0.98164	1.02445
2001-02	1.00055	0.99824	1.00550	1.00080	0.99079	0.99880	0.98164	1.02445

175. These factors reflect its application to two per cent of expenses in the component.

Reality check and updateability

176. Due to the method used to derive them, the factors are consistent with the Commission's findings on the costs associated with dispersed populations.

177. The factors will not be updated as the dispersion assessment is not updated between reviews.

SOCIO-DEMOGRAPHIC COMPOSITION

178. The Commission proposes to apply the same factor as that applied to the buildings component. This is because SDC needs could be expected to affect the need for plant and equipment as well as buildings.

SUMMARY OF FACTORS

Table 32 PLANT AND EQUIPMENT — 2004 REVIEW

Component weight	Factor	Method of calculation
23%	Physical environment	Climate — assessment based on CSIRO analysis of the impact of climate on materials Natural hazards — assessment based on Risk Frontiers' relative risk rating for each State
	Service delivery scale	Composite of factors applied to government education and Police
	Dispersion costs	Dispersion assessment relating to freight — applied to 2% of expenses
	Socio-demographic composition	Composite of demand factors applied to government education, health, and law and order, plus EPC element
	Urban influences	Composite of recurrent factors for: Police National Parks and Wildlife

OTHER CONSTRUCTION COMPONENT

179. Other construction accounts for 15 per cent of the assets covered in this assessment. The following factors are proposed for the 2004 Review:

- (i) physical environment;
- (ii) service delivery scale;
- (iii) construction costs; and
- (iv) urban influences.

180. SDC disabilities are not considered to be relevant to this component.

181. The Commission proposes to apply the same factors as those applied to the buildings component for:

- (i) physical environment;
- (ii) service delivery scale;
- (iii) urban influences; and
- (iv) construction costs.

We consider that the depreciation of other construction assets will be influenced in a material way by the physical environment, service delivery scale, urban influences and construction costs.

SUMMARY OF FACTORS TO BE APPLIED

182. Table 33 outlines the factors to be applied to the other construction component.

Table 33 OTHER CONSTRUCTION COMPONENT — 2004 REVIEW

Component weight	Factor	Method of calculation
15%	Physical environment	Climate — assessment based on CSIRO analysis of the impact of climate on materials Natural hazards — assessment based on Risk Frontiers' relative risk rating for each State
	Service delivery scale	Composite of factors applied to government education and Police
	Construction costs	Dispersion assessment relating to freight — 2% Wages input costs factor and locality allowances — 25% EPC — 73%
	Urban influences	Composite of recurrent factors for: Police National Parks and Wildlife

OTHER ISSUES

183. This section briefly outlines why the Commission has extended its use of non-capital related disability factors, and why it does not propose to assess needs for declining populations, intrastate migration or the age of assets.

Use of non-capital related disability factors

184. The Depreciation assessment adopted in the 1999 Review used several factors that were developed for non-capital related expenses. These were the socio-demographic composition, isolation and dispersion factors. Similarly, the population concentration factor was partly constructed using the administrative scale factor.

185. The proposals in this paper make greater use of the disability factors developed for non-capital related expenses. The use of discounting has been eliminated. Assessments of administrative scale, service delivery scale and urban influences have been undertaken separately. The construction costs index has been replaced with factors used to assess input costs and dispersion. In the case of socio-demographic composition, only the relevant parts of the factors have been used (for example, relevant population for government education assessments). This was done because use (rather than cost) weights are relevant to depreciation needs.

186. The Commission considers that there is a role for such factors in the Depreciation assessment. To take the example of service delivery scale: it is logical that a State with a number of small communities with services operating with excess capacity will have excess stock capacity (and higher per capita depreciation needs).¹⁵ Using the factors derived for non-capital related expenses improves the consistency of the assessments. Tailoring them by using only the relevant sub-assessments makes them more appropriate. However, in the case of physical environment (the impact of climate and natural hazards on assets), a capital-specific assessment was required.

Declining populations and intrastate migration

187. Population decline and intrastate migration raise the issue of whether the Commission should assess needs for extra capital costs incurred by States that have assets with excess capacity due to population change.

188. **Population decline.** States can experience population loss in particular regions even when the aggregate population is growing. Between 1996 and 2001, 35 per cent of local government areas in Australia experienced population decline. The three largest absolute declines were in Greater Dandenong, Marrickville and Whyalla. The six largest proportional declines were all in Western Australia.

189. **Intrastate migration.** Two typical examples of intrastate migration are the coastal drift and the ‘sponge city’ phenomena. Coastal drift refers to the growth of towns and cities along coastal Australia. The coastal drift occurs due to factors such as lifestyle choices and the services and employment that the coastal towns offer. The sponge city occurrence refers to the growth of larger regional centres (for example Albury-Wodonga) at the expense of surrounding smaller towns. There are many reasons for sponge cities including economies of scale, employment opportunities, population decline and services on offer in the larger towns.

190. **1999 Review.** The 1999 Review method did not account for either situation.

191. **Preliminary State views.** At its 2001 Workplace Discussions, Queensland discussed the difficulties of shifting populations.

192. **Commission proposal.** *Discussion Paper 2002/25 Depreciation* acknowledged the difficulties raised by these issues but tentatively concluded that the disadvantages of introducing an assessment would outweigh any likely benefits.

193. **Further State views.** Western Australia said that all States experience intrastate migration. It argued that, provided the population shifts are sufficiently slow to match reduction in service capacity through depreciation of existing assets, there would not be much net cost to States through inefficient utilisation of capital. Western Australia suggested that it was not worth the extra complication of trying to assess a disability for this issue.

¹⁵ As noted above, the Commission is aware that such a situation might also result in a longer useful life for some assets.

194. South Australia supported an assessment of the needs associated with declining populations. It argued that States were forced to deal with excess capacity, citing the Whyalla Hospital which services a population that has fallen from 35 000 to under 24 000 people. The entire top floor is unused but requires air-conditioning and regular cleaning. Ideally, the hospital would be demolished and replaced with a smaller and newer hospital but this is too costly.

195. Tasmania urged the Commission to reconsider its proposal, arguing that the indivisibility of capital and needs arising from declining populations result in capital-related disadvantages for small States.

196. The Northern Territory opposed an assessment of needs arising from declining populations and intrastate migration. It argued that declining populations advantaged a State. This is because a smaller population reduces a State's need to make provisions for the replacement of assets, and thus reduces its depreciation requirement. In terms of intrastate migration, the Northern Territory argued that depreciation could be seen as equipping a State to replace assets to meet States needs — therefore intrastate migration would only mean a change in the location of government assets to meet those needs.

197. **Commission decisions.** Where a region of a State records a decline in population, it may be judged that its assessed need for depreciation should also decline (as is currently the case). Alternatively, its standardised level of expense per capita might be increased to 'compensate' for the lower number of residents. It could be argued that, in declining regions, States may have difficulty in selling unwanted parts of capital stock. For example, if population decline is reflected in a diminishing number of school students, it may not be possible to consolidate the students and sell surplus stock. The same arguments are relevant where a whole State is facing decline. Note that this is not an issue of intrastate migration *per se* but of regions with declining populations in areas with potentially 'stranded' capital.

198. The Commission has seen examples of 'stranded capital' resulting from population decline. However, it is not convinced that there is a conceptual case for an assessment of needs in the Depreciation category. Over time, States will need to consolidate their capital stock to reflect declining populations. An assessment of needs for declining populations would likely create inefficiencies in that process. In addition, there would be several practical problems in developing an assessment. For example, it is not clear what the threshold population loss for such a disability would be, and it is very likely that any threshold would vary according to the type of capital and the nature of the service being delivered. For these reasons, the Commission does not propose to assess needs for declining populations or intrastate migration.

Age of assets

199. This issue relates to potentially different recurrent costs facing States as a result of the different average ages of their capital stocks.

200. **1999 Review.** The 1999 Review did not account for this.

201. **Commission proposal.** The Commission proposed in *Discussion Paper 2002/25 Depreciation* that no assessment be developed.

202. **State views.** South Australia urged the Commission to reconsider its position on this matter. It noted that recurrent costs are considerably increased when old technology is used — for example, costs can be twelve per cent higher in older prisons and hospitals.

203. Western Australia rebutted South Australia’s argument that older capital stock and later replacement has an effect on depreciation. Western Australia said that depreciation is an expense that represents the funding that needs to be set aside each year to enable the replacement of assets. Western Australia said that State accounting generally spreads this depreciation over the life of an asset and as this proportion does not vary over the life of the asset, the age of the capital stock is not relevant.

204. **Commission decisions.** The Commission accepts Western Australia’s argument that the purpose of depreciation is to allocate the cost of an asset over its useful life and that the age of the stock is not relevant. The Commission is not satisfied that there is a conceptual case for assessing needs for any higher expenses associated with older stock, and has therefore decided not to assess a factor for differences in the age of stock held by States.

Table 34 COMMISSION DECISIONS – POPULATION DECLINE, INTRASTATE MIGRATION AND AGE OF STOCK

Decision	Reason
No needs assessed for excess capacity of assets due to population decline or intrastate migration	Not possible to identify with assurance what the threshold population loss for such a disability would be, particularly given that it would vary according to the type of capital and the nature of the service being delivered
No needs assessed for age of capital stock	Depreciation allocates the cost of stock and does not take account of higher costs associated with older stock

PROPOSED ASSESSMENT FOR THE 2004 REVIEW

205. Table 35 summarises the assessment structure for the Draft Assessment for the 2004 Review.

Table 35 DEPRECIATION PROPOSED ASSESSMENT STRUCTURE FOR THE 2004 REVIEW

Expenditure component	Component weight %	Factors	Basis of calculation
Buildings	60.81	Physical environment	Climate — assessment based on CSIRO analysis of the impact of climate on materials
			Natural hazards — assessment based on Risk Frontiers' relative risk rating for each State
		Service delivery scale	Composite of factors applied to government education and police
		Urban influences	Composite of recurrent factors for police and national parks and wildlife
		Construction costs	Dispersion assessment relating to freight — 2% Wages input costs factor and locality allowances — 25% EPC — 73%
Plant and equipment	23	Physical environment	Climate — assessment based on CSIRO analysis of the impact of climate on materials
			Natural hazards — assessment based on Risk Frontiers' relative risk rating for each State
		Service delivery scale	Composite of factors applied to government education and police
		Urban influences	Composite of recurrent factors for police and national parks and wildlife
		Dispersion	Based on the general method with needs assessed for freight (2%)
Other construction	15	Physical environment	Climate — assessment based on CSIRO analysis of the impact of climate on materials
			Natural hazards — assessment based on Risk Frontiers' relative risk rating for each State
		Urban influences	Composite of recurrent factors for police and national parks and wildlife
		Construction costs	Dispersion assessment relating to freight — 2% Wages input costs factor and locality allowances — 25% EPC — 73%
Fixed costs	1.19	Administrative scale	Composite of factors applied to other categories

Summary of assessment structure

206. The Commission proposes that the category have four components — fixed costs, buildings, plant and equipment and other construction. A different mix of disability factors would be applied to each. These factors would reflect differences in depreciation expenses incurred by the States due to differences in:

- (i) physical environment;
- (ii) size of State government operations (administrative scale);
- (iii) population distribution (urban influences, dispersion and service delivery scale);
- (iv) impact of labour costs on construction costs (input costs); and
- (v) population composition (SDC).

Calculating the category factor

207. Table 36 summarises the components, component weights and disability factors assessed for this category for 2001-02. It shows the calculation of the category factor.

Table 36 DEPRECIATION — DERIVATION OF CATEGORY FACTOR, 2004 REVIEW

Factors	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
Buildings (component weight = 60.81%)								
Physical environment	0.97854	1.05579	0.97512	1.01573	0.97799	0.95081	0.98996	0.96026
Service delivery scale	0.99798	0.99865	1.00124	0.99999	1.00473	1.01041	0.98930	1.02331
Construction costs	1.07567	1.05481	1.00593	0.98930	0.99882	0.90038	0.96154	0.95611
SDC	1.00914	0.99661	0.99509	0.99408	0.99029	0.97649	0.99492	1.05832
Urban influences	0.99183	0.97206	1.02059	1.01764	0.99819	1.04814	0.94430	1.39897
Component factor	1.01717	1.04048	0.96457	0.98398	0.93390	0.85647	0.85466	1.32720
Cont. to category factor	0.62367	0.63796	0.59142	0.60332	0.57261	0.52514	0.52403	0.81377
Other construction (component weight = 15%)								
Physical environment	0.97854	1.05579	0.97512	1.01573	0.97799	0.95081	0.98996	0.96026
Construction costs	1.07567	1.05481	1.00593	0.98930	0.99882	0.90038	0.96154	0.95611
Urban influences	1.00914	0.99661	0.99509	0.99408	0.99029	0.97649	0.99492	1.05832
Component factor	1.02626	1.07042	0.94269	0.96566	0.92995	0.80765	0.91365	0.92587
Cont. to category factor	0.14936	0.15578	0.13719	0.14054	0.13534	0.11754	0.13297	0.13475
Plant and equipment (component weight = 23%)								
Physical environment	0.97854	1.05579	0.97512	1.01573	0.97799	0.95081	0.98996	0.96026
Service delivery scale	0.99798	0.99865	1.00124	0.99999	1.00473	1.01041	0.98930	1.02331
SDC	1.07567	1.05481	1.00593	0.98930	0.99882	0.90038	0.96154	0.95611
Urban influences	1.00055	0.99824	1.00550	1.00080	0.99079	0.99880	0.98164	1.02445
Dispersion	0.99183	0.97206	1.02059	1.01764	0.99819	1.04814	0.94430	1.39897
Component factor	1.00755	1.04304	0.97410	0.98912	0.93816	0.87523	0.84369	1.30140
Cont. to category factor	0.23115	0.23930	0.22348	0.22693	0.21523	0.20080	0.19356	0.29857
Fixed costs (component weight = 1.19%)								
Administrative scale	0.36125	0.49414	0.65360	1.25067	1.57972	5.07006	7.04490	14.66254
Component factor	0.36125	0.49414	0.65360	1.25067	1.57972	5.07006	7.04490	14.66254
Cont. to category factor	0.00430	0.00588	0.00778	0.01488	0.01880	0.06033	0.08383	0.17448
CATEGORY FACTOR	1.00848	1.03892	0.95987	0.98567	0.94199	0.90381	0.93439	1.42156

Calculation Formula

208. The following formulas were used to calculate the contribution of each expenses component to the overall category factor. In each case, the contributions are calculated as the expenses component weight multiplied by the component factor (the bracketed terms in the formulas). Each contribution to category factor was rescaled to ensure that the sum of standardised equals the sum of actual expenses.

$$\begin{aligned}
 \text{Buildings (B)} &= .6081 (p*sds*u*(d_cc+ic-1)*sdc) \\
 \text{Plant and equipment (PE)} &= .2300 (p*sds*u*d*sdc) \\
 \text{Other construction (OC)} &= .1500 (p*u*(d_cc+ic-1)) \\
 \text{Fixed costs (FC)} &= .0119 (s) \\
 \\
 \text{Category Factor} &= B + PE + OC + FC
 \end{aligned}$$

Standardised expenses

209. Table 37 shows the category factors calculated for the Draft Assessment for the 2004 Review compared with the category factors assessed for this category in the 2003 Update

Table 37 COMPARISON OF CATEGORY FACTORS, 2003 UPDATE AND THE DRAFT ASSESSMENT FOR THE 2004 REVIEW

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
2003 Update	1.08229	0.99564	0.91457	0.93627	0.95768	0.87350	0.88062	1.36594
Draft Assessment - 2004 Review	1.00848	1.03892	0.95987	0.98567	0.94199	0.90381	0.93439	1.42156

210. The category factors shown above are different from those developed in the 1999 Review. The main changes in method are set out in Table 40. The net effect has been lower needs assessed for New South Wales, and greater needs assessed for all other States. However, New South Wales’s housing and urban transit depreciation needs will now be recognised in those categories.

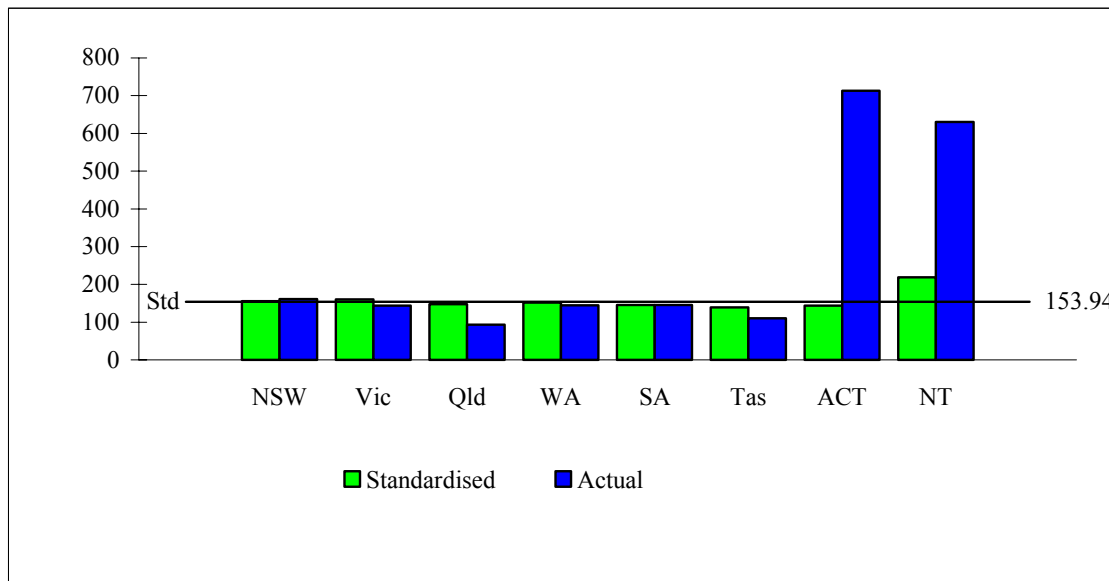
211. Table 38 shows the standardised expenses assessed for this category for 2001-02 in the draft 2004 Review assessment compared with those assessed in the 2003 Update.

Table 38 ACTUAL AND STANDARDISED EXPENSES, 2001-02

	Standard	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
2003 Update Actual Expenses									
\$ per capita	329.96	331.34	272.50	383.60	333.38	365.75	299.43	236.23	613.79
2003 Update - Standardised Expenses									
\$ per capita		357.26	328.40	301.68	308.79	316.07	288.22	290.92	450.92
2004 Review Actual Expenses									
\$ per capita	153.9	161.2	143.5	93.6	144.7	145.4	109.9	712.8	630.2
2004 Review Draft Assessment - Standardised Expenses									
\$ per capita		155.2	159.9	147.8	151.7	145.0	139.1	143.8	218.8

212. Figure 2 shows the standardised, estimated and standard expenses for Depreciation for 2001-02.

Figure 3 PER CAPITA DEPRECIATION EXPENSES – STANDARDISED, ESTIMATED AND STANDARD, 2001-02



Effect of assessment on grants

213. Table 39 shows the redistribution of grants resulting from the assessment in the 2003 Update and in the Draft Assessment for the 2004 Review.

214. Compared to an equal per capita assessment, the Draft Assessment redistributed \$59.9 million away from Queensland, Western Australia, South Australia, Tasmania and the ACT to the other States, \$168 million less than in the 2003 Update.

Table 39 EFFECT OF ASSESSMENT ON GRANT DISTRIBUTION —
DEPRECIATION

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Total ^(a)
	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m
Contribution to 2003 Update ^(b)	199.9	-10.5	-117.8	-42.9	-22.2	-21.5	-12.9	28.0	227.9
Contribution to 2004 Review Draft Assessments ^(b)	11.3	33.7	-28.0	-4.6	-15.3	-8.5	-3.6	14.9	59.9
Total change	-188.6	44.2	89.8	38.3	7.0	13.1	9.3	-13.1	201.7

(a) Total redistribution.

(b) Assuming same pool and a constant population.

(c) This figure shows the change in the amount redistributed among the States between the 2003 Update and the 2004 Review Draft Assessment. It does not necessarily equal the difference in the total contributions to the relativities between the two inquiries.

Table 40 DEPRECIATION ASSESSMENT CHANGES IN METHODOLOGY FROM THE 1999 REVIEW

Change	Effect
Replacement of asset life assessment with a climate assessment and a natural hazards assessment	The climate assessment would increase the needs of Victoria and Western Australia, and reduce the needs of Queensland and the Northern Territory.
Replacement of population concentration assessment with separate assessments for administrative scale, service delivery scale and urban influences	The separate assessment of administrative scale and service delivery scale would result in greater needs for smaller States. Urban influences are not as significant as they were under the 1999 Review approach.
Replacement of Rawlinsons Index with a construction costs factor assessing needs for wages and dispersion and incorporating an EPC element	Lower needs assessed for New South Wales, Tasmania, the ACT and the Northern Territory.
Removal of isolation assessment	Lower needs assessed for the Northern Territory, Tasmania, Western Australia and the ACT.
Re-weighting of SDC elements	The re-weighting of health, education and law and order elements had effects in different directions. For example, New South Wales and the Northern Territory benefited from a greater weighting for police, and Queensland, South Australia, Tasmania and the Northern Territory benefited from the higher weighting for health.
Removal of needs relating to urban transit	Lower needs assessed in this category for NSW, Victoria and the ACT.
Removal of needs relating to housing	Lower needs assessed in this category for NSW, Queensland, South Australia, Tasmania and the Northern Territory.

ATTACHMENT A

PROPOSED CLIMATE ASSESSMENT METHODOLOGY

1. This attachment explains how staff developed an assessment of the impact of climate on assets. The assessment would be combined with a natural hazards assessment to form physical environment factors to be used in the Depreciation assessment.

CSIRO analysis

2. The Commission engaged CSIRO to provide an analysis of how different climatic conditions affect building materials. The conditions selected by CSIRO were (in order of impact on materials):

- (i) wetness;
- (ii) pollution;
- (iii) salt;
- (iv) relative humidity;
- (v) temperature;
- (vi) biological agents;
- (vii) ultraviolet light; and
- (viii) condensation.

3. The materials selected by CSIRO were: metal, coated metal, bricks, concrete, tiles, stone, adhesives, glass, timber, paint, plastic, polyester resins, metal pipes, cement pipes, plastic pipes, timber composites, and timber.

4. CSIRO provided a report explaining the effect of each climatic condition on each material (depending on its position in construction). It also provided information about which regions were more susceptible to the climatic conditions.

Quantification

5. To develop factors from this information, staff assigned a weight to:

- (i) each condition; and
- (ii) each region's vulnerability to each condition.

6. The weight attached to **each condition** was calculated using the following chart, which was provided by CSIRO. Staff attached weights to strong (0.5), moderate (0.3) and weak (0.1).¹⁶ Each condition was then rated according to its effect on materials. These ratings are listed on the bottom row of the chart.

Table A-1 EFFECT OF ENVIRONMENTAL CONDITIONS ON MATERIALS

Material and position	Degradation Mechanism	Environmental Conditions							
		Temp	Salt	Condensation RH	Wetness	Biological Agents	Pollution	UV	
Metal - exterior cladding	Corrosion	Moderate	Strong	Moderate	Strong	Strong	None	Strong	Weak
Coated metal - exterior cladding	Corrosion	Strong	Strong	Moderate	Strong	Strong	None	Strong	Strong
Bricks - exterior cladding	Weathering/salt attack	Weak	Strong	Moderate	Strong	Strong	Weak	Moderate	Weak
Concrete - exterior cladding	Salt attack, freeze/thaw, AAR	Weak	Strong	Weak	Weak	Strong	None	Strong	Weak
Tiles - roof cladding	Salt attack/Fungal growth	Weak	Strong	Weak	Weak	Moderate	Moderate	Strong	Weak
Stone - exterior cladding	Salt attack, chemical dissolution	Weak	Strong	Weak	Weak	Moderate	Moderate	Strong	Weak
Adhesives - exterior cladding	Water penetration, photo-oxidative degradation	Strong	Weak	Strong	Strong	Strong	None	Moderate	Weak
Glass - exterior cladding		Strong	Weak	Weak	Weak	Weak	None	Moderate	Moderate
Timber - Exterior	Termites/Fungal attack. Corrosion of fasteners	Weak	Weak	Moderate	Moderate	Strong	Strong	Weak	Moderate
Paint - exterior	Chalking	Weak	Weak	Moderate	Strong	Moderate	Weak	Weak	High
Plastic - exterior	Photo-oxidation	Strong	Weak	Weak	Weak	Moderate	None	Strong	Strong
Polyester-resins - exterior	Yellowing	Strong	Weak	Weak	Weak	Strong	None	None	Strong

¹⁶ In 2002, some of these were higher weights — 0.8, 0.5 and 0.1.

Material and position	Degradation Mechanism	Environmental Conditions							
		Weak	Strong	None	None	Strong	Strong	Strong	None
Metal pipes Soil	Corrosion	Weak	Strong	None	None	Strong	Strong	Strong	None
Cement pipes Soil	Corrosion	Weak	Strong	None	None	Strong	Strong	Strong	None
Plastic pipes - soil	Degradation	Weak	Weak	None	None	Weak	Moderate	Strong	None
Metal - building envelope	Corrosion	Weak	Moderate	Strong	Moderate	Strong	None	Moderate	None
Timber composites - building envelope	Hydrolysis of adhesive-internal bond failure	Strong	None	Weak	Strong	Strong	Weak	Weak	Weak
Timber - building envelope	Termites/Fungal attack. Corrosion of fasteners	Weak	Weak	Moderate	Moderate	Strong	Strong	Weak	Weak
Degradation rating		4.4	5.1	3.5	4.5	7.4	3.2	6.1	3.4

Source: CSIRO

7. **Each region's vulnerability to each condition** was calculated as follows. Using Table A-2 (provided by CSIRO) and mapping software combined with Census data, staff calculated the proportion of the population of each State living in a region with a high, medium or low vulnerability to a particular condition. The proportion living in a high risk region was weighted at 1.5, medium at 1.3 and low at 1.1. This was repeated for each condition.

Table A - 2 CLIMATIC FACTORS THAT PROMOTE MATERIAL DEGRADATION

Climatic condition	Weight assigned to condition	High impact regions	Medium impact regions	Low impact regions
		1.5 ¹⁷	1.3 ¹⁸	1.1
Time of wetness and Moisture	7.4	Victoria, South West WA., Near Coastal NSW, Near Coastal North Queensland, ACT	Near Coastal Queensland, Coastal NT., Coastal S.A.	Inland Regions, Coastal North West WA.
Condensation	3.5	No trend	No trend	No trend
Ultraviolet or sunlight	3.4	Inland	Coastal NT, Coastal Queensland	Victoria, Southern Coastal NSW, South West WA, ACT
Maximum temperature	4.4	Inland Regions, North West Coastal WA.	Coastal Queensland	Victoria, Tasmania, Coastal NSW, Southern Coastal Queensland, South west Coastal WA, Coastal South Australia, ACT
Cyclic Temperature	4.4	Inland, Victoria, ACT	NSW coast, South West WA., Coastal SA, Tasmania	Coastal Queensland
Relative humidity	4.5	Coastal North Queensland, Coastal North West NT., South West WA, Victoria, Tasmania, South East S.A., ACT	Coastal Queensland, Coastal NT., NSW, SA	Inland Regions Of NT, NSW, SA, WA and Queensland.
Marine salts	5.1	Coastal South West WA, Coastal South East S.A. Coastal Victoria and Tasmania	Coastal NSW and Coastal Southern Queensland	Non-Coastal Regions and Coastal North Queensland and Coastal North West WA, ACT
Industrial pollutants	6.1	Sydney, Melbourne, Kalgoorlie, Brisbane, Mt Isa, Port Pirie, Gladstone	Regions in neighbourhood of Sydney, Melbourne, Brisbane, Kalgoorlie, Mt Isa, Port Pirie, Gladstone	All other regions
Biological agents	3.2			

Source: For high medium and low ratings — I.S. Cole, Assessment of information relevant to Impact of Climate on Assets in the States of Australia, April 2002, CSIRO
For weights — Commonwealth Grants Commission

8. Staff multiplied each condition's degradation weight by each State's level of vulnerability to that condition. This provided a measure of each condition's impact on each

¹⁷ In 2002, this weight was 1.8.

¹⁸ In 2002, this weight was 1.5.

State. These were added for each State to derive a gross measure of vulnerability to degradation.

Example — pollution in New South Wales

9. The following example illustrates these steps. It concerns the risk posed by industrial pollutants in New South Wales.

- (i) The relevant regions were Sydney, the region surrounding Sydney (identified as Port Stephens to Kiama and 50 kilometres inland), and the rest of the State. The corresponding risk of pollution is high, medium and low.
- (ii) 64 per cent¹⁹ of the State's population lived in Sydney (high risk), eight per cent lived in the surrounding area (medium risk), and 27 per cent lived in the rest of the State (low risk).
- (iii) Industrial pollutants were weighted at 6.1, a relatively high weighting. This was calculated by quantifying and adding the effect of pollution on a range of materials. Pollution has a strong effect (weighted at 0.5) on metal (exterior cladding), coated metal, concrete, tiles, stone, plastic, metal pipes, cement pipes and plastic pipes; a moderate effect (weighted at 0.3) on bricks, adhesives, glass, and metal (building envelope); and a weak effect (weighted at 0.1) on timber, paint and timber composites.
- (iv) The weighted population for each condition was calculated by multiplying 0.64 by 1.5, 0.08 by 1.3 and 0.27 by 1.1 (and adding them). This gave a figure of 1.361.
- (v) The figure obtained in step (iv) was multiplied by 6.1 (obtained in step (iii)) to give a figure of 8.3021 as a measure of the impact of industrial pollutants in New South Wales.

Factors

10. The factors derived using the weights identified above were as follows.

¹⁹ For simplicity, we have rounded off figures in this explanation.

Table A - 3 CLIMATE FACTORS

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
2001-02	0.97854	1.05579	0.97512	1.01573	0.97799	0.95081	0.98996	0.96026

11. The main drivers were:

New South Wales — medium vulnerability to most influences and low vulnerability to UV and biological agents;

Victoria — relatively high vulnerability to moisture, cyclic temperature, relative humidity, marine salts and industrial pollutants;

Queensland — high vulnerability to maximum temperature, medium vulnerability to UV, marine salts, industrial pollutants and biological agents and low vulnerability to remaining influences;

Western Australia — relatively high vulnerability to moisture, relative humidity and marine salts, medium vulnerability to biological agents and cyclic temperature;

South Australia — high vulnerability to relative humidity and marine salts, medium vulnerability to moisture and cyclic temperature, and low vulnerability to other influences;

Tasmania — high vulnerability to relative humidity and marine salts and low vulnerability to remaining influences;

ACT — relatively high vulnerability to moisture, cyclic temperature and relative humidity, with low vulnerability to other influences; and

Northern Territory — high vulnerability to biological agents and UV, and medium vulnerability to moisture, cyclic temperature maximum temperature and relative humidity.