Discussion Paper

A Review of the Regulatory Framework for Development of Costing Principles for Rail Access in WA

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1. OVERVIEW

1.1. Introduction and Purpose

In December 2000, Westrail's freight operations were sold to the Australian Railroad Group with a 49–year lease of the freight rail network infrastructure.

The *Railways (Access) Act 1998* ("the Act") and its subordinate *Railways (Access) Code 2000* ("the Code") establish a third party access regime governing access to the privatised track infrastructure on certain terms and conditions. The Office of the Rail Access Regulator was established in July 2001 to make the regime operational, and to give effect to the legislative requirements.

This paper discusses some of the key conceptual issues underpinning the determination of access prices under the access regime. In particular, this paper addresses the implications of the approach taken to the development of costing principles and determination of access prices under the regime and draws attention to matters that should be addressed by the Regulator in assessing WestNet Rail's Costing Principles.

This section describes the operation of the regime itself, highlighting the provisions governing the rights and responsibilities of the various parties providing and seeking access.

1.2. Nature of Regime

The basic structure of the regime is one of negotiation and arbitration of access prices within the bounds of floor and ceiling prices, subject to a "revenue cap" imposed on the railway owner (the provider of rail track services) through over-payment rules, and subject to requirements for consistency in the determination of access prices within classes of train operators (seekers of access to rail tracks). While access prices may be determined by negotiation between the railway owner and operators in the first instance, parties may resort to arbitration. An arbitrator would be appointed by the Regulator, who would also provide guidance on matters addressed by arbitrators.

A number of principles governing access are set out in the Code. These include procedural steps for seeking access to rail tracks and routes, and rules for the determination of costing principles that would be applied to the determination of floor and ceiling prices for any particular route.

1.3. The Process of Seeking Access

The steps involved in achieving access under the regime are as follows.

- Section 6 of the Code requires the railway owner to publish as soon as practicable after the commencement of the Code:

  – the form of the railway owner's standard access agreement; and

  – information specified in Schedule 2 of the Code, including general information about routes, gauge, applicable rolling stock etc.

- In accordance with section 7 of the Code an entity that is interested in seeking to operate trains on a particular route may request the railway owner to provide it with information including:

  (a) an initial indication of –

    (i) the available capacity of that route;

    (ii) the price that the entity might pay for access; and

    (iii) the terms, conditions and obligations that the railway owner would want to be included in any access agreement;

  (b) for each relevant route section, particulars of –

    (i) the gross tonnes carried on that section in each of the 3 complete financial years of the railway owner preceding the day on which the request is received; and

    (ii) the curve and gradient diagrams;

  (c) the working timetables for the route; and

  (d) the origin and destination of any train paths proposed by the railway owner for the route.

- Under section 8 of the Code, an entity seeking access may then make a proposal to the railway owner, that must

  (a) specify the route, including the railway infrastructure, to which access is sought;

  (b) indicate the times when the access is required; and

(c) set out the nature of the proposed rail operations.

- Under section 9 of the Code, the railway owner must respond to the proposal and provide the proponent with:

  (i) the floor price and the ceiling price for the proposed access;

  (ii) the costs for each route section on which those prices have been calculated; and

  (iii) a copy of the costing principles that for the time being have effect under section 46 of the Code;

- Section 13 of the Code requires that, subject to the proponent meeting conditions of financial and managerial ability and the proposed operations being within the capacity of the proposed route, the railway owner must negotiate in good faith with the entity with a view to the railway owner and the entity making an access agreement in respect of the route.

- In the event that the proponent and the railway owner are unable to reach a negotiated agreement on access, resort may be had to arbitration in accordance with sections 22 to 35 of the Code.

- Once the terms and conditions and prices for access are agreed upon, the proponent and railway owner may enter into an access agreement in accordance with provisions of sections 36 to 39 of the Code.

The Code establishes time constraints on the various steps in the seeking of access.

1.4. General Functions of the Regulator

Under section 20 of the Act, the Regulator has functions to monitor and enforce compliance with the Act and Code, and may do all things necessary to perform these functions. The Regulator is required under the Code to act in relation to a number of specific matters, including the following.

- Maintaining a register of access agreements (section 39).

- Reviewing of a number of documents submitted by the railway owner and either approval, approval with amendment, or determination of the guidelines to apply. These documents form 'matters' for the arbitrator to take into account in the event of arbitration and include:

– segregation arrangements (section 42);

– train management guidelines (section 43);

– statements of policy (section 44).

(the review of these three documents must include opportunity for public comment)

– costing principles (section 46); and

– over–payment rules (section 47).

- Reviewing the weighted average cost of capital at 30 June each year, and in 2003 and every 5 years subsequent to that, conduct a public review of the determination of the weighted average cost of capital.

2. OVERVIEW OF COSTING PRINCIPLES

2.1. Requirement for Costing Principles

As noted above, under section 9 of the Code the railway owner must respond to a proposal from a proponent seeking access to a rail route by providing the proponent with:

(i) the floor price and the ceiling price for the proposed access;

(ii) the costs for each route section on which those prices have been calculated; and

(iii) a copy of the costing principles that for the time being have effect under section 46 of the Code;

Section 46 of the Code defines the costing principles as a statement of the principles, rules and practices to be followed in the determination of costs for the purposes of determining floor and ceiling prices for a route, and a statement of the principles, rules and practices to be followed in the keeping and presentation of the railway owner's accounts and financial records as far as they relate to the determination of these costs.

The relevance of the costing principles can be explained by application to the floor and ceiling prices.

2.2. Floor Prices and Ceiling Prices

As noted above, section 9 of the Code requires the railway owner to respond to a proposal from a proponent seeking access to a rail route by providing the proponent with a floor price and the ceiling price for access to the relevant route. The floor price and ceiling price constitute bounds within which the price for access may be determined by negotiation or arbitration.

The floor and ceiling prices arise from the requirement under Clause 6 of schedule 4 of the Railways (Access) Code 2000 that prices to be paid by an operator to the railway owner for the provision of access are to be determined by negotiation subject to the negotiated price meeting criteria of the "floor-price test" and the "ceiling-price test", established by clauses 7 and 8 of schedule 4.

The floor-price test requires that the price charged to an operator must be established in accordance with two criteria set out in clause 7 of schedule 4:

- the price paid by an operator for access to a route and associated railway infrastructure not be less that the incremental costs incurred by the owner as a result of the operations to which that price relates (sub-clause 7(1)); and

- the sum total of

  - payments received by the railway owner from all operators and all other entities provided with access to a route, or part of a route, and associated infrastructure; and

  - the revenue that the railway owners accounts show as being attributable to its own operations on the route,

  must not be less than the total of the incremental costs resulting from the combined operations on the route of all operators and other entities and the railway owner (sub-clause 7(2)).

The result of this test is that negotiation must not result in a determination of a floor price that is less than would enable the railway owner to just earn revenues sufficient to cover the costs that would be avoided (i.e. not incurred) if access was not granted to the relevant operator. Further, the floor price must not be less than a level such that if all operators on a particular route were charged that price, the railway owner would recover revenues sufficient to cover all costs that would be avoided if no operations were to be conducted on the route.

It should be noted that the costs relevant to consideration in respect of the floor price reflect only costs that would be avoided if operations did not occur, for example costs of train scheduling, costs of operating of signals, and maintenance costs that arise purely in respect of additional trains passing over lines on a route, but not costs associated with returns on sunk investment, depreciation of sunk assets and certain maintenance activities that would occur regardless of whether any additional train operations actually take place.

The ceiling-price test requires that the maximum price that an operator would pay for access to a route and associated infrastructure not exceed the total costs that would be attributable to that route and that infrastructure if that operator was the sole operator on that route (sub-clauses 8(1), 8(2) of schedule 4 of the Code). In the case of the ceiling price test, "total costs" include both the incremental or avoidable costs referred to above in relation to the floor-price test, and other costs (or shares of other costs) attributed to the route such as returns on assets, depreciation costs and costs of management and maintenance that is unrelated to actual train movements on the route. The ceiling price is determined under an assumption that the proponent for access to the railway route is the only operator on that route, i.e. on a "stand alone" basis for that operator.

Clause 8 of schedule 4 of the Code also includes provisions for a "revenue cap" constraint on prices. Sub-clause 8(3) requires that the sum total of:

- payments received by the railway owner from all operators and all other entities provided with access to a route and associated infrastructure; and
- the revenue that the railway owners accounts show as being attributable to its own operations on the route,

must not exceed the total of the costs attributable to the route.

Sub-clause 8(4) of schedule 4 provides an exception to this, that being that the revenue cap established by sub-clause 8(3) may be exceeded if the railway owner complies with "over-payment" rules approved or determined by the Regulator under clause 47 of the Code. The over-payment rules effectively provide for the refund to operators of revenues in excess of the revenue cap established under sub-clause 8(3) of schedule 4 of the Code.

The Western Australian regulatory system of price determination by negotiation with a range of prices between a floor price and a ceiling price and subject to a revenue cap, is consistent with the regulatory systems or regimes established, or sought to be established, in Queensland for Queensland Rail,[1] in New South

[1] Queensland Rail's Draft Access Undertaking, October 2001, p 30.

Wales for the Rail Access Corporation,[2] and nationally for the Australian Rail Track Corporation.[3]

2.3. Total Costs and Cost Allocation

The determination of floor and ceiling prices requires the determination of incremental costs and of total costs, and the allocation of these costs to sections (or segments) of the rail network.

Clause 1 of schedule 4 of the Code defines total costs as meaning the total of all:

- operating costs;
- capital costs; and
- the overhead costs attributable to the performance of the railway owner's access related functions whether by the railway owner or an associate.

Cost allocation involves attributing the "fixed" (as opposed to incremental) component of total costs to routes or segments of the rail network for the purposes of determination of ceiling prices for individual routes. The Code is silent on the method of allocation of costs except in so far as indicating that the ceiling price must be not more than the total costs attributable that the relevant route and infrastructure (sub-clause 8(1) of schedule 4 of the Code).

The determination of total costs and the allocation of these costs are required to be set out under the costing principles prepared by the railway owner and approved by the Regulator. Matters that should be taken into account in assessment of Costing Principles prepared under the Code are discussed in the following sections of this report.

[2] Independent Pricing and Regulatory Tribunal of New South Wales, April 1999, Aspects of the NSW Rail Access Regime Final Report, pp24 – 27.

[3] The access undertaking submitted by the Australian Rail Track Corporation to the ACCC under Part IIIA of the Trade Practices Act sought to establish a regime with negotiation of prices within range of floor prices and ceiling prices, but established no revenue cap. The ACCC in its draft decision of November 2001 indicated a preference for including a revenue cap.

3. TOTAL COSTS

3.1. Capital Costs

Meaning of "Capital Costs"

The term "capital costs" is defined in clause 2 of schedule 4 of the code to mean the costs comprising both the depreciation and risk-adjusted return on the relevant railway infrastructure, where that railway infrastructure is indicated in clause 2 to not include the land on which the infrastructure is situated or of which it forms part.

Clause 3 of schedule 4 indicates that the capital costs are to be determined as the equivalent annual cost or annuity. Guidelines for the calculation of the annuity are set out in clause 4 of schedule 4, indicating that the calculation of the annuity is to be made by applying –

- the gross replacement value (GRV) of the railway infrastructure as the principal;
- the weighted average cost of capital (WACC) as the interest rate; and
- the economic life of the infrastructure which is consistent with the basis for the GRV (expressed in years) as the number of periods.

The WACC is set by the Regulator.

Capital costs are calculated as an annuity to provide for the depreciation of the asset value and for payment of returns on capital through a capital charge that remains constant over time, but within which the component comprising depreciation increases over time and the component comprising "interest" decreases over time, as the asset value is depreciated.

The WACC determined by the Regulator was the subject of the previous report provided by The Allen Consulting Group to Indec Consulting (Rail Access Issues Review of the WACC, November 2001). The matters of asset valuation and depreciation are considered in more detail below.

Asset Valuation – Gross Replacement Value

Clause 4 of Schedule 4 of the Code defines the GRV as being the gross replacement value of the railway infrastructure (i.e. the gross cost of replacing that infrastructure at the current time), calculated as the lowest current cost to replace existing assets that:

- have the capacity to provide the level of service that meets the actual and reasonably projected demand; and
- are, if appropriate, modern equivalent assets.

By virtue of the requirement to consider "modern equivalent assets", the gross replacement value as defined in the Code is similar to the concept of an optimised replacement cost, a more widely used term in the context of regulation of access to essential infrastructure. Changes in technology since the assets were constructed and different expectation of use of the assets may cause the "modern equivalent" or "optimised" assets to be different from the existing assets.

The purpose of valuation of the assets by gross replacement value defined in this way is to ensure that the capital costs upon which access prices are based reflect the costs that would be incurred if those assets were constructed today, by an efficient provider of railway services, for the purposes of meeting current and expected future demand for these services. By adopting such a basis for asset valuation, current operators would face prices based on the costs that would be incurred by an efficient new entrant in providing the rail assets, rather than the historical costs of asset construction which could include costs of constructing assets that are now redundant or which may have been more expensive to construct in the past by virtue of inferior technology at that time.

The "gross replacement value" approach to asset valuation under the Western Australian regulatory regime differs from the approaches used in respect of access regimes for rail infrastructure in Australia. The Australia Rail Track Corporation (ARTC),[4] the NSW Rail Access Corporation[5] and Queensland Rail[6]

[4] ACCC Draft Decision Australian Rail Track Corporation Access Undertaking, November 2001, pp 123, 128.
[5] Independent Pricing and Regulatory Tribunal of New South Wales, April 1999, Aspects of the NSW Rail Access Regime Final Report, p32.
[6] Queensland Rail's Draft Access Undertaking, October 2001, p 30.

have all determined access prices on the basis of a "depreciated optimised replacement cost" approach to asset valuation.

As mentioned above, under the Western Australian regulatory regime the gross replacement value is conceptually similar to an optimised replacement cost. The difference between the gross replacement value or optimised replacement cost and a depreciated optimised replacement cost is that the latter value is scaled to reflect the age of the assets. For example, consider an hypothetical asset that has an optimised replacement cost of $100 million, has an expected life of 100 years and which is currently 20 years old. If that asset is assumed to be depreciated (i.e. to "wear out" or lose economic value) at a steady rate of its expected life, then the depreciated optimised replacement cost would be calculated by scaling the optimised replacement cost to reflect the fact that the existing asset only has 80 percent of its life remaining. That is, the depreciated optimised replacement cost would be $80 million.[7]

Although the Western Australian regime values assets using a different methodology than under other regulatory regimes in Australia, this does not necessarily mean that the Western Australian regulatory regime is not appropriate for the purposes of achieving the objectives of regulation, or that it would have different implications for the prices that operators would pay. Rather, the different approaches may all achieve similar outcomes if applied in an appropriate manner. Whether or not the approaches are applied "appropriately" depends upon treatment of capital depreciation and operating costs in a manner consistent with the asset valuation methodology. This is further addressed below after a discussion on depreciation.

Depreciation

Depreciation is the capital cost recognised for the purpose of allowing a capture of revenue to compensate the asset owner for any decline in the economic value of its asset base over time. It is a return of capital to the asset owner.

The decline in economic value may arises as the useful life of the asset become shorter either due to the asset wearing out (technical depreciation), or to the asset

[7] In more technical terms, this reflects a "straight-line" depreciation methodology.

becoming progressively redundant due to advances in technology or reduced demand for the services provided with the asset (economic depreciation).

Depreciation is a provision rather than an actual cash expenditure. It is therefore determined in accordance with a methodology based on assumptions about the decline in economic value of the asset, rather than reflecting a direct cost. The time path of depreciation costs reflects a chosen depreciation profile and assumptions as to the economic life of the asset.

The most common depreciation methodology used in regulating access prices for essential infrastructure in Australia is straight-line depreciation, whereby the asset value is depreciated at a constant rate over the life of the asset. For example, an asset valued at $100 million with a life of 100 years would be depreciated at a rate of $1 million each year. Such a depreciation methodology has been almost invariably used in determining regulated access prices to electricity and gas-pipeline infrastructure in Australia, and has been used in determining rail access charges for the Australia Rail Track Corporation[8] and the NSW Rail Access Corporation.[9]

Depreciation methodologies could also “accelerate” or “front-load” depreciation so that a greater proportion of asset value is recovered in early years of the life of the asset, or “back-loaded” so that a greater proportion of asset value is recovered in the later years of the life of the asset.

The annuity method of determining capital costs required to be applied under the Western Australian rail access regime is an example of a back-loaded depreciation schedule. Under the annuity method, the capital costs, which comprise the return on capital and depreciation, are held constant over time. In the early years of the asset life when the asset value is high, the capital costs are comprised largely of the return to capital or “interest”. As the asset becomes depreciated, the value of the return on capital decreases and hence the share of the constant “annuity” that comprises depreciation increases.

While the annuity method of determining capital costs implies a different treatment of depreciation under the Western Australian rail access regime than

[8] ACCC Draft Decision Australian Rail Track Corporation Access Undertaking, November 2001,n pp 123, 128.
[9] Independent Pricing and Regulatory Tribunal of New South Wales, April 1999, Aspects of the NSW Rail Access Regime Final Report, p46.

has been applied elsewhere in Australia, the acceptable or appropriate treatment of depreciation depends more on consistency with asset valuation and operating costs than with the specific depreciation methodology applied.

3.2. Operating Costs

Clause 1 of Schedule 4 of the Code defines operating costs in relation to railway infrastructure as including:

- train control costs, signalling and communications costs, train scheduling costs, emergency management costs, and the costs of information reporting; and
- the cost of maintenance of railway infrastructure calculated on the basis of cyclical maintenance costs being evenly spread over the maintenance cycle,

being costs that would be incurred were the infrastructure replaced using modern equivalent assets.

There are two particular points of note in this definition of operating costs.

Firstly, there is the provision that the cost of maintenance of railway infrastructure be calculated on the basis of cyclical maintenance costs being evenly spread over the maintenance cycle. That is, those costs that in the parlance of the railway industry are referred to as the costs of “periodic major maintenance” should be treated as an annualised provision rather than a cost expensed in the year in which the maintenance expenditure actually occurs.

Secondly, the operating costs are defined as being the costs that would be incurred if the infrastructure was replaced using modern equivalent assets. That is, the operating costs are to be calculated on the assumption that the assets are new and constructed using modern technology, rather than calculated on the basis of the costs that are expected to occur for the actual existing assets. This treatment of operating costs differs from that under other access regimes for rail in Australia. The Australian Rail Track Corporation and Queensland Rail both calculate operating costs on the basis of costs expected to be incurred.

3.3. Determination of Total Costs under the Western Australian Access Regime

As noted above, the appropriateness of a methodology to be used for calculating costs of a regulated business is not a matter of there being a unique suitable methodology, but rather there are a range of suitable methodologies that may be applied and what is important is that there is consistency in the choice and application of methodologies used for different cost components.

The matter of principal concern in applying the costing methodologies is to ensure that the estimate of total costs (and hence the target revenue to be captured by the regulated business) is just sufficient to cover the costs incurred by a regulated business through:

- the return on capital (i.e. the business's costs of debt and equity finance);
- depreciation (i.e. the decline in the economic value of assets);
- operating costs; and
- overhead costs.

In very general terms, this may be undertaken according to two different premises:

- estimating the forward-looking efficient costs for a regulated business with the existing actual assets; or
- estimating the forward-looking efficient costs for an hypothetical business with modern equivalent assets.

The differences between the Western Australian regulatory regime and the regimes elsewhere in Australia can be largely attributed to differences in the underlying basis for estimating costs, with estimation of costs under the Western Australian regime being based on the latter of these approaches, and other regimes being based on the former.

The estimation of costs within this context is discussed below.

Asset Valuation

It was noted above that the Western Australian regime differs from the regulatory regimes in the methodology used for asset valuation with the Western Australian regime using a gross replacement value (or optimised replacement cost) methodology whereas other regimes have utilised a depreciated optimised replacement cost methodology. The value used by the Western Australian regime will return a higher asset value by virtue of the absence of depreciation.

The differences in valuation of the existing asset do not, however, affect estimates of total costs if other costs are treated in a manner consistent with the asset valuation. This can be demonstrated by a simple numerical example.

Consider a rail asset costing $100 million to build and which would has a useful life of 10 years in the absence of major periodic maintenance. For the sake of the example assume the asset is two years old at the time that regulation commences. To maintain the asset value in perpetuity, major periodic maintenance would need to occur at 10 year intervals, at a cost of $100 million. Other operating costs amount to $1 million per annum, and the cost of capital is 10 percent per annum.

With the asset valued at the optimised replacement cost (i.e. $100 million, assuming no inflation and no changes in technology since the asset was constructed), assumed costs over the ensuing 10 year period would be as indicated in Table 1. Note that costs are based on the premise that the asset is new, hence the major periodic maintenance is assumed to not occur until year 10, and the annualised costs of the major period maintenance are spread over the entire 10 year period. The present value of costs (in perpetuity) is $172.75 million.

TABLE 1: COST SUMMARY FOR AN HYPOTHETICAL RAIL ASSET WITH INITIAL REGULATORY ASSET VALUE SET AT OPTIMISED REPLACEMENT COST AND ANNUALISED MAJOR PERIODIC MAINTENANCE COSTS

Year	1	2	3	4	5	6	7	8	9	10
Asset Value	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
MPM Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00
Annualised MPM Cost	6.27	6.27	6.27	6.27	6.27	6.27	6.27	6.27	6.27	6.27
Return on Capital	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
Operating Costs	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total Costs	17.27	17.27	17.27	17.27	17.27	17.27	17.27	17.27	17.27	17.27
Present Value of Costs (in perpetuity)	172.75									

With the asset valued at depreciated optimised replacement costs ($86.82 million[10]), assumed costs over the first ten year period of regulation would be as indicated in Table 2. In this case, the asset value is reset annually at the DORC value, the estimated costs are based on the premise that the asset is two years old, hence the major periodic maintenance is assumed to occur in year 8. Annualised periodic maintenance costs increase at each annual "regulatory reset" due to the older value of the asset.[11] After year 8, the asset has been restored to a new condition and the cost cycle for annualised periodic maintenance costs recommences. The present value of costs in perpetuity is still $172.75 million.

TABLE 2: COST SUMMARY FOR AN HYPOTHETICAL RAIL ASSET WITH INITIAL REGULATORY ASSET VALUE SET AT DEPRECIATED OPTIMISED REPLACEMENT COST AND ANNUALISED MAJOR PERIODIC MAINTENANCE COSTS

Year	1	2	3	4	5	6	7	8	9	10
Asset Value	86.82	79.23	70.88	61.69	51.59	40.47	28.25	14.80	100.00	93.73
MPM Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00
Annualised MPM Cost	7.59	8.35	9.19	10.11	11.12	12.23	13.45	14.80	6.27	6.90
Return on Capital	8.68	7.92	7.09	6.17	5.16	4.05	2.82	1.48	10.00	9.37
Operating Costs	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total Costs	17.27	17.27	17.27	17.27	17.27	17.27	17.27	17.27	17.27	17.27
Present Value of Costs (in perpetuity)	172.75									

10 Here the DORC value is calculated as the optimised replacement cost ($100 million) less the difference between the present value of replacement costs of the old asset and the present value of replacement costs of the new asset.

11 Note that the same solution holds if regulatory resets occur at less frequent intervals.

This simple example indicates that, for an asset being managed and operated in perpetuity, whether the asset is valued initially at the gross replacement value or depreciated optimised replacement cost does not affect the present value of costs, and as a result will also not affect the present value of prices that users of the asset in perpetuity would pay for access. The higher initial asset valuation under a gross replacement cost valuation methodology (and hence higher returns on capital to the asset owner) is offset by the lower costs of asset maintenance that are determined on the basis of an assumption that the asset is new.

Depreciation

It was noted above that the Western Australian access regime differs from regulatory regimes elsewhere in Australia in respect of the depreciation methodology. An annuity method of calculating capital (and depreciation) costs is used under the Western Australian regime, whereas a straight-line depreciation methodology is used under other access regimes in Australia.

It is also noted that different approaches to depreciation have reflected different considerations of the future use of the railway assets and hence considerations as to an appropriate economic life of assets. For example, the Independent Pricing and Regulatory Tribunal of New South Wales determined that economic depreciation of the railway assets in the Hunter Valley of New South Wales over a 40 year period was appropriate on the basis of a forecast decrease in coal mining activity and hence use of the assets.[12] Under different circumstances, the Australian Rail Track Corporation proposed no depreciation of rail track assets on the basis that the useful life of these assets is to be kept at a "steady state standard in perpetuity" through regular maintenance which is expensed and passed on to operators as part of the access charge, and that there are no expectations of loss of rail freight or technological redundancy of the rail track assets that would be expected to justify economic depreciation.[13]

The two considerations of the depreciation methodology to be used for assets and the appropriate economic life of assets are addressed further below.

[12] Independent Pricing and Regulatory Tribunal of New South Wales, April 1999, Aspects of the NSW Rail Access Regime Final Report, p47.
[13] Independent Pricing and Regulatory Tribunal of New South Wales, April 1999, Aspects of the NSW Rail Access Regime Final Report, p 42.

In regard to the depreciation methodology, as was the case with the asset valuation methodology, the depreciation methodology does not make a difference to the present value of total costs for the railway business, all other things being equal. This can be shown by further use of the numerical example used above in relation to asset valuation methodologies. Tables 3 and 4 below summarise costs with straight-line depreciation and annuity depreciation for the asset of initial cost of $100 million and useful lives of ten years.

It is noted that in these examples, that both straight-line depreciation and annuity depreciation return the same present value of costs. The spread of costs over the period does, however, differ with costs under straight line depreciation being constant over the period, and costs for annuity depreciation being constant over the period.

TABLE 3: COST SUMMARY FOR AN HYPOTHETICAL RAIL ASSET OF LIFE 10 YEARS AND DEPRECIATED BY STRAIGHT LINE DEPRECIATION

Year	1	2	3	4	5	6	7	8	9	10
Asset Value	100.00	90.00	80.00	70.00	60.00	50.00	40.00	30.00	20.00	10.00
Depreciation	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
Return on Capital	10.00	9.00	8.00	7.00	6.00	5.00	4.00	3.00	2.00	1.00
Operating Costs	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total Costs	21.00	20.00	19.00	18.00	17.00	16.00	15.00	14.00	13.00	12.00
Present Value of Costs (in perpetuity)	172.75									

TABLE 4: COST SUMMARY FOR AN HYPOTHETICAL RAIL ASSET OF LIFE 10 YEARS AND DEPRECIATED BY ANNUITY DEPRECIATION

Year	1	2	3	4	5	6	7	8	9	10
Asset Value	100.00	90.00	80.00	70.00	60.00	50.00	40.00	30.00	20.00	10.00
Capital Annuity	16.27	16.27	16.27	16.27	16.27	16.27	16.27	16.27	16.27	16.27
Operating Costs	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total Costs	21.00	20.00	19.00	18.00	17.00	16.00	15.00	14.00	13.00	12.00
Present Value of Costs (in perpetuity)	172.75									

On the second point of whether depreciation of rail assets is appropriate, consideration should address expectations of future use of the asset, and also the treatment of investment in "renewal" of the assets (typically as major periodic maintenance).

In general, justification for economic depreciation should be made on grounds of a reduction of the economic value of the asset, either due to the asset wearing out (technical depreciation) or the asset becoming progressively redundant due to advances in technology or reduced demand for the services provided with the asset (economic depreciation).

In regard to technical depreciation, the appropriate treatment of depreciation would depend upon the treatment of costs of major periodic maintenance. For an asset to be maintained in perpetuity and for which costs of major periodic maintenance are to be accounted as a levelised expense (i.e. smoothed over the maintenance cycle), it would not be appropriate for the asset owner to be compensated for technical depreciation. However, if the costs of major periodic maintenance are to be regarded as capital expenditure (and the costs added to the regulatory asset value), it would generally be appropriate to make provision for technical depreciation. Both of the above methods for the treatment of costs of major periodic maintenance and depreciation should result in an equivalent long term present value of costs.

Operating Costs

Operating costs may be regarded as being of two types:

- day-to-day operating and maintenance expenses for management of the rail infrastructure and provision of services to train operators; and
- costs of major periodic maintenance.

The treatment of the costs of major periodic maintenance has already been discussed above in relation to asset valuation and depreciation. The treatment of these costs may be either as maintenance expenditure or capital expenditure; however it is necessary to be consistent in treatment of these costs with the methodologies of asset valuation and depreciation as to avoid over-recovery of costs by the railway owner. The major points in this regard are as follows.

Firstly, where asset valuation occurs by a gross replacement cost (or optimised replacement cost) methodology, costs of periodic maintenance expenditure should be determined on the basis of the expenses that would be incurred for a new asset and not for the existing assets. This can be illustrated by continuing the hypothetical example from above.

With the asset valued at optimised replacement costs ($100 million) but major periodic maintenance costs determined for an asset that is already two years old, costs over the first ten year period of regulation would be as indicated in Table 5. The present value of actual costs in perpetuity is $185.92 million, but the present value of costs allowed to be recovered under regulation is $208.52 million, allowing for an over-recovery of costs of $22.60 million.

TABLE 5: COST SUMMARY FOR AN HYPOTHETICAL RAIL ASSET WITH INITIAL REGULATORY ASSET VALUE SET AT OPTIMISED REPLACEMENT COST AND ANNUALISED MAJOR PERIODIC MAINTENANCE COSTS ASSUMED FOR ON AN OLD ASSET

Year	1	2	3	4	5	6	7	8	9	10
Asset Value	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Actual MPM Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00
Allowed MPM Cost	7.59	8.35	9.19	10.11	11.12	12.23	13.45	14.80	6.27	6.90
Return on Capital	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
Operating Costs	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total Costs Incurred	11.00	11.00	11.00	11.00	11.00	11.00	11.00	111.00	11.00	11.00
Total Costs Allowed	18.59	19.35	20.19	21.11	22.12	23.23	24.45	25.80	17.27	17.90
Present Value of Costs Incurred (in perpetuity)	185.92									
Present Value of Costs Allowed (in perpetuity)	208.52									
Cost Over-Recovery	22.60									

Secondly, where costs of major periodic maintenance are treated as capital expenditure, provision may be made in depreciation costs for technical depreciation. The resultant recovery of an appropriate value of regulated revenue is evident from the hypothetical example in Tables 2 and 3, above.

Finally, where costs of major periodic maintenance are treated as levelised operating costs, no provision should be made in depreciation costs for technical depreciation to the extent that the physical decline of assets is remedied (the assets renewed) by the major periodic maintenance. The resultant recovery of an appropriate value of regulated revenue is evident from the hypothetical example in Tables 1 and 2, above.

The first of these points also applies to the treatment of day-to-day operating expenses. Where asset valuation occurs by a gross replacement cost (or optimised replacement cost) methodology, operating cost should be determined on the basis of the costs that would be incurred for the operation of a new asset, which may be less that the actual forecast operating costs for the existing assets.

4. COST ALLOCATION

As indicated in Section 2, the Code is silent on the method of allocation of costs across different parts of the network except in so far as indicating that the ceiling price must be not more than the total costs attributable that the relevant route and infrastructure (sub-clause 8(1) of schedule 4 of the Code), that similar costs/prices must be applied to users operating in the 'same market' (subclause.13(b) of schedule 4 of the Code), and that any apportionment of costs should be fair and reasonable (subclause.13(d) of schedule 4 of the Code).

Typical practice in the allocation of costs to parts of a larger asset is as follows:

- allocation of capital costs on the basis of proportion of total asset value attributable to the particular parts – for example allocation on the basis of the gross replacement value of specific assets that make up a particular segment of a rail network;
- allocation of operating and maintenance costs directly related to specific parts of the larger asset to those parts; and
- allocation of operating and maintenance costs and overhead costs that arise from activities not directly associated with particular parts of the larger asset according to rules of thumb such as, for rail assets, numbers of train movements through each segment of a network.

Despite common application of such rules, allocations must also be assessed against criteria of efficiency and equity, as implied by clause 13 (of schedule 4 of the Code).

Efficiency criteria may be used to set lower and upper bounds on cost allocations.

In general, the "lower bound" on the costs allocated to a part of an asset would be the avoidable costs of operating that part of an asset, for example the operating and maintenance costs that would be avoided if a rail route was closed. An upper bound would be the cost of duplicating the relevant service (using least cost technology), for which if customers were charged a price equal to this cost they may be induced to by-pass the asset. If this resulted in costs being borne that exceed the avoidable cost of serving that customer through the existing system, this would result in society incurring costs that are unnecessary, and so may be regarded as wasteful.

There are also equity criteria against which an allocation of costs can be assessed. Reasonable equity considerations would require that costs allocated to each part of a large asset would cover at least the costs of undertaking activities associated with each respective part of the asset and that common costs be allocated such that each user of the asset bears an "equitable" share of these costs. It is on the basis of equity criteria that costs are often allocated to segments of a rail network on the basis of, say, numbers of train movements in each segment. Such equity criteria may be determined on the basis of general acceptability to the asset owner and users rather than any more rigorously developed basis.

Equity (eg the requirement to be 'fair and reasonable') is largely in the eye of the beholder. However, equity is commonly interpreted as treating users with similar circumstances similarly (horizontal equity, eg operating in the same market with similar requirements etc) and users with different circumstances differently (vertical equity, eg different abilities to pay). This implies that, while a cost allocation methodology may be quite arbitrary (within bounds) from an economic efficiency point of view, the system could be seen as more equitable to the degree that it consistently treats similar users similarly and different users differently in terms of the key dimensions of service or demand. It is this criterion that underlies the principle stated in sub-clause 13(b) of Schedule 4 the Code, which states that if the access of different entities relates to the same market, any difference between the respective prices to be paid by them for access must only reflect a difference between them in the costs or risks associated with the provision of services. That is, operators in similar circumstances should be treated similarly.

In practice, there may be a wide range of possible cost allocations that may meet generally accepted criteria of efficiency and equity. Without being able to point to an inconsistency with any particular criterion of efficiency or equity it would be difficult for a regulator to not leave substantial discretion with the asset owner in regard to the cost allocation.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1. General Conclusions

The following conclusions and recommendations are made in regard to principal matters that should be addressed in assessing costing principles proposed under the Railways (Access) Code of Western Australia.

Asset Valuation

- The Western Australian regime differs from the regulatory regimes in the methodology used for asset valuation with the Western Australian regime using a gross replacement value (or optimised replacement cost) methodology whereas other regimes have utilised a depreciated optimised replacement cost methodology. The value used by the Western Australian regime will return a higher asset value by virtue of the absence of depreciation.

- For an asset being managed and operated in perpetuity, and with an appropriately implemented regulatory regime, the present value of the costs would be the same whether the asset is initially valued at gross replacement value or at depreciated optimised replacement cost. As a result, the present value of prices that users of the asset in perpetuity would pay for access should also be the same. The higher initial asset valuation under a gross replacement cost valuation methodology (and hence higher returns on capital to the asset owner) would be offset by the lower costs of asset maintenance that are determined on the basis of an assumption that the asset is new.

- The valuation methodology applied to an asset does, however, have implications for the treatment of depreciation and operating expenses in determining an appropriate level of total costs (and hence maximum revenue) for the railway owner.

Depreciation

- The Western Australian access regime differs from the regulatory regimes elsewhere in Australia in respect of the depreciation methodology. An annuity method of calculating capital (and depreciation) costs is used under the Western Australian regime, whereas a straight-line depreciation methodology is used under other access regimes in Australia.

- The depreciation methodology does not make a difference to the present value of total costs for the railway business, all other things being equal. Under an appropriately implemented regulatory regime, both straight-line depreciation and annuity depreciation would return the same present value of costs. The spread of costs over the period does, however, differ with costs under straight line depreciation being constant over a regulatory period, and costs for annuity depreciation being effectively 'back-ended' over the period.

- Costing principles should include justification for any proposed depreciation of assets, where such justification is based on grounds of a reduction of the economic value of the asset, either due to the asset wearing out (technical depreciation) or the asset becoming progressively redundant due to advances in technology or reduced demand for the services provided with the asset (economic depreciation).

- The appropriate treatment of depreciation would depend upon the treatment of costs of major periodic maintenance. If the costs of major periodic maintenance are to be regarded as capital expenditure (and the costs added to the regulatory asset value), it would generally be appropriate to make provision for technical depreciation. However, for an asset that is to be maintained in perpetuity and for which the costs of major periodic maintenance are to be accounted as a levelised expense, it would not be appropriate for the asset owner to be compensated for technical depreciation.

- In general, providing for technical depreciation <u>and</u> expensing of costs of major periodic maintenance would allow for over-recovery of costs by the railway owner.

- The Code makes provision for annuity depreciation of assets and expensing of major periodic maintenance costs. For assets to be maintained in perpetuity, and for which there is no justification for technical depreciation where costs of major period maintenance is expensed, it would be appropriate to determine annuity payments on an assumption of infinite asset lives, in which case the annuity payments comprise only the return on capital.

Operating Costs

- Costs of major periodic maintenance costs may be treated as either maintenance expenditure or capital expenditure; however it is necessary to be consistent in treatment of these costs with the methodologies of asset valuation and depreciation to avoid any 'double counting' and over-recovery of costs by the railway owner.

- Where asset valuation occurs by a gross replacement cost (or optimised replacement cost) methodology, costs of periodic maintenance expenditure should be determined on the basis of the expenses that would be incurred for a new asset and not for the existing assets.

- Where costs of major periodic maintenance are treated as capital expenditure, provision may be made in depreciation costs for technical depreciation.

- Where costs of major periodic maintenance are treated as levelised operating costs, no provision should be made in depreciation costs for technical depreciation to the extent that the physical decline of assets is remedied (the assets renewed) by the major periodic maintenance.

- Where asset valuation occurs by a gross replacement cost (or optimised replacement cost) methodology, operating cost should be determined on the basis of the costs that would be incurred for the operation of a new asset, which may be less that the actual forecast operating costs for the existing assets.

Cost Allocation

- Cost allocations must be assessed against criteria of efficiency and equity. In practice there may be a wide range of possible cost allocations that may meet generally accepted criteria of efficiency and equity. Without being able to point to an inconsistency with any particular criterion of efficiency or equity it would be difficult for a regulator to not leave substantial discretion with the asset owner in regard to the cost allocation.

- The Code points to a criterion of horizontal equity as an important consideration in allocation of costs, being that users in similar circumstances should be treated similarly.

5.2. Recommendations

Until there is a determination of costs under the Code by the Regulator, we would suggest that Alcoa adopt one of the following models to calculate the likely outcome of a pricing determination under the Code:

Costs	Approach 1	Approach 2
Capital Base Capital Charge	Gross Replacement Value (optimised for modern equivalent assets). Include depreciation by using the annuity calculation based on GRV, Economic life and WACC.	Gross Replacement Value (optimised for modern equivalent assets). Exclude depreciation, assume an infinite asset life and maintain the asset in perpetuity. Annual capital charge should be interest only on capital base.
Operating	Operations costs should reflect forward looking efficient costs for a modern equivalent asset. Maintenance costs should only include routine and preventative maintenance for a new MEA levelised to the next GRV reset.	Operations costs should reflect forward looking efficient costs for a modern equivalent asset. Maintenance costs should include routine, preventative and major periodic maintenance for a new MEA levelised over the asset life.
Overheads	Based on efficient costs and allocated.	Based on efficient costs and allocated.

Costings provided by Indec Consulting to date have been based on Approach 1.