WEIGHTED AVERAGE COST OF CAPITAL

TO APPLY TO

WESTNET RAIL

AND

THE WESTERN AUSTRALIAN GOVERNMENT RAILWAYS COMMISSION

DETERMINATION OF
THE WESTERN AUSTRALIAN
INDEPENDENT RAIL ACCESS REGULATOR

IN ACCORDANCE WITH THE REQUIREMENTS OF

CLAUSE 3, SCHEDULE 4 OF THE RAILWAYS (ACCESS) CODE 2000

1 JULY 2003

Contents

1.   Introduction

WestNet Rail (WNR) is the principal provider of below rail freight infrastructure in Western Australia, covering approximately 5,000 kilometres of track in the south west of Western Australia. WNR is a subsidiary of the Australian Railroad Group (ARG), a company owned 50:50 by Wesfarmers and Genesee Wyoming. ARG also provides above rail services in Western Australia.

The Western Australian Government Railways Commission (WAGR) is a public sector entity that operates the suburban railway passenger services for the Western Australian Government's Department for Planning and Infrastructure (DPI) under a formal arrangement. The suburban passenger rail service carried over 30 million passengers on approximately 241,000 train services in 2001-02. WAGR has ownership control of 112 kilometres of railtrack, of which 17 kilometres are dual purpose for passenger and rail freight.

The Rail Access Regulator ("the Regulator") is aware that the Western Australian Government is in the process of establishing the Public Transport Authority (PTA) which is expected to be proclaimed on 1 July 2003. It is understood that the PTA will assume all the responsibilities and obligations of the WAGR and DPI in the provision of railway passenger services. At the time of writing this Determination, the PTA was not proclaimed, and as a consequence reference is made to WAGR throughout the document and not the PTA.

Section 3 of the Western Australia Railways (Access) Act 1998 ("the Act") defines a "railway owner" to mean the person having the management and control of the use of the railway infrastructure. Within this context, WNR is considered to be the railway owner for the Western Australian non-urban railway infrastructure. Similarly, WAGR is considered to be the railway owner for the Western Australian suburban railway infrastructure.

2.   The Western Australian Legislative WACC Requirements

The legislative requirements in relation to the determination and application of the Weighted Average Cost of Capital (WACC) in the WA Rail Access Regime are summarised as follows:

Definition of "capital costs" (Clause 2, Schedule 4 of the Code)

Capital costs are the costs comprising both the depreciation and risk-adjusted return on

the relevant railway infrastructure, not including land. It is to be determined using an annuity formula by applying the Gross Replacement Value (GRV) of the infrastructure as the principal, the WACC as the interest rate and the economic life of the assets as the number of periods.

Determination of the WACC (Clause 3, Schedule 4 of the Code)

The Regulator is required to determine, as at 30 June in each year, the WACC for the railway infrastructure associated with the urban and non-urban network. In 2003 and every five years thereafter, the Regulator is to publicly consult when determining the WACC. Clauses 3(3), 3(4) and 3(5), Schedule 4 of the Railways (Access) Code 2000 ("the Code") outline the steps that must be taken as part of the public consultation process including the:

- placing of a notice in newspapers;
- period of public consultation; and
- Regulator to have regard to the comments in submissions from stakeholders.

Competition Principles (Section 20(4) of the Act)

The Act also provides a framework within which the Regulator's determination required under Clause 3, Schedule 4 is to be made. Section 20(4) of the Act states:

In performing functions under this Act or Code, the Regulator is to take into account:

(a) *the railway owner's legitimate business interests and investment in railway infrastructure;*

(b) *the railway owner's costs of providing access, including any costs of extending or expanding the railway infrastructure, but not including costs associated with losses arising from increased competition in upstream or downstream markets;*

(c) *the economic value to the railway owner of any additional investment that a person seeking access or the railway owner has agreed to undertake;*

(d) *the interests of all persons holding contracts for the use of the railway infrastructure;*

(e) *firm and binding contractual obligations of the railway owner and any other person already using the railway infrastructure;*

(f) *the operational and technical requirements necessary for the safe and reliable use of the railway infrastructure;*

(g) *the economically efficient use of the railway infrastructure; and*

(h) *the benefits to the public from having competitive markets.*

The nature of the decision-making power given to the Regulator under Clause 3, Schedule 4 of the Code is such that it is mandatory in so far as the Regulator must exercise it by taking into account all the factors listed in Section 20(4). However, under Clause 3 of Schedule 4, its application is discretionary in so far as the Regulator may allocate such weight to each of the factors listed in Section 20(4), as the Regulator considers appropriate for the particular case.

3. Report by Consultant and Public Consultation

The Regulator commissioned the Network Economics Consulting Group (NECG) to review and advise on the appropriate methodology for calculating the WACC for the below-rail operations of WNR and WAGR and to develop estimates for the appropriate parameters in the calculation of the WACC.

Following the completion of the draft report by NECG, and in accordance with Clauses 3(3) and 3(4) of Schedule 4, a notice calling for public submissions was placed in *The West Australian* and *The Australian* newspapers on 5 April 2003 with the closing date of 9 May 2003 for submissions.

Submissions were received from:

- Alcoa World Alumina Australia (Alcoa);

- Australian Rail Track Corporation (ARTC);

- Portman Mining, who provided a supporting submission from their consultants Meyrick and Associates (Meyrick); and

- WestNet Rail.

The final NECG report, incorporating comments from stakeholders, and copies of the submissions are available on the Office of the Rail Access Regulator's (ORAR) website (www.railaccess.wa.gov.au).

4. Framework Issues

The Code does not stipulate any particular approach to the determination of a WACC. As a consequence, NECG was engaged to review and recommend to the Regulator the framework and parameter values in the calculation of the WACC. The WACC represents the weighted average of the costs of debt and equity and is expressed as:

$$\text{WACC} = R_e \, (E/V) + R_d \, (D/V)$$

where:

R_e	=	cost of equity capital,
R_d	=	cost of debt capital,
E	=	market value of equity,
D	=	market value of debt, and
V	=	market value of the firm (E+D).

The cost of debt capital is composed of the risk free rate, a debt risk premium and the debt issuance cost, and is expressed as:

$$R_d = R_f + DRP + DIC$$

where

R_f	=	the risk free rate,
DRP	=	the debt risk premium, and
DIC	=	the debt issuance cost.

Determining the cost of equity capital is more difficult to estimate. One of the methodologies used is the Capital Asset Pricing Model (CAPM). The CAPM is expressed as:

$$R_e = R_f + \beta * [(R_m) - R_f]$$

where

R_f	=	risk free rate of return;
R_m	=	market rate of return;
β	=	systematic risk parameter ("equity beta").

4.1 Capital Asset Pricing Model

NECG examined a number of alternatives for estimating the cost of equity capital including the CAPM, the International CAPM, the Dividend Discount Model and the Arbitrage Pricing Theory Model and found that there was general acceptance for the CAPM. This approach is used by all Australian regulators and by a large number of organisations in Australia to determine the cost of equity capital.

NECG also indicated that the CAPM provided a more robust basis for estimating the cost of equity capital than any other available approach. Given the well-established

support for the CAPM, NECG indicated there was a need to demonstrate that the alternative models have significantly improved empirical properties before shifting from the CAPM.

Meyrick noted the CAPM has been almost universally accepted in Australian regulatory circles as the best available tool for assessing the cost of capital, and argued there was little to commend the adoption of an alternative model at this time. WNR and ARTC also supported the use of the CAPM as proposed by NECG.

CAPM has also been used since the establishment of the regulatory regime for the rail industry in Western Australia on the recommendation of Macquarie Bank[1] ("Macquarie"). A copy of the Macquarie report is available on the ORAR's website (www.railaccess.wa.gov.au).

The Regulator agrees that the CAPM approach be used to determine the cost of equity capital.

4.2 Nominal Post-tax versus Real Pre-tax Measurement

NECG has proposed that the Regulator apply a nominal post-tax ("vanilla") WACC with the explicit sharing of tax efficiencies exploited by the regulated business. However, it recognised that if the Regulator believes that this approach introduces unwarranted complexity and that tax issues are unlikely to be significant, then the Regulator may prefer to adopt a pre-tax approach. NECG has also asserted that the Regulator may wish to maintain the real pre-tax approach having regard to established precedent in Western Australia and practical considerations surrounding the implications of accommodating the GRV methodology.

The advantage associated with the use of a post-tax nominal vanilla model in providing a WACC is that it does not introduce the additional estimation error associated with the transformation between real and nominal or between pre and post-tax.

The Regulator is aware that recent regulatory decisions of the ACCC and some other Australian regulators, such as the Queensland Competition Authority (QCA) and Essential Services Commission of South Australia (ESCOSA), have moved to defining costs in nominal terms and on an after corporate tax basis. The effect of corporate tax is then incorporated in the costs, just like any other cost faced by the regulated

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[1] Macquarie Bank, Western Australian Rail Access Regime Independent Assessment of the Maximum Rate of Return on Rail Infrastructure, 23 August 1999.

business.

WNR supported continuation of the real pre-tax approach, arguing it was most consistent with the GRV methodology. Meyrick argued that issues in relation to the valuation of rail assets and allocation of specific elements of the asset base needed to be sorted out before an informed judgement could be made on the use of a nominal WACC. ARTC supported use of a nominal post-tax framework for consistency with its Access Undertaking with the ACCC.

Macquarie recommended using the real pre-tax approach, which was subsequently adopted and is currently being used in the calculation of the WACC.

WNR's access pricing model to calculate the floor and ceiling of route sections as required in Clause 9, Schedule 4 of the Code has been developed based on a real and pre-tax WACC. Significant effort was made to ensure that the model is working properly, and the Regulator has undertaken two audits of the WNR model prior to commencing the floor and ceiling determination of the WNR network. A similar access pricing model is currently being constructed by WAGR. Changing to a nominal post-tax approach for the WACC will require amendments to the models, additional verification by the Regulator, re-calculations of the floors and ceilings and possibly another round of public consultation.

For the above reasons, the Regulator considers that it is more appropriate to use the real pre-tax approach to calculating the WACC at this time. However, the Regulator will maintain a watching brief on developments prior to the next review of the WACC.

4.3 Transformation

To convert from a nominal post-tax WACC to a real pre-tax WACC, the most commonly used approach is the "market transformation approach", which can be summarised in the following sequence:

> Nominal post-tax (after tax and imputation)$\rightarrow$ [gross up by tax] $\rightarrow$ nominal pre-tax $\rightarrow$ [minus inflation] $\rightarrow$ real pre-tax.

An alternative method is the "reverse transformation approach" which changes the sequence of conversions as follows:

> Nominal post-tax (after tax and imputation) $\rightarrow$ [minus inflation] $\rightarrow$ real post-tax $\rightarrow$ [gross up by tax] $\rightarrow$ real pre-tax.

The recent trend in Australian regulation has been to adopt the market transformation

approach, which means that in practice it has been more common to adjust the tax rate for inflation. However, some regulatory bodies have considered both approaches. For instance, IPART[2] used a combination of the two approaches to obtain an intermediate estimate of a real pre-tax WACC, although more recently, IPART has announced its intention to adopt the market transformation approach. The method used by Macquarie in its 1999 report also resulted in an averaging of the two approaches.

The market approach assumes that the interaction between inflation and taxes impacts upon the real rate of interest. In the absence of being able to model the tax in the cash flows, NECG supports using the market approach, maintaining that in the current tax environment in Australia, there are few sources of tax timing differences, so the tax liability for accounting purposes will approximate tax paid. In other words, the effective tax rate will approximate the statutory tax rate. Therefore, this liability warrants adjustment for inflation.

Meyrick and WNR both supported adoption of the market transformation approach.

On the basis that the market transformation approach has near uniform acceptance by regulators and stakeholders, the Regulator accepts the market transformation approach in converting the nominal post-tax WACC to the real pre-tax WACC.

5.   Parameter Values

This section assesses the appropriate values for the various parameters that are included in the CAPM and the WACC.

5.1 Risk Free Rate (of return)

The risk-free rate is required for determining the cost of equity capital in the CAPM, and also forms the base on which a debt premium is applied to come up with a cost of debt. The risk-free rate in the CAPM is generally derived from government bond rates. The key issues for the risk free rate are twofold – the appropriate bond maturity to adopt and the period over which any averaging of the rate takes place.

NECG has indicated that the adoption of the 10-year bond is consistent with the opportunity cost of capital and provides the best incentive for investment by the regulated firm. In addition, given that all major estimates of the market risk premium (MRP) are based on the 10-year bond, adoption of a maturity other than 10 years for

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[2] IPART, Aspects of the NSW Rail Access Regime, 28 April 1999.

the risk free rate will result in the assumptions of the CAPM being violated, without any adjustments to the MRP.

As to whether any averaging of the rate should take place, the NECG preference is for setting the risk free rate as the rate on the date that the regulated period begins. However, NECG recognises that it may not be practical for some regulated businesses to put all of their debt and hedging instruments into place on a single day, particularly when it is to be on the last day of the financial year. As a result, NECG has recommended the adoption of 10-day averaging prior to 1 July 2003 for the purposes of setting the risk free rate, noting that a 20-day averaging period would not be inappropriate.

Meyrick and WNR both supported use of the 10-year bond as the maturity for the risk free rate. ARTC considered that because of the annual review of the return provided for in the Code, a shorter-term bond was most appropriate given that the annual review would ameliorate inflation risk.

WNR considered some averaging prevents the influence of very short-term market fluctuations at year-end unduly influencing the outcome. Meyrick supported 20-day averaging, and ARTC considered some averaging over a period prior to the date of commencement was reasonable.

Macquarie proposed using the 20-day average of the 10-year bond rate as the most appropriate rate for the risk free rate.

The Regulator considers that a 10-year bond rate is appropriate for the risk free rate. This is consistent with stakeholder comments and the approach adopted by most regulators, with the exception of the ACCC who has adopted a 5-year bond as the appropriate measure.

The Regulator also believes that a 20-day average is appropriate because of consistency with regulatory practice.

As of 30 June 2003, the 20-day average yield of the 10-year Commonwealth bond is 4.80%.

5.2 Inflation

In the normal course of business, values and rates of return are stated in nominal terms. Therefore, to define the WACC in real terms requires an adjustment. Similarly, costs and the asset base must be measured in real terms to be consistent with a real WACC. In general terms, for a given nominal interest rate (r) and inflation (i) the Fisher

equation allows us to calculate the real interest rate (R) as:

$$R = (1 + r) / (1 + i) - 1$$

There are two main sources of data for estimating inflation – information in the financial markets and government (or other) estimates.

The first method involves considering yields on nominal and capital indexed government bonds of similar maturity. By using the Fisher equation, an estimate of inflation can be determined. The alternative approach is to refer to inflation forecasts of the major market participants such as the Reserve Bank of Australia (RBA).

NECG supported the use of the first approach for the following reasons:

- the inflation forecasts issued by organisations such as the RBA are by their nature short term in nature, and may only reflect expectations for a much shorter period than the regulatory term; and

- by considering the yield on nominal and capital indexed bonds, an inflation forecast consistent with the CAPM parameters can be determined.

WNR and Meyrick both supported estimating inflation from financial market data.

Macquarie estimated the rate of inflation using the second approach based on the long term target for the RBA between 2.0% and 3.0%.

The Regulator has considered the two approaches and supports estimating inflation from the yield on nominal and capital index bonds as this approach is consistent with the CAPM and standard regulatory practice.

As of 30 June 2003, the estimate for inflation is 2.01%.

5.3 Debt Risk Premium

The cost of debt capital for a company is related to market rates of interest on debt, the appropriate maturity of debt, the assumed capital structure and the company's credit rating. The debt risk premium is set as a margin above the risk free rate.

Both rail owners were not prepared to provide actual or prospective data on debt margins. As a result, the NECG assessment was based on its perception of the credit worthiness of the companies and evidence from prior regulatory decisions.

NECG expects that WNR and WAGR would have solid credit ratings and be able to raise debt capital with a credit rating of A. The corresponding debt margin for a

business with an A credit rating is estimated at 111 basis points (as of 17 March 2003), based on a maturity period of 10-years, consistent with that of the risk free rate.

NECG also believes that the debt issuance costs should be compensated through the WACC and has estimated the costs to be 0.125% in the absence of actual information.

WNR argued that a credit rating of BBB, with a corresponding debt margin of 180 basis points, was appropriate based on a list of comparable companies from the airports, gas and rail sectors. Although WNR was invited to provide further evidence to support its position based on interest cover ratios, it did not put forward any evidence to rebut an "A" credit rating. Meyrick and Alcoa supported the estimate of 111 basis points as proposed by NECG.

Alcoa argued that the allowance for debt issuance costs should be lower than in the ACCC's GasNet decision because of the difference in relative risk and the need for future augmentation to be built into the gas system earlier. However, NECG believes that as debt issuance represents a transaction cost, there should not be any material difference in transaction costs between businesses except for the relative size of debt issued. Meyrick and WNR supported debt issuance costs being included in the debt premium and a value of 0.125% as proposed by NECG. Meyrick, however, pointed out that some regulators, such as QCA, account for these costs as they occur through the cash flow.

Macquarie, in its estimation of the debt premium, differentiated between the two rail businesses with a value of 1.3% for the freight infrastructure and 1.1% for the urban infrastructure. There was no separate allowance made for debt issuance costs.

As no additional evidence was provided by WNR to support its assertion that the company should be classed as BBB, the Regulator accepts NECG's recommendation that both WNR and WAGR be classed as A credit rating companies, with a debt risk premium of 1.11%.

The Regulator is aware that there is no uniform view on debt issuance costs with some regulators not accounting for these costs separately, others such as the QCA including the costs in the cash flow and finally some, such as the ACCC and ESC, include them in the WACC through the debt risk premium. However, as debt issuance costs are considered legitimate costs of doing business, the Regulator is prepared to accept the recommended inclusion of debt issuance costs of 0.125% to the cost of debt.

5.4 Capital Structure

NECG believes that the actual gearing levels of companies should be used when

determining the WACC. WNR and WAGR were approached to provide their actual and target gearing levels but declined to do so on the basis that the gearing levels should be based on observations of similar companies in the same market. Accordingly, NECG has benchmarked gearing levels against the relevant regulatory and industry standards and arrived at a gearing of 50% debt for both rail companies. This level of gearing is within the lower end of the range of rail regulatory decisions in Australia between 1999 and 2001 but is considered by NECG to be broadly consistent with overseas observations.

WNR recommended that the Regulator adopt observed industry practice in establishing gearing levels and accepted the estimate of 50% as appropriate. Meyrick supported a target gearing of 55% on the basis that it is at the mid-point of the generally accepted range of 50-60% used for rail infrastructure in Australia.

Macquarie distinguished between the freight and urban businesses in their estimation of gearing for the two businesses with a range of 50% to 60% applied to the former and 60% to 70% to the latter.

The Regulator is of the view that a gearing level of 55%, which represents the mid-point of the 50% to 60% range of past rail regulatory decisions in Australia, should be adopted.

5.5 Market Risk Premium

The market risk premium (MRP) is the amount an investor expects to earn from an investment in the market above the return earned on a risk-free investment.

In estimating the appropriate MRP from historical realised MRP in Australia dating back to 1882, NECG asserts the generally accepted range among corporate finance professionals in Australia is 6% to 8%. However, because a number of commentators have suggested that the *ex ante* MRP has declined over the past decade or so, NECG has recommended the adoption of a MRP of 7.0%, with a caveat that if the Regulator feels constrained by regulatory precedent then a MRP of 6% or 6.5% could be applied.

WNR supported the view that trends in MRP should be viewed over longer time periods rather than short-term experience.   WNR noted regulatory precedent setting the MRP at 6% with statements by financial practitioners supporting a range of 6-6.5%. Alcoa questioned whether regulators should err on the side of a high MRP because of the asymmetric consequences of regulatory intervention, stating that regulated rail infrastructure is not a risky business. In addition, Alcoa stipulated that regulatory precedents should be followed especially where NECG has not proven a compelling argument to change. ARTC has supported NECG's approach, particularly the use of a

more longer term average, but consider that NECG's proposal is at the higher end of reasonable estimates.

Meyrick supported a value of 6% MRP, arguing that regulators have adopted the lower end of the range for the MRP because "it best reflects the prospective MRP" and due to evidence of "some reduction in MRP in recent years", including because of the effect of dividend imputation. Meyrick also assert that it is "doubtful that benchmarking analysis adds anything meaningful to the debate" because of the number of uncertainties in relation to key variables.

Macquarie estimated the MRP in the range of 5% to 6% for both rail businesses on the basis that a stable inflationary environment and the impact of dividend imputation would mean that the forward looking MRP should be lower than what empirical evidence demonstrates.

A number of regulators have justified adopting a MRP at the bottom end of the historical range based on market trends showing a reduction in the ex-post MRP in Australia. It is clear that regulatory precedent in Australia favours a MRP of 6%.

On the basis of the uncertainty identified above and the regulatory precedent in establishing the measure at the bottom end of the estimated range of 6% to 8%, the Regulator believes that an MRP of 6% should prevail in this instance. However, the Regulator will maintain a watching brief on developments in the debate prior to the next review of the WACC.

5.6 Systematic Risk

The systematic risk (beta) of a firm is the measure of how the changes in the returns to a company's stock are related to the changes in returns to the market as a whole. There are three basic approaches to estimating systematic risk:

- direct estimation from observed company share price information;
- comparable companies; and
- first principles.

Direct estimation of the betas for WNR and WAGR is not possible as they are not separately listed companies and as a consequence the other two measures must be used.

The estimates of systematic risk must reflect the leverage of the firm. Leverage gives a higher expected return to the shareholders, but at the cost of higher risk. To utilise equity beta estimates of comparable firms in developing estimates of the equity beta for

the rail companies, the differences in leverage must be taken into account. To do this an observed equity beta is converted to what is called an asset beta by removing the effect of leverage. This process is referred to as de-levering. The result is an estimate of the beta of the firm if it had no debt. The asset betas for WNR and WAGR established in this way need to be re-levered using their gearing ratios to obtain an estimate of their equity betas. The equity betas will then be used in the CAPM to estimate the cost of equity. There are a number of different approaches used for the de-levering and re-levering calculations with the Monkhouse formula established as the most popular approach in Australia.

The technique of de-levering requires estimating the systematic risk of the debt of the company to establish a debt beta. There are three common approaches to estimating the debt beta. An approach that is often used including by some Australian regulators is to assume that the debt beta is zero. Generally there is little or no justification for the assumption other than that it is simple (as the debt beta does not then enter into the de-levering calculation). A second approach is to estimate the debt beta using the structure of the CAPM and the third approach is to actually consider the systematic risk component of the company's debt. NECG asserts that the return for systematic risk of debt will be very low although perhaps not zero. Rather than arbitrarily assume a low value for the debt beta, NECG has assumed that it is zero.

WAGR's network serves predominately passenger traffic. Apart from the regulatory assessment of ARTC's operations, there has not been any explicit assessment of the non-diversifiable risk associated with this type of operation.

NECG has reviewed the asset and equity betas of international below rail operators which show an average adjusted asset beta of around 0.42 for UK operators and 0.37 for American, European and Japanese operators.

NECG argues that the most significant factor affecting WAGR's level of non-diversifiable risk relates to the nature of its contractual relations with the State Government. In particular, these arrangements substantially remove cost, price and volume risk from WAGR. Consequently, NECG believes that WAGR's asset beta would be lower than the international passenger service providers outlined above.

NECG has proposed a value of 0.30 be adopted as the asset beta. Applying the Monkhouse equation and assumed gearing to convert the asset beta into equity beta resulted in an estimate of 0.60 for WAGR.

WNR's network serves the following traffics:

- bulk which includes alumina, iron ore and other bulk;

- intermodal traffic (both intrastate and interstate);

- grain; and

- passenger.

There are few comparable companies for the nature of the risk faced by the bulk traffic. WNR enjoys a degree of market power in the relevant markets and the demand for rail access for bulk products is unlikely to be correlated with the domestic economy.

There have been two regulatory decisions on similar traffics in recent years. IPART estimated an asset beta in the range of 0.29 to 0.55 for the Rail Access Corporation's coal business in 1999, and QCA estimated that Queensland Rail's (QR) asset beta for bulk coal traffic was in the order of 0.45 in 2001. If a debt beta of zero is assumed, then the value of the asset beta for the QR decision would be in the order of 0.35.

NECG proposed that the asset beta for WNR's bulk traffic should be 0.40.

NECG believes that a higher beta would be expected for intermodal traffic relative to bulk traffic as volumes for intermodal traffic are likely to be highly correlated with the economy and vulnerability to economic cycles because of competition from road transport. There are comparable companies from which an assessment can be made of the non-diversifiable risk associated with WNR's intermodal traffic. NECG has outlined the equity and asset betas for relevant comparators from Australia which have indicated an average asset beta of 0.56.

This higher asset beta is also supported by regulatory precedent. ESCOSA recently adopted an asset beta of 0.55 (debt beta of 0.06) for the Alice Springs to Darwin rail line. Also, in its assessment of ARTC's undertaking, the ACCC accepted ARTC's submission of an asset beta of 0.58 (debt beta of 0.12) for the interstate network. The equivalent asset beta for these decisions with a debt beta of zero is just over 0.50.

NECG has proposed that an asset beta of 0.55 be adopted for WNR's intermodal traffic.

While WNR's grain traffic faces intermodal competition, it is exposed to relatively low levels of non-diversifiable risk on account of the variation of output being largely diversifiable in nature (dependent upon rainfall, increased yield from improved grain etc). Accordingly, the non-diversifiable risk profile of the grain traffic is in NECG's view more closely aligned with bulk traffic than intermodal traffic. The only grain related company with a statistically significant beta estimate is Graincorp, whose adjusted and unadjusted asset betas are 0.44 and 0.32 respectively.

NECG has estimated that the asset beta for WNR's grain traffic to be 0.45.

WNR's exposure to passenger traffic is predominantly related to the country passenger and tourist markets. The tourist market is considered to experience higher income elasticity than would be the case for WNR's country passenger traffic, on account of the latter being driven at least in part by passenger movements that are subsidised by the State Government. NECG considers it unlikely that WNR would be fully exposed to fluctuations in passenger numbers on account of the nature of the charging structure.

As a consequence, NECG has assessed the asset beta for this type of activity at 0.45. This asset beta estimate is higher than that applied to WAGR on account of the intrinsically higher systematic risk of WNR's passenger traffic, which is based on tourism and country passengers rather than urban passenger movements.

Based on the assessment of asset betas for each significant component of WNR's operations, NECG has assessed its overall asset beta at 0.45. This is derived from a single average of each asset beta weighted by the revenue earned by that component of the business over the last two years. Applying the Monkhouse equation and assumed gearing to convert the asset beta into equity beta resulted in an estimate of 0.90 for WNR.

There was no comment from stakeholders on the asset beta for WAGR.

Meyrick and Alcoa supported an asset beta for WNR of 0.40, while WNR supported a value of 0.50. ARTC noted that it did not have any concerns with the approach adopted, but had expected WNR's beta to be lower than ARTC given the different market risk. Meyrick argued that the analysis should focus on pure infrastructure business as weighting the beta by the share of the beta of the respective traffics was of questionable statistical validity and was likely to bias the beta upwards because of the different nature of the assets, cost structures and competitive environments between the rail infrastructure and transport operations businesses. This view implies there is some benefit to the systematic risk of the business from diversification. However, NECG contends that this has been eliminated by considering the betas of the different traffics.

WNR argued that its level of systematic risk cannot be easily compared with other international below rail comparators due to a number of constraints:

- leasing rather than owning the rail infrastructure;

- operational performance standards that have to be maintained;

- obligation to return the leased asset in appropriate state to owner; and

▪ inability to surrender lines regardless of viability.

NECG accepts that rail companies in different companies have different operational environments. However, it is of the view that considering the beta values of rail companies overseas does result in a wider range of comparators and provides useful information on relative measures of covariance.

WNR and Meyrick questioned some of the comparators used in determining the beta value of the various industry segments. In relation to intermodal transport, WNR claimed that it is inappropriate to include some transport companies, such as Qantas and Wridgeway's as comparators, as they do not operate intermodal transport. WNR stated that removing these companies would produce an average asset beta for the remaining companies of 0.62. However, even excluding Qantas and Wridgeway, NECG contends that the proposed value of 0.55 for this business segment is still roughly mid-way between the comparator average (0.62) and regulatory precedent (approximately 0.50 with debt beta of zero). NECG further contends that there is good reason to expect that the systematic risk of this part of WNR's business would be lower than the operators in the market, on account of, its tariff structure involving a flagfall and gross tonne kilometre components, which is likely to lead to significantly lower revenue volatility to WNR than for the revenue of the transport operators.

WNR claims a high level of risk for its grain traffic because it represents the most volume sensitive part of its business on account of its dependence with rainfall, significant competition from road transport and strong competition between marketers leading to diversification in transport services. NECG accepts that there is be a degree of correlation between rainfall in the Western Australian grainbelt and national economic activity, but do not consider that this is substantial. Moreover, they note that the assigned asset beta for WNR is above even the adjusted beta for Graincorp. Given Graincorp's operations are in bulk commodity storage and handling, marketing and logistics NECG considers that it provides a reasonable comparator for WNR's below rail grain services.

Meyrick claims that it is inappropriate to include Graincorp as a comparator for this part of the business as it is neither a customer nor provider of services but does not suggest an alternative comparator. However, NECG considers Graincorp provides a reasonable comparator on which to base an assessment of the systematic risk of WNR's grain business.

Macquarie did not establish separate asset betas for each of the two rail businesses in their determination of the equity betas. They, like NECG, looked at comparative companies and examined the systematic risks for each of the businesses before

coming up with an equity beta in the range of 0.8 to 1.0 for the freight business and 0.3 to 0.4 for the urban business.

There was no comment from stakeholders on the use of the Monkhouse formula for de-levering calculations other than by Meyrick who supported the use of this approach. In regard to NECG's approach in setting the debt beta value as zero, none of the parties expressed a contrary view to this approach, with Meyrick expressing approval, while ARTC noted it had no issue with this approach.

The Regulator accepts the approach proposed by NECG in identifying comparators with the two rail companies supported by an estimation based on first principles as the most appropriate approach in the absence of direct estimation of systematic risk for WAGR and WNR.

The Regulator also accepts the Monkhouse approach to de-levering and re-levering comparators equity betas when calculating the equity betas for WAGR and WNR. This approach has been accepted by most Australian regulators and has also been supported in stakeholder comments.

In regard to the consideration of the debt beta, the Regulator is aware that there is no consistent approach among regulators to estimating the debt beta with values ranging from 0 to 0.18. This uncertainty has been recognised by NECG in their proposal to set the debt beta value at 0. The Regulator is aware of the relationship between the debt beta and the asset beta in that if the debt beta were to be increased then a corresponding increase would need to be made to the asset beta which would have no net effect on the resulting WACC.

In the absence of any stakeholder comments to the contrary and in consideration of the uncertainty in establishing an estimate for this value, the Regulator accepts the estimate of a zero value for the debt beta as proposed by NECG. In practice, the assumption is not material if a consistent approach is adopted for the debt beta in the levering and de-levering of beta values, although care must be taken when comparing asset betas estimated by reference to different debt betas.

The Regulator accepts the NECG recommendation of the adoption of a value of 0.30 for the asset beta. With a gearing of 55%, the equity beta for WAGR becomes 0.66.

The Regulator acknowledges that there is a significant difference in views between WNR and the other stakeholders in regard to the estimate of values for the asset beta and equity beta for WNR. In consideration of the stakeholder comments, the Regulator is of the view that the estimated asset beta value of 0.45, as recommended by NECG, represents an appropriate balance between the estimates provided by WNR and

access seekers. The corresponding equity beta value for WNR is 1.00 when a gearing of 55% is adopted.

5.7 Dividend Imputation

The dividend imputation mechanism used in Australia is intended to ensure that profits are taxed only once for Australian resident taxpayers but this benefit is not intended for foreign shareholders. Dividends that are paid out of after-corporate-tax profits can be accompanied with a "franking" credit to the extent of the corporate tax paid. The value of franking credits is represented with the parameter gamma. The value of franking credits will be determined at the level of the investor and will be influenced by the investor's tax circumstances. As these will differ across investors, the result will be a value of the franking credit between nil and full value (ie. a gamma value between zero and one).

Early studies have generally recommended a value for gamma of around 0.50. Since then, a gamma of 0.50 or below is well established in Australian regulatory decision-making.

NECG does not consider there is a basis for any increase in gamma above 0.50, but the case for adopting a gamma value below 0.50 is not yet definitive. NECG also argued that the market value of distributed franking credits should be established at the market level, not the firm level. So for regulatory purposes, NECG agrees with current regulatory practice that treats firm specific shareholding, including for Government owned businesses such as WAGR, as irrelevant.

Meyrick agreed that the arguments for each of the polar positions on gamma are inconclusive and supported the adoption of 0.50. WNR argued that a value of 0.50 runs the risk of under-compensating or discouraging investors, and that the Regulator should err on the side of the decision that best supports investment and therefore apply 0.30 but did not provide any substantive justification for this view.

Macquarie adopted a gamma value in the range of 0.40 to 0.50 for WNR and WAGR.

In the absence of any evidence to the contrary, the Regulator is of the view that regulatory precedent needs to be adopted in setting this parameter and as a consequence accepts the 0.50 value for franking credits proposed by NECG and endorsed by most regulators.

5.8 Tax

None of the stakeholders addressed the tax issue as all parties with ARTC being the

exception indicated support for the real pre-tax approach which assumed the statutory tax rate of 30% would be used in the WACC calculation as opposed to an effective tax rate which would be an outcome of a nominal post-tax approach.

Macquarie proposed using the statutory tax rate in the WACC calculation which at the time was 36%.

The Regulator accepts that the statutory tax rate of 30% be used in the real pre-tax WACC calculation to ensure consistency with other regulators using the real pre-tax approach to calculating the WACC.

6. Asymmetric Risk

NECG believes that the rail companies face some risks that are unavoidable and asymmetric and therefore should be accounted for in the regulatory process. To appropriately deal with the asymmetric risks faced by the companies, the magnitude of the exposure needs to be determined.

NECG considers that the risks can be reflected as an actuarially-fair insurance premium to be imputed to the costs of the company and that the most appropriate approach to be taken is to account for the asymmetric risks in the cash flow rather than as a premium in the WACC.

WNR proposed an increment to its WACC of 1.75% to reflect asymmetric risk for the following reasons:

- stranded asset risk – with it being more appropriate to adjust the WACC rather than the economic life of the asset due to the subject nature of probability distribution function, and because calculating an annuity using a probability weighted average life can result in biases against the owner due to non-linear nature of calculations. WNR illustrated this with calculations of the probability weighted annuity value by component and an annuity calculated on weighted average life (as allowed in the Costing principles) for the Kwinana-Mundijong track, resulting in an estimate of an increment on WACC of 0.84%; and

- operation of the overpayment rules – which involve asymmetry in that the railway owner must repay any overpayment that occurs above the ceiling, while it cannot claim underpayment. The process by which underpayment is offset against overpayment exposes the business to the risk of earning less than its WACC over time.

Alcoa argued that an allowance for asymmetric risk is inappropriate as:

- WNR does not own the lines – it leases them from WAGR and can hand back redundant sections;

- as grain account for only 37% of Net Tonne Kilometres, asymmetric risk may only cover a fraction of the network (if it applies at all);

- in practice WNR has sought revenue guarantees and customer funding for major expansions to the network in recent times;

- rail assets always have few customers, but tonnage is likely to be stable even if an operator leaves the network. Bulk haulage has no road alternative and is committed to rail by agreement with State Government; and

- the ceiling price is not the break-even price.

The Regulator is aware that some regulators in Australia, such as the ACCC and ESCOSA, have recognised that asymmetric risks are a valid issue that should be incorporated into the regulatory process and that the procedure used to reflect the economic impact of asymmetric risk is still evolving.

The Regulator concurs with the approach that asymmetric risk, where it exists, should be addressed through the cash flow as the risk is likely to be specific to a route or part of the network where there is likely to be only one or a small number of users, rather than include the risk in the WACC which would effect all users of the network and involve an element of cross subsidisation.

However, the Regulator is of the view that the stranded asset risks identified by WNR are already adequately protected through:

- the Costing Principles where the Regulator has allowed WNR to calculate the annuity based on a shorter life where WNR can demonstrate that the economic life of an asset is dependent on the life of a specific business, such as a mine;

- the re-determination of the ceiling costs with the review of the GRV of the asset base every three years, which could also take account of changed asset lives in cases of potential asset stranding;

- the ability of WNR, if affected by asset stranding, to surrender the rail line (if it is not one of the main lines) under the terms of the Lease Agreement or receive compensation from the State Government to maintain the rail line in question; and

- the ability to minimise asset stranding through contractual agreements in access agreements.

With regard to asymmetric risk due to the operation of the over-payment rules, again, the Regulator is of the view that these risks are adequately protected through:

- allowing WNR to balance out over-payments by under-recoveries over a successive three year period, even though there is no reference to under-recoveries in the Code;

- permitting WNR to allocate access revenue to cover the costs attributable to the applicable route sections to ensure the recovery of capital costs on branch or feeder (dedicated) lines ahead of shared lines where there is no other traffic on these lines to fund the dedicated infrastructure; and

- approving the establishment of an account in WNR's accounting record where WNR has the use of the over-payment funds for up to three years at an interest cost of the 10 year long term bond rate.

Accordingly, the Regulator does not support WNR's request to an incremental increase of 1.75% to its WACC or adjustment of its cash flow.

7.   Determination

The Regulator has adopted the following approach to determining the WACC as summarised in the shaded column of Table 1. The column on the right is provided for comparative purposes.

TABLE 1:   APPROACH TO THE WACC DETERMINATION

Methodology	*Approach as approved by the Regulator*	*Macquarie approach previously adopted*
Method to calculate the cost of equity capital	Capital Asset Pricing Model	Capital Asset Pricing Model
Nominal Post/Real Pre-tax	Real Pre-tax	Real Pre-tax
Tax rate	Statutory corporate rate	Statutory corporate rate
Conversion method from Nominal Post to Real Pre-tax	Market Transformation	Average of Market and Reverse Transformation
Estimating Risk free rate	20 day average of 10 year Commonwealth bond	20 day average of 10 year Commonwealth bond
Adjusting for inflation	Fisher equation on indexed government bond yields	Mid point of the Reserve Bank of Australia's target range
WACC parameter values	Estimated single value for each parameter	Estimated range for some of the parameters

Methodology	Approach as approved by the Regulator	Macquarie approach previously adopted
Different WACC parameter values for WNR and WAGR	Equity beta	Debt risk premium; Gearing; Equity beta
Estimating Equity beta	Monkhouse equation from estimated Asset beta	Direct from comparable companies
Asymmetric risks	No consideration	Consideration given to WNR with a WACC that was the maximum of the range

The parameter values and resultant WACCs are outlined in the shaded columns of Table 2 below. The two columns on the right are provided for comparative purposes only, where the figures represent the parameters and resultant WACCs for WNR and WAGR should the Macquarie methodology be maintained.

TABLE 2:   PARAMETERS OF THE WACC

WACC/CAPM Parameters	Approach as approved by the Regulator		Macquarie approach previously adopted	
	WNR	WAGR	WNR	WAGR
Risk Free rate (%)	4.80	4.80	4.80	4.80
Debt proportion (%)	55	55	50 – 60	60 – 70
Equity proportion (%)	45	45	50 – 40	40 – 30
Debt risk premium (%)	1.11	1.11	1.3	1.1
Debt issuance costs (%)	0.125	0.125	Nil	Nil
Cost of debt (%)	6.035	6.035	6.10	5.90
Market risk premium (%)	6.0	6.0	5.0 – 6.0	5.0 – 6.0
Asset beta	0.45	0.30	NA	NA
Debt beta	Nil	Nil	NA	NA
Tax rate (%)	30	30	30	30
Franking credits- Gamma (%)	50	50	40 – 50	40 - 50
Equity beta	1.00	0.66	0.8 – 1.0	0.3 – 0.4
Indexed bond rate (%)	2.74	2.74	NA	NA

WACC/CAPM Parameters	Approach as approved by the Regulator		Macquarie approach previously adopted	
	WNR	WAGR	WNR	WAGR
Inflation (%)	2.01	2.01	2.50	2.50
Real pre-tax WACC(%)	6.87	5.84	6.44	3.58
Nominal post-tax cost of equity(%)	10.77	8.78	8.80 – 10.80	6.30 – 7.20
Equivalent nominal post-tax vanilla WACC (%)	8.17	7.27	5.46 – 6.74	4.45 – 4.94

Using the information outlined above on the individual WACC parameter values, the Regulator has determined the real pre-tax WACC for WAGR and WNR to be 5.8% and 6.9% respectively which will apply for the financial year commencing 1 July 2003.

The Regulator considers that this Determination appropriately balances the interests of the railway owners, WAGR and WNR, access seekers and the community as required under Section 20(4) of the Act.

Dr Ken Michael
ACTING RAIL ACCESS REGULATOR

1 July 2003