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Dear Angus

Supplementary Report in Relation to NBN's Proposed Special Access Undertaking ["SAU"]

Expert Witness Statement

This opinion has been prepared jointly by Professor Robert Officer and Dr Steven Ross Bishop.

Professor Robert Rupert Officer is a Professor Emeritus of the University of Melbourne and has been closely involved in company tax policy and the effect of changes in company tax systems since the early 1980's. He has written extensively on cost of capital matters. A brief Curriculum Vita is attached.

Dr Steven Ross Bishop is an Executive Director of Education & Management Consulting Services Pty Ltd, a business specialising in business valuations, management consulting and cost of capital estimation for regulatory and business purposes. A brief Curriculum Vita is attached.

We have been provided with a copy of Expert Witnesses in Proceedings in the Federal Court of Australia, Practice Note CM7. We have read, understood and comply with this Practice Note. The opinions that we express in this report are based wholly or substantially on our specialised knowledge as described above and in our Biographical Notes attached below.

Context

You have advised that NBN is preparing for a variation to the SAU to be lodged with the ACCC to take into account the wider set of technologies that the NBN network will now comprise. In addition to the fibre-to-the-premises [“FTTP”], fixed wireless and satellite technologies, the NBN network technologies will comprise a Multi-Technology Mix (“MTM”) that includes fibre-to-the-node (“FTTN”), fibre-to-the-building (“FTTB”) (each a mix of copper and fibre technology) and the hybrid fibre co-axial network (“HFC”). This report is limited to the changes to the SAU arising from the MTM and, when referring to the MTM in this report, we are referring to the additional technologies (namely, FTTN, FTTB and HFC). This report does not cover the application of the SAU to the FTTP, fixed wireless and satellite networks. Please refer to our previous report in relation to these existing technologies.

This change in technologies involves NBN acquiring certain copper and HFC network assets from Telstra. In a related transaction, NBN will also purchase certain HFC network assets from Optus.

You have asked

“Whether the proposed approach to determining in the Initial Regulatory Period the rate of return as a risk-free rate plus a risk-premium, as well as the SAU WACC margin of 350 basis points above the government bond rate, are reasonable when applied to the new MTM technologies and associated new products having regard to the Amended Agreements¹, current financial conditions and any regulatory determinations dealing with the WACC made since acceptance of NBN’s SAU (but only so far as such decisions are relevant to the impact of the MTM related changes on NBN); and

Whether the cost of capital principles for the Subsequent Regulatory Period of the SAU are unaffected by the variations to capture the new technologies, associated new products and the Amended Agreements.”

Our 2012 Report

During 2012 we conducted an examination of the appropriate WACC for NBN in a report to Webb Henderson (on behalf of NBN) dated September 2012, which NBN provided to the

¹ The Amended Agreements refer to the agreements entered into between NBN Co and Telstra, and between NBN Co and Optus, on 14 December 2014, which amended the definitive agreements that had been entered into in 2011 by the parties.

ACCC as part of its submission on the 2012 SAU. Our conclusions, which were in a pre-MTM rollout context, were previously summarised by the ACCC as follows:

- It is reasonable to set a Weighted Average Cost of Capital ["WACC"] based on the long-term government bond rate plus a real margin, varying annually with the long-term bond rate — but it is important to recognise that the risks associated with such an approach can flow-through to consumers as price changes;
- Based on a review of other regulatory decisions, the proposed WACC margin of 350 basis points is at the lower end of a reasonable range in the current environment. In particular, looking at regulated WACC values in the electricity, gas and water industries, the report found that over the past 13 years, the risk premium values have ranged from 257 to 488 basis points, while over the past 3 years, the risk premium values have ranged from 277 to 488 basis points;
- The average risk margin over the 13 year period for the water, gas and electricity industries was 358 basis points, while the median was 335 basis points;
- Telstra's regulated WACC risk margin has been quite stable at 343 basis points, until recently when it increased in 2008-09 to 380 basis points, then decreased in 2011-14 to 338 basis points (due to a revision of the regulatory debt risk premium and equity beta, determined using the Capital Asset Pricing Model ["CAPM"]); and
- Using a bottom-up approach (cost of debt and cost of equity), an appropriate mark-up over the risk free rate for NBN's WACC would be between 375 and 420 basis points. The report concluded that 350 basis points would be in a reasonable confidence interval around the 2012 Report's estimate of an appropriate mark-up.²

The ACCC concluded that in circumstances where suitable benchmarks cannot be found for each of the WACC parameters³

"...the proposed Officer and Bishop approach of setting the rate of return as a risk-free rate plus a risk premium is reasonable."

² Our conclusions as summarised by the ACCC in its Draft Decision on the SAU dated April 2013. This summary was also referred to in the ACCC's Final Decision dated December 2013.

³ ACCC, "Draft Decision about the 2012 NBN Co Special Access Undertaking lodged by NBN Co on 18 December 2012", April 2013 p152

The Draft Decision went on to say⁴

“In respect of the level of the 350 basis points, the ACCC notes it is difficult at this point in time to form definitive conclusions about whether the proposed risk premium under- or overcompensates NBN Co relative to a ‘normal commercial return’ for this type of investment. In this context, the ACCC is conscious that attempting to estimate individual WACC parameters for NBN Co at this stage of its operations could give rise to false accuracy and precision. In turn, the ACCC considers that, in the current context, the Officer and Bishop approach of essentially benchmarking at the more general level of the overall WACC and across a broad range of regulatory decisions is appropriate. The ACCC also considers that — in the absence at this point in time of better information — the 350 basis point risk-premium which the Officer and Bishop approach establishes is likely to allow NBN Co to earn a normal commercial return on its investment.”

Since our 2012 Report we understand that the primary changes within the operational aspects of the overall roll-out of the NBN network and associated services relate to the method of delivery of services via the MTM rather than FTTP and, in particular, an outcome that the acquisition of certain copper and HFC assets will reduce the amount of construction activity. It could be expected that construction activity undertaken by NBN will expose it to greater total risk than if it was simply operating an existing network. The question then becomes whether the reduction in construction activity due to MTM has any impact on systematic risk (i.e. risk that determines a required rate of return) during the Initial Regulatory Period. Taking this one step further, we assess the ultimate question: whether the fixed risk premium of 350 basis points applied to the existing technologies is appropriate for the MTM?

Summary of Our View

First Question: *Whether the proposed approach to determining in the Initial Regulatory Period the rate of return as a risk-free rate plus a risk-premium, as well as the SAU WACC margin of 350 basis points above the government bond rate, remain reasonable when applied to the new MTM technologies and associated new products having regard to the Amended Agreements, current financial conditions and any regulatory determinations dealing with the WACC made since acceptance of NBN’s SAU.*

⁴ Op cit p152

In our view

- It is reasonable to set a WACC for the new MTM technologies and associated services based on the long-term government bond rate plus a real margin, varying annually with the long-term bond rate — but, as we noted in our 2012 report, it is important to recognise that the risks associated with such an approach can flow-through to consumers (once the ICRA is extinguished and there is a contemporaneous link to NBN's pricing);
- Using a bottom-up approach (cost of debt and cost of equity), an appropriate mark-up over the risk free rate for NBN's WACC would be around 400 basis points. These estimates are expected values and given the high level of uncertainty around such estimates, the proposed 350 basis points would be in a reasonable confidence interval around this estimate⁵. Our assessment of the appropriate risk premium in our September 2012 report did not explicitly recognise any higher risk for construction activities because of the challenges in estimating the risk of construction activities undertaken for rolling out telecommunication services (as opposed to more widely based construction activities). Consequently, it was largely based on providing fibre-based telecommunication products and services. Thus, despite the change to less construction activities we are of the view that the proposed risk margin of 350 basis points remains appropriate when applied to the MTM;
- Based on a review of other recent regulatory decisions as presented in Appendix 1, the proposed WACC margin of 350 basis points is within the range of a selection of regulatory determinations made between April 2015 and October 2015 by the AER and ACCC. The range of 17 (12) recent decisions is 288bp to 420bp (290bp to 420bp), with a simple average of 347bp (333bp).⁶ A wider set of 29 (24) determinations incorporating decisions by other regulators over a longer period from June 2014 to October 2015 has a range of 288bp to 420bp (290 to 420 bp), with the simple average of 350bp (343bp); and
- The ACCC's recent Final Access Determination for Telstra's Fixed Line Services derived a WACC risk premium of 324bp. It is below our estimate for the MTM assets of 400bp due to a different estimate of the debt and equity risk premium.

⁵ For example, the 95% confidence interval around the average historical MRP from 1958 to 2014 is circa 11.8%. The estimates of WACC Risk Premium in the regulatory decisions summarised in our September 2012 report show a variation of circa 230 basis points from the highest to the lowest estimate.

⁶ The figures in parenthesis exclude 5 decisions that the Australian Competition Tribunal has referred back to the AER for review. See http://www.competitiontribunal.gov.au/_data/assets/pdf_file/0003/30666/Summary-AER-Review-Decisions-26-Feb-2016.pdf.

Second question: *Whether the cost of capital principles, for the Subsequent Regulatory Period of the SAU, are unaffected by the variations to capture the new technologies, associated new products and the Amended Agreements*

We are of the view that the cost of capital principles for the Subsequent Regulatory Period of the SAU are appropriate principles for recognising a required return on investment to incorporate in a building block approach as contained in the SAU. These principles are quite general and are unaffected by the variations to the SAU to capture the new technologies, associated new products and the Amended Agreements. In our view, investors in any commercial enterprise wish to earn a required rate of return on invested capital and it is reasonable that pricing of regulated assets reflects such a return.

It is important to recognise that the asset base used to derive the return on capital component of the building block approach reflects that required to deliver the service that is in demand by customers and, in turn, the owners of these assets are rewarded or compensated by a return that justifies their construction or purchase.

Full Response to Questions

Contextual Caveat

We note that in estimating a WACC risk premium we are concerned with estimating the market risks faced by investors in NBN since these are the risks that determine the cost of capital. Market risk is different from (less than) the total risk that NBN faces as an operating business. It is less because prudent investors holding a well-diversified portfolio of investments can 'diversify away' non-market or specific risks faced by the operating business such as 'construction risk' that is specific to the enterprise. We also note that measurement of the market risks (captured by beta times the 'market risk premium' ("MRP") under the CAPM) is challenging and fraught with measurement error. The broad nature of current estimation techniques which generally rely on finding listed comparable companies mean it is challenging to refine beta estimates for subtle changes in product or service offerings, especially when the product or service is yet to be fully available to the market as is the case for NBN.

We understand that during the Initial Regulatory Period the Long Term Revenue Constraint Methodology ("LTRCM") reflects the actual (prudently incurred) costs of NBN (rather than the expected costs). Consequently, forecasting the capital expenditure and operating expenditure impact of the changes in technology, product offerings and the specific risks will not be relevant in this regulatory period.

First Question

"Whether the proposed approach to determining in the Initial Regulatory Period the rate of return as a risk-free rate plus a risk-premium, as well as the SAU WACC margin of 350 basis points above the government bond rate, remain reasonable when applied to the new MTM technologies and associated new products having regard to the Amended Agreements, current financial conditions and any regulatory determinations dealing with the WACC made since acceptance of NBN's SAU (but only so far as such decisions are relevant to the impact of the MTM related changes on NBN)."

In 2012, we were asked a number of questions relating to some key aspects of the approach NBN adopted in setting an appropriate WACC within the current SAU (i.e. before the change

in technologies referred to above).⁷ This context is relevant to answering the current questions. At that time, we were asked to advise on:

“...the effective WACC applied for regulatory purposes to other utilities and telecommunications companies; and ... your best estimate of the current WACC risk margin for NBN Co and how that compares to the 350 basis point risk margin proposed by NBN Co in its SAU.”

In answering this question, we assessed a risk premium on equity for NBN (a component of the WACC) using the Capital Asset Pricing Model. This model described the risk premium over the prevailing risk free rate as:

Market Risk Premium $\times \beta_i$

Here β_i is an estimate of the risk of NBN relative to the market. In particular, it is a component of the total risk of NBN that investors cannot diversify away by holding a well-diversified portfolio of securities.

This risk component is an essential part of the overall WACC risk premium and we address the overarching questions by forming a view as to whether the beta risk of NBN is different for the MTM compared with the risk envisaged for the prior SAU. We address the issue of the debt risk premium further on and reach a conclusion that the debt risk premium of NBN has not been changed by the MTM.

We proceed by dealing with four matters:

1. A restatement of our view associated with setting an annual WACC based on the long term government bond rate, which varies over time, plus a real margin;
2. A brief discussion of the known determinants of the beta of equity to set the scene for discussing how the change in technology and product set is likely to affect the beta of NBN in the third matter;
3. The difference between total risk and systematic risk as captured by beta. We revisit this because we are of the view that a number of the construction risks that NBN would have faced under the previous technology and is expected to face and continue to face even with the MTM are idiosyncratic to NBN and not systematic risks that affect the WACC risk premium; and
4. We estimate a beta reflecting the change in service and technology since our 2012 Report.

⁷ See Terms of Reference in “Report on WACC component of NBN’s Special Access Undertaking” Prepared by Professor Bob Officer and Dr Steven Bishop September 2012.

1. Reasonableness of an annual WACC based on the long-term government bond rate plus a real margin.⁸

We assume that an intent of the SAU is for NBN to be restricted to earn a maximum return that does not exceed the WACC over the period of the SAU. Put another way, the intent is that the market value of NBN be at most equal to the RAB plus ICRA (a NPV = 0 construct). This does not guarantee that NBN will recover all costs, including the WACC, because this will depend on demand for NBN's services and the final costs of rolling out and operating the network.

The only time the market value will be equal to the RAB plus ICRA under such a regulatory regime, other than by chance, is when funding is for the life of the asset and the WACC is estimated over this life. Typically neither of these conditions apply in practice.

It is evident that market risk premiums on debt and equity will vary over time reflecting some combination of changes in underlying market risk and changes in investors' risk aversion. Consequently the market WACC risk premium will vary over time since it is a weighted average of the debt and equity risk premiums. This in turn will differ from either a set WACC risk premium as proposed by NBN or by the periodic reset of the WACC risk premium at regular intervals as is undertaken by regulatory authorities in Australia and other countries. The outcome will be that the market value of the regulated assets differs from the RAB. Of importance here is whether the times there is under-compensation for risk is compensated by the times there is over-compensation.

We note that differences in the set WACC risk premium and the market WACC risk premium can arise not only from changes in market risk and investor attitudes to risk but also because the set WACC risk premium may not be the best estimate of the market WACC risk premium. This can occur, even at the time it is set, due to challenges in estimating equity market risk and the inherent conservatism of the regulatory setting agencies.⁹

A further challenge arises because regulated businesses are exposed to an additional risk due to the nature of revenue caps (which in NBN's case is a long term revenue cap). The consequence is a limit on upside revenue but not on downside revenue. The demand for NBN's services may turn out to be insufficient to cover all costs. Consequently, the expected operating free cash flow that drives the value of a business will be lower than that implicit in the regulated revenue. We would expect that this risk should be compensated in the regulatory process. To the extent that this is not allowed for explicitly (as in the current context),

⁸ A more detailed discussion is provided on page 6 of our 2012 report.

⁹ For example the AER did not increase the ERP during and post the GFC when it was evident that market risk had increased.

there is an argument that it is better to err on the high rather than the low side in setting the WACC risk premium and this would still be 'reasonable'¹⁰.

In the Initial Regulatory Period, NBN is proposing a set WACC risk premium of 350 basis points rather than a process of reassessing the premium at periodic intervals as is the case for other regulated assets in Australia. (The latter approach will, however, be used in the Subsequent Regulatory Period.)

One advantage of this set WACC risk premium for defining a maximum 'profit' is its simplicity and avoidance of a complex and costly process of having a formal reset at defined intervals. It also removes one aspect of regulatory risk arising from unexpected changes in regulators' decisions around WACC or regulators not capturing market risk at the time of each decision. However, offsetting this is the possibility of 'excess' profits or losses which can only be identified with the benefit of hindsight and with some imprecision.

As we pointed out in our 2012 report, it is important to point out the solution to this problem of setting a long term WACC (or the equivalent margin over the risk free rate) is not overcome by frequently re-setting the WACC. If the assets are of a long term duration they have to be funded for the long term and re-setting a WACC to meet current market conditions only increases the risk arising from the imbalance between the 'duration' of the assets and the liabilities (the funding). Similarly, with the ACCC re-setting the WACC at the time NBN is to be sold there is the risk that the WACC that is set is inconsistent with the funding costs of the assets i.e. the 'duration' of the assets is inconsistent with the 'duration' of the liabilities.

We are unable to assess how well the set WACC will hold over time. We can, however, form a view as to whether the proposed 350 basis points is a reasonable reflection of the current prevailing long term view of the WACC risk premium – this is addressed in another section below.

2. Determinants of Beta

To assist with making judgements of an appropriate estimate of the equity beta, it is useful to recognise the underlying drivers of an equity beta. These include:

- a. Revenue beta i.e. how the revenue from the asset(s) is expected to co-vary with the overall market revenue.
- b. Operating leverage i.e. the proportion of fixed operating costs to total costs. The combination of revenue beta and operating leverage determine the asset beta. In turn, the asset beta reflects the operating risk of the business that cannot be

¹⁰ As discussed in paragraphs 52 to 55 of our September 2012 report

reduced by a well-diversified investor. It is the risk that is subsequently shared by debt and equity investors.

- c. If operating costs are all variable then the asset beta will be the same as the revenue beta. The larger the operating leverage the larger will be the asset beta (for positive revenue betas).
- d. Financial leverage i.e. the proportion of 'fixed' interest claims to the value of the business. With no debt, the beta of equity will equal the beta of assets. Funding with debt (which is typically of lower risk than that reflected in the beta of assets) will pass risk to equity and increase the equity beta relative to the asset beta.

Ultimately the risk, as reflected by beta, is an empirical question. However, due to high measurement error in the estimation process combined with challenges in finding pure play listed companies that reflect the MTM to facilitate empirical estimation, informed judgement has to be brought to bear.

The limited information available means it is not clear whether the MTM will affect the demand for NBN services in the operating stages or more particularly the relative changes in demand with changes in aggregate economic activity. The level of demand will be affected by, and will respond to, changes in economic activity. However, the extent to which it is affected is too hard to answer without market research and even then it is not clear that we could find a suitable 'surrogate market' for NBN's services.

3. Systematic risk versus total risk

In the context of the theory underlying CAPM, total risk can be thought of as comprising two basic types:

- i) Non-diversifiable risk, which is also known as systematic risk or market risk. It is the risk that is inherent in the economy and, while one can bear different levels of this risk (including zero), one cannot diversify out of it. Moreover, this type of risk must be borne by someone and as a consequence a premium is required to bear such risk. The name market risk derives from it being market wide in that it is risk that all businesses / investors face to varying degrees;
- ii) Diversifiable risk is also known as unique or idiosyncratic risk. As the name suggests this is risk that is capable of being diversified away because it is not market wide - it is unique to the activity. As a consequence of being able to diversify such risk there is no risk premium, as such, paid to bear this type of risk. However, this does not imply this risk is irrelevant or should not be taken into account in evaluating projects or assessing a revenue requirement.

All risk can be thought of as belonging to either of these two types of risk, moreover most projects contain both types of the risk although they are handled differently in the evaluation of projects.

The standard approach to estimating a market determined cost of capital incorporates the premium for the systematic or non-diversifiable risk in the cost of capital. In effect, this approach provides an estimate of the cost of capital taking account of non-diversifiable or market risk but not diversifiable or unique risk. The unique risk is taken account of in the estimate of net cash flows and if cash flows do not cover the expected costs (including the expected costs from exposure to diversifiable risk) the project will not proceed. Diversifiable risk is not ignored.

In contrast to non-diversifiable risk, because unique or idiosyncratic risk is diversifiable it is not priced in a market cost of capital because many of the providers of capital will be able to diversify away this risk and competition amongst providers will ensure there is no premium for it in the market determined cost of capital.

The business, is however, also exposed to downside risks. Some are explicitly insured and some are self-insured. The former will be recognised in the estimation of costs. Ideally, the actuarial equivalent cost of the self-insured cost is also recognised and included in estimating costs, however such costs are hard to estimate and, for that reason, are often (inappropriately) ignored.

It is our understanding that the acquisition of certain existing copper assets to the home and of certain HFC assets does not mean absolution from construction activities associated with these networks. In any event, in our view, the risks associated with such activity are largely diversifiable risk rather than market risk because they will reflect construction activity specifically related to NBN and not economy-wide construction.

Nevertheless, the underlying question we address below remains as to whether there is greater systematic risk during the roll-out of the network than during the subsequent operation of the network. In the end, this is an empirical question upon which we comment further in the next section.

4. Revisiting our estimate of the beta of equity.

We refer to our assessment of the beta for NBN in our 2012 Report.¹¹ In that report, we wrote:

"We have selected a beta of equity as used for Telstra. We note Telstra is a mature network whereas NBN Co will go through a construction phase and growth phase before it can be viewed as a mature network like Telstra.

Ideally the comparable companies for assessing a beta during the construction phase would be those providing construction services to the Telco industry. Finding such pure-play companies is clearly a challenge so we do not have a view as to how the comparable betas might fall. However, ultimately the value of the constructed services / activities will be determined by demand for the services they provide, in turn a function of the systematic risk of Telco demand. Put another way, the ultimate funding for the construction phase is from the revenue generated by NBN Co and the non-diversifiable risk arises from how this changes with the economy. This will be, in turn, affected by the operating leverage of the construction business which may differ from the Telco business leading to a different asset beta however we do not have any fact base to test whether this will be significantly different.

As a consequence of lack of data, we have opted for using the Telstra beta.

However it is likely that the downside risks will be different in the construction phase to the operational phase. These risks will be insured either explicitly or implicitly by self-insurance. Such costs should be included in the cost component of the building block approach".¹²

As our initial assessment of the WACC risk premium did not explicitly consider a blended beta of telecom service operations and construction activities but rather just telecom services, if there was a reduction in NBN's overall beta arising from less construction activities during the network rollout, then our initial assessment of beta would be unaffected. This is because we may have initially under-estimated the beta of NBN and so underestimated the WACC risk premium by using a beta of 0.7 rather than a higher blended beta. Our choice at that time was deliberate because of the challenge of empirically estimating a beta of the construction

¹¹ "Report on WACC component of NBN Co's Special Access Undertaking" Prepared by Professor Bob Officer and Dr Steven Bishop September 2012.

¹² Op cit p14-15.

activities that are specifically focussed on servicing NBN's activities in this regard. This challenge still remains.

Nevertheless, it can be argued general construction activities have a higher equity beta than operating an established telecommunication network. The empirical evidence presented below supports this view. The table presents our estimates of betas for firms classified in three sectors using GICS codes. The betas shown are weighted averages of the member firms estimates.

BETAS OF RELEVANT SECTORS

Sector	FY 2014	FY 2013	FY 2012	FY 2011
Construction	1.3	1.1	1.1	1.1
Engineering Services	1.2	1.2	1.3	1.3
Telecommunications	0.6	0.6	0.6	0.6

However, the listed construction companies in Australia are exposed to a wide range of business sectors e.g. many provide services to the mining sector which, in turn, has a higher beta of assets than the telecommunications sector. NBN provides a list of external contractors on its website.¹³ Unfortunately, only two (Downer EDI and Transfield) are listed on the ASX enabling an assessment of the betas. We note that these are engaged in servicing a wide range of business sectors not just the telecommunications sector. Consequently we cannot empirically test whether construction services to the telecommunication sector have a beta more characteristic of an overall telecommunications operating business or are more reflective of the broader construction industry.

To further inform our judgement, we asked NBN whether the assets and raw materials used to service the NBN network were special purpose assets or more widely applicable to other sectors. Our expectation is that if the assets and raw materials were special purpose then the ultimate activity chain and revenue stream they service is that of NBN's service offering. In this case the revenue beta would be that of NBN's operating activities possibly modified for contractual risk shifting and operating leverage differences. On the other hand, if the assets and consumables were usable across a range of sectors and demand and competitive behaviour was therefore relative to the broader range of sectors then the beta of construction would be more appropriate.

¹³ <http://www.NBNco.com.au/corporate-information/about-NBN-co/building-the-workforce/jobs-with-construction-delivery-partners.html>

The response to our questions signalled that there is a mix of these two possibilities. While there is some specificity and consequent asset (and consumable) stranding risk there is also some exposure to the broader construction market.

This indicates that the beta of the overall construction activities of NBN may be marginally higher than the beta of telecommunications and lower than the beta of more general construction activities.

Our initial assessment of the appropriate risk premium for NBN did not explicitly recognise any higher risk for construction activities (see quote above) primarily due to challenges in finding suitable comparable companies that are listed and enable an empirical assessment of risk. This same challenge exists under the MTM. Consequently, acquisition rather than construction of some aspects of the technology would not, per se, change our previous view that 350 basis points is an appropriate risk premium to add to the prevailing risk free rate.¹⁴ The expectation that there will be times when it under- and over-estimates the market MRP continues to apply in the changed circumstances.

Review of WACC Risk Premium

The first question asks us for our view as to whether the proposed approach to determining the rate of return (WACC) as a risk-free rate plus a risk-premium of 350 basis points above the government bond rate, remains reasonable having regard to current financial conditions and any regulatory determinations dealing with the WACC made since acceptance of NBN's SAU.

We address this with attention to a recent final decision by the ACCC in regard to access determinations for fixed line services provided by Telstra.¹⁵ This is the most relevant regulatory decision for NBN as it deals with the same industry and some similarity in the assets and basic communication connectivity services to those provided (and to be provided) by NBN. Further, our 2012 assessment of the proposed 350 basis points WACC risk margin was related to similar decisions at that time. As we note below the primary change in financial conditions since our 2012 report that affects the WACC risk premium is the debt risk premium.

The table below captures the inputs to our indicative¹⁶ estimate, the estimate of the WACC risk premium in our September 2012 report, as well as an update as at end February 2016. It shows an estimate using a 10 year forward view. Ideally, a 30 year (or longer) forward view would be

¹⁴ Again this is contingent on no change in the revenue beta arising from a different service offering (largely around download and upload speeds).

¹⁵ ACCC, "Public inquiry into final access determinations for fixed line services Final Decision" October 2015

¹⁶ It is indicative because we have used DRP and risk free rate data from the RBA website. The RBA report the effective tenor of the debt to be 9.04 years for the February estimate. We have not extrapolated this to 10 years. We are unsure of the tenor of the reported 10 year CTBs so are unsure whether there is a mismatch. The DRP is calculated as the yield on corporate bonds less the 20 day average risk free rate as reported in the Table.

more appropriate for assets with a long life as is the case for the NBN network. Given a typical upward sloping yield curve, the longer term view leads to a higher required rate of return. However, there is a paucity of yield data on long term financial instruments in Australia consequently it is difficult to estimate the additional return empirically.

The first two column blocks in the table provide the 10 year estimates of the WACC and WACC risk margin estimated in our earlier report and an update as at the end of February 2016. Also shown for reference is a 10 year view as estimated by the ACCC in the “Public inquiry into final access determinations for fixed line services Final Decision” October 2015 for Telstra with the final column showing the Telstra (June 2014) view of the components of the WACC as reported in the ACCC Final Decision.

COMPONENTS OF THE WACC RISK PREMIUM

	10 yr Est	10 yr Est	10 Yr Est	10 Y Est
	Sep-12	Feb-16	ACCC TLS Aug-15	TLS Proposal Jun-14
Inputs				
Risk free rate	3.0%	2.5%	2.76%	3.66%
MRP	7.0%	7.0%	6.00%	6.50%
Beta equity	0.7	0.7	0.7	0.8
Debt risk premium	3.1%	2.6%	1.74%	1.40%
Gearing	40.0%	40.0%	40%	40%
Debt Issuance Cost		0.1%	0.07%	0.07%
Calcs				
Cost of Equity	7.9%	7.4%	6.96%	8.86%
Cost of Debt	6.1%	5.1%	4.57%	5.13%
WACC	7.2%	6.5%	6.00%	7.37%
WACC risk margin	4.2%	4.0%	3.24%	3.71%

ACCC estimate from Public inquiry into final access determinations for fixed line services Final Decision October 2015 p67

The difference in our estimate of the WACC risk margin and that of the ACCC lies in the difference in MRP (it explains 70bp on an unweighted basis or 42bp on a weighted basis) and in the DRP (it explains 82bp on an unweighted basis or 33bp on a weighted basis).

The change in our estimate since 2012 is due to the change in the estimate of the DRP as is the case for the ACCC. This is commented upon below in the context of a broader discussion of the changes in market conditions since 2012. The DRP assessed by the ACCC in its 2011

decision was 2.06% compared with our (non-contemporaneous) estimate of 3.1%. The WACC risk premium assessed by the ACCC in 2011 was 3.38%.¹⁷

The following points are relevant to considering the impact of changed market conditions since 2012 on the WACC risk premium:

- The yield on 10 year Commonwealth Trading Bonds, the proxy for the risk free rate, has fallen to unprecedented low levels. This is due to both a reduction in expected inflation and in the real risk free rate. Our current estimate of 2.5% represents the average of the 20 trading days to 29 February 2016. However, this change has no direct impact on the risk premiums for debt and equity;
- The risk premium for equity comprises the beta of equity multiplied by the market risk premium. The beta of equity has not changed in our analysis and we have not changed our estimate of the MRP¹⁸. Although we differ in our respective view on the level of the MRP with the ACCC we note it is using the same beta and MRP as in regulatory decisions relating to the period 2011-14. This contrasts with the use of a higher MRP of 6.5% in many of the AER decisions summarised in the next table. In our view the MRP changes with market conditions, the beta less so. Consequently there may be variations over time. If the debt risk premium changes due to general market conditions then we would expect the risk premium on equity to also change since similar forces will affect both. However, the change in equity risk premium is challenging to estimate and has not affected either our or the ACCC's estimate of the WACC risk premium and therefore the relative change over time in the table;
- The market value gearing has not changed in the estimate;
- The major change in market conditions is reflected in the debt risk premium. This has fallen since 2012. Our recent estimate of the premium for 'A' rated debt has been taken from the RBA website which publishes Bloomberg estimates of the yield on 10 year

¹⁷ See ACCC, "Inquiry to make final access determinations for the declared fixed line services", Final Report, July 2011, public version, p59

¹⁸ A detailed discussion of our view on the MRP is contained in earlier reports prepared by the authors. See for example:

Professor Bob Officer and Dr Steven Bishop, "Report on WACC component of NBN Co's Special Access Undertaking" September 2012

Officer and Bishop, "Market Risk Premium: A Review Paper", prepared for Energy Networks Association, Australian Pipeline Industry Association & Grid Australia, August 2008

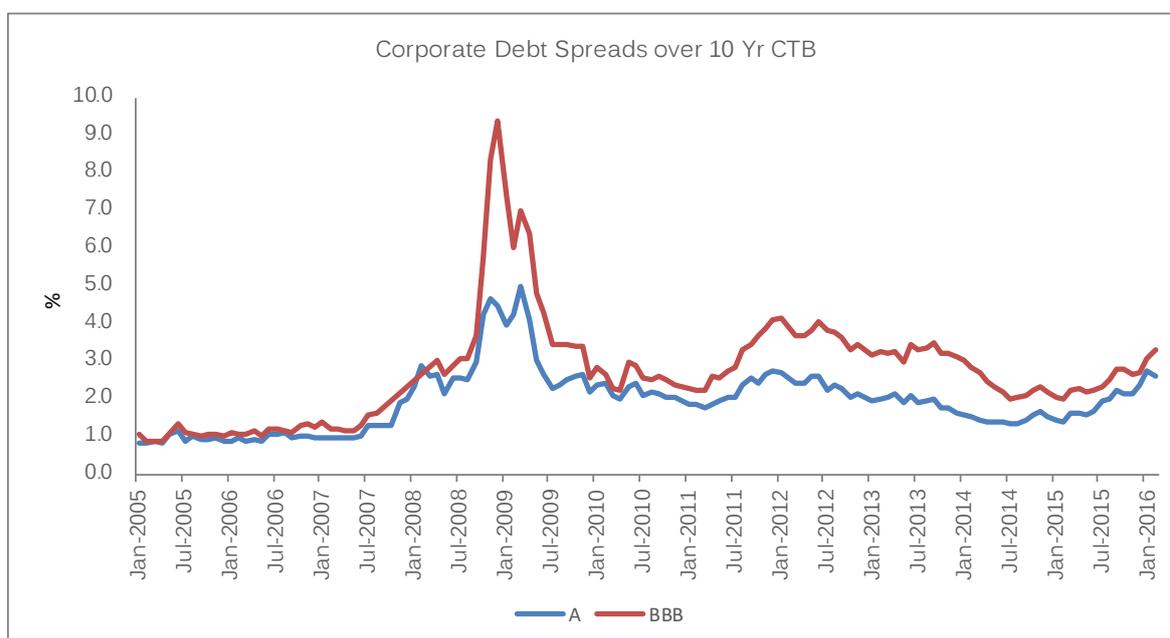
Bishop S, M Fitzsimmons & R Officer, "Adjusting the market risk premium to reflect the global financial crisis", JASSA Issue 1 2011

S Bishop "Commentary on MRP" paper prepared for DBNGP (WA) Nominees Pty Ltd as trustee of the DBNGP WA Pipeline Trust and DBNGP (WA) Transmission Pty Limited, November 2011.

maturity bonds (and other maturity bonds) although the reported maturity is 9.04 years. We comment further on the behaviour of the debt risk premium below.

The figure below shows an estimate of the debt risk premium on A and BBB rated corporate bonds since January 2005, the longest time series available from the RBA website. It is evident that the premium is quite variable and rose substantially during and after the GFC. We are of the view that much of the variation reflects market conditions and we expect the risk premium on equities to respond to the same factors, most likely in a magnified way. However estimating the behaviour of the risk premium on equities is a difficult empirical issue.

DEBT RISK PREMIUM OVER TIME



Source: RBA website, F3 AGGREGATE MEASURES OF AUSTRALIAN CORPORATE BOND SPREADS AND YIELDS: NON-FINANCIAL CORPORATE (NFC) BONDS. Relevant columns for this table and for estimating the bond risk premium for NBN are labelled FNFYA10M, FNFA10M FNFYBBB10M, FNFCBBB10M

Consequently, we expect a WACC risk premium to vary over time. There will be times when it is above and times when it is below the 350 basis points set out in the current SAU and our view of the best estimate for the MTM (i.e. 400 basis points). We believe that the 350 basis points is a reasonable representation of the variable WACC risk premium over time.

It is also instructive to review recent WACC determinations by regulatory authorities. These are summarised in Appendix 1 and summary statistics are provided in the Table below. The Table contains summary statistics that both include and exclude five final decisions made by

the AER that were referred back to it by the Australian Competition Tribunal in February 2016¹⁹. Replacement determinations are pending at the time of writing this report. The summary statistics for the smaller set are captured in parentheses in the discussion below.

It is apparent that the proposed WACC margin of 350 basis points for NBN is within the range of these determinations made between April 2015 and October 2015 by the AER and ACCC. The range of 17 (12) recent decisions is 288bp to 420bp (290bp to 420bp) with a simple average of 347bp (333bp). A wider set of 29 (24) determinations incorporating other regulators over a longer period from June 2014 to October 2015 has a range of 288bp to 420bp (290bp to 420bp) with the simple average being 350bp (343bp).

The decisions selected have an average beta of 0.7 however the debt equity mix in many cases reflects higher leverage (debt to value of 60% compared with the 40% ratio for NBN). It is challenging to assess the impact of this on the WACC premium given the high level of uncertainty around the inputs to the WACC calculation. On the one hand, the lower debt to value ratio for NBN could arise because it is seen to be more risky (higher beta of assets) than those businesses with a higher debt to value ratio and therefore cannot support the higher level of debt. The higher beta of assets means a higher vanilla WACC and WACC risk premium. On the other hand, the lower debt to value ratio could mean a lower cost of debt. While the data presented has a mix of betas of equity and a mix of debt to value ratios, in our opinion the WACC risk premium range is a reasonable range for comparative purposes, essentially because of the uncertainty around the estimates, including the likelihood that our estimate of 0.7 for NBN could be understated as discussed above (due to an underestimation of construction activities).

RECENT REGULATORY DECISIONS

	Recent AER, ACCC April – Oct 2015	Recent AER, ACCC April – Oct 2015 excluding decisions subject to re-estimation by AER	AER, ACCC and Other Regulators Oct 2014 – Oct 2015	AER, ACCC and Other Regulators Oct 2014 – Oct 2015 excluding decisions subject to re- estimation by AER
High	420bp	420bp	420bp	420bp
Low	288bp	290bp	288bp	290bp
Average	347bp	333bp	350bp	343bp
Number of Decisions	17	12	29	24

¹⁹ http://www.competitiontribunal.gov.au/data/assets/pdf_file/0003/30666/Summary-AER-Review-Decisions-26-Feb-2016.pdf

It should be noted that the AER is using an MRP of 6.5% in these decisions in contrast to 6.0% in the ACCC's final decision for Telstra. We used an MRP of 7.0% in our 2012 Report and we still maintain that it is our best estimate.

We note that the key driver of the range in the WACC risk premiums for utilities assessed by their regulator to have a beta of 0.7 (the same as we have estimated for MTM) is the cost of debt / debt risk premium. Given the same beta then the equity risk premium will only deviate by the expected MRP. This (the expected MRP) has not changed over time in ACCC decisions. As noted, the AER used 6.5% in the decisions summarised in the table above and this represents a change from earlier AER decisions when 6.0% was used.²⁰

We would normally expect the opportunity cost of equity and debt to be subject to similar forces i.e. the equity and debt risk premiums would be correlated to some extent arising from changes in overall market risk. Both are financial assets whereby, under the CAPM, the expected return is influenced by the MRP and beta. Since the MRP is common to both it is somewhat unusual to have the DRP changing but not the equity risk premium ["ERP"] as has been the case in the determinations made by the same regulatory authorities in Appendix 1.

We note the AER has adopted an "on the day" cost of debt approach and is transitioning to a trailing average cost approach. The differing costs of debt in Appendix 1 largely reflect different starting dates for estimating the "on-the-day" cost of debt. This approach does not reflect the opportunity cost of debt (as it only applies to some of the debt) and treats the cost of debt and equity differently (i.e. the current opportunity cost is used for equity but not for debt – the same logic should be used for both in our opinion).

Our indicative cost of debt of 5.1%²¹ reflects an "on-the-day" estimate as of end February 2016 and therefore reflects the current opportunity cost. It is our view that the cost of debt should be assessed as the "on-the-day" rate in relation to the WACC applicable to the MTM assets, consistent with the approach for the cost of equity – the opportunity cost of capital is a forward looking concept.

As stated above, in our view, the proposed 350 basis points falls within a reasonable confidence interval around our estimate of the risk premium for MTM assets and products and is consistent with the range of recent outcomes from relevant regulatory decisions.

²⁰ See for example the decisions captured in Appendix 1 of our 2012 report cited above.

²¹ The debt risk premium was taken from the yield on A rated bonds available on the RBA website of 5.03% less the 20 day average risk free rate - see footnote 16 above

Second Question

“Whether the cost of capital principles for the Subsequent Regulatory Period of the SAU are unaffected by the variations to capture the new technologies, associated new products and the Amended Agreements.”

Our understanding of the cost of capital principles for the Subsequent Regulatory Period is that the annual building block revenue forecast will contain an allowance for a return on capital. The return on capital will be calculated as an estimate of a WACC times an opening regulatory asset base. The WACC will be:

“... the rate of return will be determined by estimating a nominal vanilla WACC for Financial Year (t) having regard to efficient financing practices and the risks involved in providing the NBN Access Service, Ancillary Services and the Facilities Access Service.”²²

We are of the view that the cost of capital principles for the Subsequent Regulatory Period of the SAU are appropriate principles for recognising a required return on investment to incorporate in a building block approach as contained in the SAU.

These principles are quite general and are unaffected by the variations to capture the new technologies, associated new products and the Amended Agreements. In our view, investors in any commercial enterprise wish to earn a required rate of return on invested capital and it is reasonable that pricing of regulated assets reflects such a return.

The principles that apply for the Subsequent Regulatory Period are high level in the sense that they do not prescribe any guidelines for how to estimate the nominal vanilla WACC. This level of generality is certainly applicable to the MTM and can embrace a change over time in accepted principles of finance theory and the empirical method for estimating the nominal vanilla WACC. Currently, we view the accepted principles for estimating a nominal vanilla WACC to be as listed below and we anticipate subsequent estimates of the WACC would involve replacing these with agreed alternatives should theory and practice evolve.

- Current theory and practice has been discussed in our response to Question 1 and that, in our view, is applicable to the Subsequent Regulatory Period unless there are significant changes in knowledge between now and the application of Module 2. In brief, the key components discussed were efficient financing, that is: a) matching the duration of funding with the duration of the cash flows generated by the asset over its life and b) using a mix of debt and equity funding that minimised the WACC;

²² Section 2C.2.1(d) of NBN Co Special Access Undertaking 18 December 2012 varied on 18 November 2013

- the DRP is the current cost of raising the debt with a maturity as described above thereby reflecting the opportunity cost of debt;
- the CAPM is the most widely used method of estimating an ERP and the opportunity cost of equity;
- the ERP under the CAPM is, in turn, an expected risk premium reflecting the expected market risk premium multiplied by the beta of the asset (MTM based technology); and
- the actuarial cost of downside unsystematic risks should be included in the cost component of the building block approach.

Declaration

We declare that we have made all the inquiries that we believe are desirable and appropriate and that no matters of significance that we regard as relevant have, to our knowledge, been withheld from the ACCC or the Court.

Yours sincerely



Dr Steven Bishop



Professor Robert Officer

Appendix 1: Recent WACC Decisions by Regulatory Authorities (excluding decisions where beta is equal to or greater than 1)

Regulator	Decision	Sector	Regulatory Period	Date	Risk Free Rate	Beta	MRP	DRP*	D/V	Cost of Equity	Cost of Debt**	WACC	WACC ²³ Premium	Comments
QCA	SEQ Water Irrigation Price Review	Water irrigation	2013-17	May-13	2.89%	0.55	6.0%	3.32%	60%	6.19%	6.21%	6.20%	3.31%	Debt costs built up to allow for swap and issuance costs
ESCV	Greater metropolitan water businesses, Final Decision	Urban water	2013-18 (Retail) 2013-16 (Melbourne Water)	Jun-13	3.23%	0.65	6.0%	3.49%	60%	7.13%	6.72%	6.89%	3.66%	DRP is midpoint of 2.97 - 4.01%
ACCC	Wholesale ADSL access, final determination	Telco	2013-14	Jul-13	3.19%	0.7	6.0%	1.54%	40%	7.39%	4.73%	6.33%	3.14%	Source: ACCC spreadsheet. DRP included debt issue costs 7.4bp
ACCC	State Water Pricing for bulk water, Final Decision	Bulk water - NSW - Murray Darling Basin	2014/15 - 2016/17	Jun-14	3.98%	0.7	6.0%	2.10%	60%	8.18%	6.08%	6.92%	2.94%	
QCA	Aurizon Network, Draft Decision	Rail	2013 - 2017	Sep-14	3.21%	0.8	6.5%	2.94%	55%	8.41%	6.15%	7.17%	3.96%	Risk-free rate based on four year term to maturity.
QCA	Queensland Rail Access, Draft Decision	Rail	Acceptance to 2017	Oct-14	2.81%	0.8	6.5%	3.24%	55%	8.01%	6.05%	6.93%	4.12%	Further draft decision released May 2015 using same method but no WACC estimate
ERA	ATCO Gas, amended final decision	Gas Distribution	2015 – 2019, RoD updated annually	Sep-15	1.96%	0.7	7.6%	3.21%	60%	7.28%	5.17%	6.02%	4.06%	Debt costs estimated independently of a premium over risk free rate. Risk-free rate based on five year term to maturity, and applicable in respect of RoE only.
ERA	PTA Rail, Final Decision	Rail	2015-16	Sep-15	2.97%	0.60	7.3%	1.79%	50%	7.35%	4.76%	6.05%	3.08%	Calculated vanilla WACC from ERA inputs. Includes debt issuance costs

²³ WACC premiums have been rounded to 2 decimal places.

Regulator	Decision	Sector	Regulatory Period	Date	Risk Free Rate	Beta	MRP	DRP*	D/V	Cost of Equity	Cost of Debt**	WACC	WACC ²³ Premium	Comments
ESCoSA	SA Water, indicative estimate	Water	2016-2020	Nov-14	3.75%	0.8	6.0%	2.52%	60%	8.55%	6.27%	7.18%	3.43%	Indicative because actual rate to be set in 2016. Values stated are midpoint of range in ESCoSA report.
OTER	Water and sewerage, Final Report	Water and sewerage	2015-18	Apr-15	3.28%	0.65	6.0%	2.53%	60%	7.18%	5.81%	6.36%	3.08%	We calculated comparable plain vanilla WACC based on OTER estimates
IPART	Indicative for transport	Transport		Aug-15	3.80%	0.9	6.95%	2.65%	60%	10.06%	6.45%	7.89%	4.09%	IPART publish indicative rates for guidance to industry, Reported numbers derived from their published spreadsheet using mid-point estimates
IPART	Indicative for water businesses	Water		Aug-15	3.80%	0.7	6.95%	2.65%	60%	8.67%	6.45%	7.34%	3.54%	
AER	Jemena Gas Networks (NSW), Final Decision ²⁴	Gas Distribution	2015 – 2020, RoD updated annually	Jun-15	2.53%	0.7	6.50%	1.75%	60%	7.10%	4.28%	5.41%	2.88%	Applicable in respect of 2015/16. Risk free rate applies in respect of RoE only.
AER	Transgrid, Final Decision	Electricity Transmission	2015/16 – 2018, RoD updated annually	Apr-15	2.55%	0.7	6.5%	4.12%	60%	7.10%	6.51%	6.75%	4.20%	Applicable in respect of 2015/16. Risk free rate applies in respect of RoE only.
AER	Ausgrid, Final Decision ²⁵	Electricity Distribution	2015/16 – 2018/19, RoD updated annually	Apr-15	2.55%	0.7	6.5%	3.96%	60%	7.10%	6.40%	6.68%	4.13%	Applicable in respect of 2015/16. Risk free rate applies in respect of RoE only.

²⁴ In the matter of *Applications by PIAC, Ausgrid and Others* [2016] ACompT 1–4, the Australian Competition Tribunal has ordered the AER to reconsider this decision. Accordingly, the figures included in this table for this decision will be re-determined by the AER at a future date.

²⁵ See footnote 24.

Regulator	Decision	Sector	Regulatory Period	Date	Risk Free Rate	Beta	MRP	DRP*	D/V	Cost of Equity	Cost of Debt**	WACC	WACC ²³ Premium	Comments
AER	Endeavor Energy, Final Decision ²⁶	Electricity Distribution	2015/16 – 2018/19, RoD updated annually	Apr-15	2.55%	0.7	6.5%	3.96%	60%	7.10%	6.40%	6.68%	4.13%	Applicable in respect of 2015/16. Risk free rate applies in respect of RoE only.
AER	Essential Energy, Final Decision ²⁷	Electricity Distribution	2015/16 – 2018/19, RoD updated annually	Apr-15	2.55%	0.7	6.5%	3.96%	60%	7.10%	6.40%	6.68%	4.13%	Applicable in respect of 2015/16. Risk free rate applies in respect of RoE only.
AER	ActewAGL, Final Decision ²⁸	Electricity Distribution	2015/16 – 2018/19, RoD updated annually	Apr-15	2.55%	0.7	6.5%	3.52%	60%	7.10%	5.91%	6.38%	3.83%	Applicable in respect of 2015/16. Risk free rate applies in respect of RoE only.
AER	TasNetworks, Final Decision	Electricity Transmission	2015/16 – 2018/19, RoD updated annually	Apr-15	2.55%	0.7	6.5%	3.52%	60%	7.10%	5.88%	6.37%	3.82%	Applicable in respect of 2015/16. Risk free rate applies in respect of RoE only.
AER	Directlink, Final Decision	Electricity Transmission	2015/16 – 2019/20, RoD updated annually	Apr-15	2.55%	0.7	6.5%	1.80%	60%	7.10%	4.35%	5.45%	2.90%	Applicable in respect of 2015/16. Risk free rate applies in respect of RoE only.
ACCC	Telstra FAD, final decision	Telecommunications	2015 - 2019	Aug-15	2.76%	0.7	6.0%	1.81%	40%	6.96%	4.57%	6.00%	3.24%	Cost of Debt allows for issuance costs (7bp)
AER	Energex, Final Decision	Electricity Distribution	2015/16 – 2019/20, RoD updated annually	Oct-15	2.96%	0.7	6.5%	2.05%	60%	7.50%	5.01%	6.01%	3.05%	Applicable in respect of 2015/16. Risk free rate applies in respect of RoE only.

²⁶ See footnote 24.

²⁷ See footnote 24.

²⁸ See footnote 24.

Regulator	Decision	Sector	Regulatory Period	Date	Risk Free Rate	Beta	MRP	DRP*	D/V	Cost of Equity	Cost of Debt**	WACC	WACC ²³ Premium	Comments
AER	Ergon Energy, Final Decision	Electricity Distribution	2015/16 – 2019/20, RoD updated annually	Oct-15	2.96%	0.7	6.5%	2.05%	60%	7.50%	5.01%	6.01%	3.05%	Applicable in respect of 2015/16. Risk free rate applies in respect of RoE only.
AER	SA Power Networks, Final Decision	Electricity Distribution	2015/16 – 2019/20, RoD updated annually	Oct-15	2.96%	0.7	6.5%	2.32%	60%	7.50%	5.28%	6.17%	3.21%	Applicable in respect of 2015/16. Risk free rate applies in respect of RoE only.
AER	AusNet, Preliminary Decision	Electricity Distribution	2016 – 2020, RoD updated annually	Oct-15	2.76%	0.7	6.5%	2.54%	60%	7.30%	5.30%	6.10%	3.34%	Applicable in respect of 2016. Risk free rate applies in respect of RoE only.
AER	CitiPower, Preliminary Decision	Electricity Distribution	2016 – 2020, RoD updated annually	Oct-15	2.76%	0.7	6.5%	2.40%	60%	7.30%	5.16%	6.02%	3.26%	Applicable in respect of 2016. Risk free rate applies in respect of RoE only.
AER	Jemena Preliminary Decision	Electricity Distribution	2016 – 2020, RoD updated annually	Oct-15	2.76%	0.7	6.5%	2.40%	60%	7.30%	5.16%	6.02%	3.26%	Applicable in respect of 2016. Risk free rate applies in respect of RoE only.
AER	Powercor Preliminary Decision	Electricity Distribution	2016 – 2020, RoD updated annually	Oct-15	2.76%	0.7	6.5%	2.40%	60%	7.30%	5.16%	6.02%	3.26%	Applicable in respect of 2016. Risk free rate applies in respect of RoE only.
AER	United Energy, Preliminary Decision	Electricity Distribution	2016 – 2020, RoD updated annually	Oct-15	2.76%	0.7	6.5%	2.57%	60%	7.30%	5.33%	6.12%	3.36%	Applicable in respect of 2016. Risk free rate applies in respect of RoE only.

Notes

* In some cases the Cost of Debt was estimated without specific reference to the risk free rate e.g. ERA ATCO decision and recent AER decisions using a trailing average approach.

Consequently we have derived the equivalent DRP by deducting the risk free rate

** Includes debt issuance costs, where applicable.

Biographical Notes

Professor Bob Officer

B AgSc (Melbourne), M AgEc (New England), MBA (Chicago), PhD (Chicago), SF Fin

Bob has primarily focused on academic and consulting work. His expertise and research includes corporate and international finance, capital markets, industrial organisation, takeovers and antitrust.

He has played a substantive role in advising both regulatory bodies and regulated bodies on a whole range of issues associated with regulatory price setting for infrastructure assets. He has an international reputation for his pioneering work on the impact of dividend imputation on valuation

Bob was Chair of Victorian Funds Management Corporation until May 2006 with about \$37 billion under management and he has been integrally involved in the Australian Pension Fund industry for many years. He has held several other appointments including Chairman of both the Victorian and National Commissions of Audit, and has consulted to a large number of public, private and government organisations.

He sits on the Board and Investment committee on a number of Fund Managers Acorn Capital, CP2, JCP Investment Partners.

Bob has held Professorial positions in Finance at Monash University, University of Queensland and Melbourne Business School. He has held visiting Professor roles at Stanford Graduate School of Management and the Wharton School. He is Professor Emeritus at University of Melbourne.

Dr Steven Bishop

B Ec (Monash), MCom (Hons) (UNSW), PhD (AGSM), FCPA, F Fin

Steve is a valuation and corporate finance consultant. He is an executive Director of Education and Management Consulting Services Pty Ltd. He was a founding director of Value Adviser Associates, a business valuation and corporate advisory practise.

Steve's primary consulting interest is around the application of valuation insights to business decisions. In particular, he has guided the implementation of value-based management in a number of large and medium sized corporations.

Assignments have included business valuations for compliance, cost of capital estimation, merger and acquisition advice, the development of strategic and business plans, strategy advice, transfer pricing analysis and aspects of price determination in utility regulation.

Steve has worked in a number of industries including Aquaculture, Chemicals, Electricity, Financial Services, Forestry, Gas, Infrastructure, Minerals and Mining, Pharmaceutical, Property, Rail, Retailing, Shipping & Transportation, Telecommunications, Water and Wastewater.

Prior to Value Adviser Associates Steven worked with L.E.K. Consulting, as a partner in the world-wide management consultancy business; with Marakon Associates, as a senior manager in the firm that was a foundation consulting business in value based management principles and application; with Andersen Consulting as a Senior Manager in the Strategic Services section.

Prior to joining the consulting sector, Steve worked as an academic for over 15 years. He held academic positions at AGSM, University of NSW, Monash, Melbourne Business School and the Bendigo Institute of Technology. Steven co-authored "Corporate Finance" by Bishop, Faff Oliver and Twite (now in the 5th edition). He continues to teach in the Macquarie Masters of Applied Finance programme.