

YOUR TRUSTED VALUE ADVISER



Report on WACC component of NBN Co's Special Access Undertaking

Prepared by Professor Bob Officer and Dr Steven Bishop

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Background

1. This opinion has been prepared jointly by Professor Robert Officer and Dr Steven Ross Bishop.
2. 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.
3. Dr Steven Ross Bishop is an Executive Director of Education & Management Consulting Services and a former Executive Director of Value Adviser Associates Pty Ltd, both businesses specialise in business valuations and cost of capital estimation for regulatory and business purposes. A brief Curriculum Vita is attached.
4. We have been provided with a copy of the Federal Court Guidelines for Expert Witnesses. We have read and note the Guidelines. We declare that we have made all the inquiries that we believe are desirable and appropriate, within the timeframe permitted, and that no matters of significance that we regard as relevant have, to our knowledge, been withheld from this report.

Terms of Reference

5. We have been asked to update our report dated December 2011 regarding aspects of the WACC methodology used in NBN Co's special access undertaking (SAU) lodged with the Australian Competition and Consumer Commission (ACCC) on 5 December 2011.
6. In particular we have been asked to consider any impact of changes in the SAU, made in light of ACCC and industry feedback, on our prior advice.
7. Our brief contained the following terms of reference (the full brief is attached as an Appendix):

"In general terms, the revised SAU maintains the Weighted Average Cost of Capital (WACC) formulation of risk free rate plus 350 basis points that was proposed in NBN Co's previous SAU. However, NBN Co's revised proposal is that this formulation applies only for an initial 10 year regulatory period of a 30 year SAU (i.e. a period of approximately 10 years from the date of commencement of the SAU), with the adoption of WACC 'principles' to apply for consecutive regulatory periods of between 3 and 5 years over the remaining years of the SAU (i.e. the period between year 11 and year 30).

Consequently, could you please provide us with your independent expert opinion on whether it is reasonable, having regard to the statutory criteria, for NBN Co to propose an approach in its SAU which adopts as part of the Long Term Revenue Constraint Methodology:

- *nominal vanilla WACC formulated by reference to the mean yield on 10 year Commonwealth Government Securities (i.e. the risk free rate) plus 350 basis points for each financial year of a period of 10 years from the commencement date of the SAU (see clause 1F.6);*
- *a return on capital formulation calculated as the product of:*
 - *a nominal vanilla WACC, forecast for the Regulatory Cycle with reference to*
 - *the risks involved in providing the NBN Access Service, Ancillary Services and Facilities Access Service;*

- a financing structure that meets benchmark standards as to gearing and other parameters for a similar going concern and reflects in other respects best practice;
- a cost of debt and a cost of equity (determined for the Regulatory Cycle using a well-accepted financial model, such as the Capital Asset Pricing Model) that meet benchmark standards as to efficient financing of equity and debt for a similar going concern, having regard where appropriate to past, present and expected future financial conditions; and
 - the opening value of the nominal RAB for year t , which is to be forecast consistently with the RAB Roll Forward equation set out clause 2D.7.1(b) and using the expected value of Capital Expenditure for the years in between when the forecast is made and year t ,

to apply for consecutive regulatory periods of between 3 and 5 years from the end of the initial regulatory period until the conclusion of the SAU term at 30 years (see clause 2D.2.1(a)(iii)).

Given the changes to NBN Co's approach to the WACC component of its SAU, could you also please confirm that the conclusions made in your December 2011 report (those which are not affected by the elements discussed above) remain valid. In particular, could you please confirm your conclusions in relation to:

- 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 your review, could you please consider any impacts that the historically high spread which currently exists between Commonwealth Government Securities and other low risk assets, such as NSW Government issued TCorp bonds, may have on your conclusions in relation to NBN Co's risk margin (see note at Attachment 3)
- whether you consider that the following assumptions that have been used by NBN Co for the purpose of calculating the net tax allowance within the Long Term Revenue Constraint Methodology in the Initial Regulatory Period are reasonable:
 - return on debt (inclusive of debt raising costs) = the actual interest expense recorded in NBN Co's statutory accounts for the relevant financial year
 - $\gamma = 25\%$.

8. Our understanding of the primary change with regard to the WACC in the SAU since our last report, is that the prior process whereby the cost of capital was set annually as a risk free rate plus 350 basis points over a 30 year period now becomes an arrangement whereby the 30 year period is broken into an Initial Regulatory period of 10 years followed by the Subsequent Regulatory period which is made up of a series of Replacement Modules of 3 to 5 years in length until the overall 30 year period is reached. Prior to the commencement of each

Replacement Module NBN Co will estimate a WACC following defined WACC principles and this will be used to establish a revenue cap using a Building Block Revenue approach.

9. The revenue cap established in this way commences when NBN Co recovers its initial cost (which includes a return on capital invested). Until this time (a Methodology Change Event) prices of services (and maximum changes in prices) are defined by price schedules, initial pricing principles and price increase caps.
10. The defined WACC principles to be followed for each Replacement Module include setting a nominal vanilla WACC with reference to: the risks involved in providing the relevant services; a benchmark financing structure; and a cost of debt and a cost of equity (determined using a well accepted financial model such as the Capital Asset Pricing Model) that meet benchmark standards for efficient financing, having regard where appropriate to past, present and expected future financial conditions. The WACC estimation process will be reviewed by the ACCC as part of the Replacement Module Application process.

Summary of Advice

Use of Set Risk Margin for 10 years subsequently revised for Replacement Modules

11. In our prior report we concluded that it was 'reasonable' to set a WACC based on the long term government bond rate plus a real margin and varying annually with the long term bond rate but it was important to recognise the risks associated with the approach. Such an approach will 'tend to' set the value of the business (assets) and vary costs of capital (reflecting economic conditions) such that consumers will take up these risks in price changes in the services offered. Whereas, setting a constant WACC for the life of the asset will 'tend to' set prices but the varying costs of capital (reflecting economic conditions) will be reflected in changing values of the business (assets) so that producers absorb these economic risks.
12. We also note that there are risks in setting a constant margin over the 'risk free rate' and that these risks may offset the advantages of the approach of setting a constant margin if there is not an adequate recognition and allowance for them by way of a margin over and above that set by the WACC. We also noted that an outcome of the fixed margin approach will be that the value of the business will vary over time when the risk margin in the opportunity cost of capital differs from the set margin.
13. The proposed changes will reduce these 'margin risks' but not remove them. Given the challenge in quantifying the risks and recognising them as a cost to the business, we are of the view that the revised proposal should be a lower risk outcome.
14. We agree that the return on capital for each Replacement Module should be estimated as a nominal vanilla WACC with reference to: the risks involved in providing the relevant services; a benchmark financing structure; and a cost of debt and a cost of equity (determined using a well accepted financial model such as the Capital Asset Pricing Model) that meet benchmark standards for efficient financing, having regard where appropriate to past, present and expected future financial conditions. The principle of using a nominal vanilla WACC as an opportunity cost of capital, estimated in this way, is consistent with practice in both commercial and regulatory environments. Current practice is to estimate the cost of equity using the CAPM and the cost of debt from current rates of appropriate maturity from the capital market. However this does not preclude the possibility of another method replacing or informing the CAPM.
15. We also agree that the nominal vanilla WACC be applied to the opening value of the Regulatory Asset Base for each financial year of the regulatory period as is practice for regulated businesses.
16. The use of the nominal vanilla WACC means all taxation effects of financing are accounted for in the other components of the building block approach viz. the tax benefit of interest deductions is in the estimate of net cash flows whereby the statutory tax rate is adjusted to reflect the value of imputation tax benefits. Our assumption is that this consistency between the WACC definition and the definition of the building block components is adhered to.

Comparability with other Regulatory Rates

17. Our conclusion from our review of other regulatory decisions is that the proposed WACC margin of 350 basis points is at the lower end of a reasonable range in the current environment:
 - The Telstra WACC risk margin has been quite stable at 343 basis points until recently when it has changed due to revision of the debt risk premium and the beta of equity;

- Other regulatory determinations show volatility in the WACC risk margin with recent levels generally above both the Telstra WACC risk margin and the proposed 350 basis points for NBN Co. However the equity beta is higher, gearing is at 60% and the assumed debt rating is circa BBB; and
 - The WACC risk premium will be variable rather than fixed over time.
18. However, in our view, recent regulatory decisions under-estimate the cost of equity and therefore a WACC risk margin that is reflective of current market conditions. Consequently the use of 350 basis points is more consistent with regulatory practice than our view of current market rates.

Estimate of WACC Risk Premium

19. Our best estimate of a current WACC risk margin for NBN Co. is circa 420 basis points. With the exception of the MRP, our estimate over 10 years would accord with the approach taken in other regulatory decisions. We note that regulatory authorities have used 6% as an MRP (based on a 10 year risk free rate) however we are of the view that this does not reflect current economic circumstances and is not appropriate. If 6% is used rather than our estimate of 7% then the margin is circa 375 basis points. Given the estimation error around the estimates a 350 basis point mark-up would fall at the lower end of a reasonable confidence interval around this estimate.

Calculation of net tax allowance in Initial Regulatory Period

20. Typically the tax savings for price determinations will be estimated using the opportunity cost of debt that is used in the estimate of the WACC to ensure a consistent forward view of cash flow estimates and the required rate of return. The proposed approach in the Initial Regulatory Period will lead to a mismatch in the tax savings calculated this way and those arising from using the opportunity cost of debt used to estimate the WACC. However it is challenging to estimate the magnitude and materiality of any error in advance. The error will be the difference between the opportunity cost of debt and the actual cost multiplied by the effective tax rate (gamma adjusted). It can be positive or negative. This will be immaterial until all tax losses are used.
21. We are aware that the 0.25 as used in the calculation of the net tax allowance is consistent with a recent decision made by the Australian Competition Tribunal ["ACT"] based on the most recent research available to it. We have reviewed this research and have no grounds for disagreeing with the decision, despite it being lower than our expectation. Given that the ACT provides an opportunity for AER decisions to be appealed we are comfortable with gamma being set in this way.

Advice

Context for WACC

22. The context for use of the WACC was described in our report dated December 2011. Under the SAU, NBN Co proposes to commit to an overall revenue constraint across all products using a building block model (i.e. one that includes an allowance for WACC) and a regulatory asset base ["RAB"] method. The latter has a WACC component within it to reflect the intra year capital expenditure and disposal profile. This is now captured in the Long Term Revenue Constraint Methodology under Schedule 1F for the Initial Regulatory Period and Schedule 2D for the Subsequent Regulatory Period.
23. As noted above, the primary change with regard to the WACC in the SAU since our last report, is that the prior process whereby the cost of capital was set annually as a risk free rate plus 350 basis points over a 30 year period now becomes an arrangement whereby the 30 year period is broken into an Initial Regulatory Period of 10 years followed by the Subsequent Regulatory Period which is made up of a series of Replacement Modules of 3 to 5 years in length until the overall 30 year period is reached. Prior to the commencement of each Replacement Module NBN Co will estimate a WACC following defined WACC principles and this will be used to establish a revenue cap using a Building Block Revenue approach.
24. The revenue cap established in this way commences when NBN Co recovers its initial cost (which includes a return on capital invested). Until this time (a Methodological Change Event) prices of services (and maximum changes in prices) are defined by prices schedules and price increase caps.
25. The Initial Cost Recovery Account tracks unrecovered costs which includes a return on capital. The WACC used in this calculation is updated annually to reflect the prevailing risk free rate plus 350 basis points.
26. Of importance for our purpose is that a building block method is used to assess the cost recovery amount each year in the Initial Cost Recovery Period and to assess the annual maximum revenue in the Building Block Revenue period after the losses are fully recovered. It is proposed that the nominal vanilla WACC in year t used in the first 10 years of the SAU be revised each year according to:

$$\text{Nominal Vanilla WACC} = r_f + 3.5\%$$

Where r_f is the risk free rate of interest calculated on a moving average basis from the mean annualised yield on Commonwealth Government Securities with a maturity of 10 years, averaged over the final 20 Business Days of the preceding Financial Year and using the indicative mid rates published by the Reserve Bank of Australia; and we refer to the 3.5% as the 'set WACC risk premium'.

27. A nominal vanilla WACC will be estimated prior to the commencement of a nominated Replacement Module that may commence in year 11 of the SAU. The intent is to estimate the nominal vanilla WACC with reference to: the risks involved in providing the relevant services; a benchmark financing structure; and a cost of debt and a cost of equity (determined using a well accepted financial model such as the Capital Asset Pricing Model) that meet benchmark standards for efficient financing, having regard where appropriate to past, present and expected future financial. The principle of using a nominal vanilla WACC as an opportunity cost of capital, estimated in this way, is consistent with practice in both commercial and regulatory environments. Current practice is to estimate the cost of equity using the CAPM and the cost of debt from current rates of appropriate maturity from the

capital market. However this does not preclude the possibility of another method replacing or informing the CAPM.

28. Typically the annual return on capital component (set at the beginning or the regulatory period for its duration) of the building block approach is calculated by applying a WACC to the RAB. The WACC is assessed as:

$$WACC = k_d \frac{D}{V} + k_e \frac{E}{V} \quad (1)$$

Where

k_e is the expected return on equity or cost of equity

k_d is the expected return on debt or cost of debt

V is the market value of debt plus the market value of equity. D/V is the market value of debt as a proportion of the market value of equity and debt

E/V is the market value of equity as a proportion of the market value of equity and debt or $(1 - D/V)$.

29. The cost of debt is typically assessed by direct reference to debt risk premiums on comparable traded corporate bonds, usually of 10 year maturity, which is added to an estimate of the risk free rate, usually an average of 20 days traded yields on 10 year maturing Commonwealth Treasury Bonds.
30. The cost of equity is not directly observable in capital markets consequently a model is required to guide the choice. Typically the Capital Asset Pricing Model ["CAPM"] is used for the purpose. The CAPM can be expressed as:

$$k_e = r_f + [k_m - r_f] \beta_e \quad (2)$$

Where k_e is the expected return on asset e or cost of equity if the asset is equity

r_f is the nominal risk free rate of return

k_m is the expected return on the market portfolio

$[k_m - r_f]$ is often called the expected market risk premium ["MRP"] being the amount by which investors will be rewarded for bearing the risk of the market portfolio which has a beta of 1

β_e is the risk of asset e relative to the risk of the market or equity beta.

31. The risk free rate typically used is also used to estimate the risk premium on debt. Since both the cost of debt and the cost of equity have a common risk free rate then the WACC can be expressed as a risk free rate plus a risk premium as follows:

$$r_f + (WACC - r_f) = r_f + DRP \frac{D}{V} + ERP \frac{E}{V} \quad (3)$$

Or

$$(WACC - r_f) = DRP \frac{D}{V} + ERP \frac{E}{V} \quad (4)$$

Where $WACC - r_f$ can be viewed as a WACC risk premium

DRP is the debt risk premium or $k_d - r_f$

ERP is the equity risk premium or $k_e - r_f$.

32. The SAU proposes to use the prevailing risk free rate at the beginning of each year for the first 10 years of the Building Block Revenue period and add 350 basis points

to derive a WACC. While the brief does not refer to the source of the 350 basis points we use the relationships above to guide our assessment of the reasonableness of the approach in a later section.

Use of Set Risk Margin for 10 years subsequently revised for Replacement Modules

“ . . . could you please provide us with your independent expert opinion on whether it is reasonable, having regard to the statutory criteria, for NBN Co to propose an approach in its SAU which adopts as part of the Long Term Revenue Constraint Methodology:

- *nominal vanilla WACC formulated by reference to the mean yield on 10 year Commonwealth Government Securities (i.e. the risk free rate) plus 350 basis points for each financial year of a period of 10 years from the commencement date of the SAU (see clause 1F.6.1);*
- *a return on capital formulation calculated as the product of:*
 - *a nominal vanilla WACC forecast with reference to;*
 - *the risks involved in providing the NBN Access Service, Ancillary Services and Facilities Access Service;*
 - *a financing structure that meets benchmark standards as to gearing and other parameters for a similar going concern and reflects in other respects best practice;*
 - *a cost of debt and a cost of equity (determined for the Regulatory Cycle using a well-accepted financial model, such as the Capital Asset Pricing Model) that meet benchmark standards as to efficient financing of equity and debt for a similar going concern, having regard where appropriate to past, present and expected future financial conditions; and*
 - *the opening value of the Regulatory Asset Base for each financial year of the regulatory period (which is to be forecast consistent with the RAB Roll Forward equation set out clause 2D.7.1(b) and using the expected value of Capital Expenditure for the years in between when the forecast is made and that financial year),*

to apply for consecutive regulatory periods of between 3 and 5 years from the end of the initial regulatory period until the conclusion of the SAU term at 30 years (see clause 2D.2.1(a)(iii)).

33. As discussed in our prior report, our view is that it is reasonable to propose a nominal, post tax plain vanilla WACC for each year, i.e. the current long term government bond rate (r_f) plus a fixed real rate such as the 350 basis points as proposed, providing the 'rules of the game' are clear to investors (and customers).
34. We are of the same view for the revised proposal i.e. it is reasonable to break the 30 year period into a 10 year period with the prevailing risk free rate plus a fixed risk premium with revisions to the WACC in subsequent Replacement Modules, again providing the 'rules of the game' are clear to investors (and customers).
35. Certainly investors in regulated infrastructure in Australia will be familiar with the proposed process of resetting for a period shorter than the life of the asset albeit for a longer term in the first instance because of its use by regulatory authorities. However, the indexation of the WACC to changes in the risk free rate annually

and flowing into the Initial Cost Recovery Account and to the Annual Building Block Revenue Requirement (should it occur in the Initial Regulatory period) is an innovation. In the unlikely event that the initial costs are fully recovered during the Initial Regulatory Period such that there was a flow on to prices (subject to compliance with applicable individual price increase limits), such an approach will 'tend to' set the value of the business (assets) and vary costs of capital (reflecting economic conditions) such that consumers will take up these risks in price changes in the services offered. Whereas, setting a constant WACC for the life of the asset will 'tend to' set prices but the varying costs of capital (reflecting economic conditions) will be reflected in changing values of the business (assets) so that producers absorb these economic risks.

36. We note in the instructions that NBN Co consider it unlikely that the Methodology Change Event (recovery of initial costs) will occur in the Initial Regulatory period and have any direct impact on NBN Co's pricing during that period.
37. This section largely follows the content of our December 2011 report but with further comment on the proposed introduction of the Replacement Modules and associated revisions to the nominal vanilla WACC.
38. We assume that an intent of the SAU is for NBN Co to be restricted to earn a maximum expected return equal to the WACC over the period of the SAU. Put another way, the intent is that the market value of NBN Co be at most equal to the RAB (a NPV = 0 construct).
39. This will occur if the prevailing WACC at any point of time is either equal to the set WACC or if expected variations in the WACC in the future are effectively the same as the WACC reflecting market conditions at the time. Under the proposed SAU there may be a different 'set WACC' in each of the first 10 years and then revised for subsequent 3 – 5 year periods. The WACC will be set at the beginning of the 3 – 5 year periods and remain invariant for the duration of each period.
40. The only time we can have confidence that a set WACC will be equal to the 'market WACC' such that the return on the RAB sets NPV=0, is when the life of the asset(s) is consistent with the period over which the set WACC is estimated. When this does not occur, there is likely to be 'windfall gains or losses' for the entity. Conceptually, it is the same as a bank failing to match the duration of their assets and liabilities – borrowing long and lending short or borrowing short and lending long expose the bank to risks that do not occur when the duration of assets and liabilities are matched.
41. At one extreme, the proposed set WACC risk premium for any period and the WACC framework captured above can be reconciled if the equity and debt risk margin, as well as gearing, is held constant over the entire period of interest. For the ERP to be constant, it further requires both the MRP and the beta of equity to be constant or the product of the two to be constant. Parenthetically, these risk premiums are unlikely to be constant for any extended period because if they were then there would be no risk for that period and by inference no premium if it was expected.
42. However the WACC is an opportunity cost and there is no reason to suppose that it will only change with the risk free rate. There is evidence that the ERP and DRP change over time. Consequently there will be years when the set WACC risk premium will be above the prevailing opportunity cost and times when the opposite is the case.
43. We cannot easily assess the impact of changes over time. Perhaps Monte Carlo simulation using historically based distributions of ERP and DRP may assist to form a view as to the reasonableness of the use of a set WACC versus a variable WACC. The variable WACC arises from variations in ERP and DRP over time and use of the Monte Carlo analysis will inform the sort of 'risk margin' that might be required to

adequately compensate for the exposure to the unexpected changes in risk margins. There is no model that can be used to set such a risk margin other than by positing various scenarios and ensuring the 'over' adequately compensate the 'unders', such as a Monte Carlo study based on historical parameters.¹

44. Nevertheless it is possible to form a view about the likely impact of the use of the proposed approach on the value of the NBN Co business relative to the RAB. Since the building block approach sets a maximum annual revenue that NBN Co can earn then it is most likely that the expected cash flow will be less than this amount. This arises from there being a limit on the upside but not on the downside, analogous to coupon paying debt. The analogy to debt arises because it has a series of promised payments which are a maximum. The expected cash flow will be below this because of the probability of default i.e. there is downside but no upside. Consequently the expected cash flow will be lower than that required to earn the set WACC.
45. This means that if the prevailing WACC and the set WACC (either for the 10 years or subsequent 3 – 5 year periods) were the same currently but through time the market WACC is inconsistent with the set WACC, then NBN Co is exposed to the risk explained above. If this risk is uncompensated then it is likely to result in the value of NBN Co being below the RAB. For example, suppose that NBN Co was expected to earn the set WACC risk premium over time. In this case its value at any point in time (present value of the expected stream of cash flows) will be a function of the relationship between the prevailing market WACC risk premium over the remaining life of the assets and the best view of the set WACC risk premium over the same period. If the set WACC risk premium is higher than the prevailing WACC then the value of NBN Co will be above the RAB. The converse will also hold.
46. We are unable to assess how the relationship 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.
47. One advantage of the set WACC risk premium for defining a maximum 'profit' for the first 10 years 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 regulator's decisions around WACC. However offsetting this is the (unknown by us at this time) possibility of 'excess' profits or losses which can only be identified with the benefit of hindsight.
48. The proposed resetting of the WACC for the Replacement Modules will add cost, complexity and increased exposure to the regulatory risk mentioned above relative to the SAU lodged in December 2011 but may reduce the size of 'excess' profits or losses because there may be improved re-adjustment to market rates and the relative certainty of the rates set under the proposal will remove some of these risks.
49. It is important to point out the solution to this problem of setting a long term WACC (or the equivalent margin over the bond 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 'approving' the WACC at the beginning of each Replacement Module there is the risk that the WACC that is

¹ By 'overs' and 'unders' we mean when the set WACC is set too low the entity will lose money (at least in opportunity cost) and when the set WACC is too high the entity will gain money or 'rent' from its 'monopoly position'.

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.

50. We conclude that it is 'reasonable' to set a WACC based on the long term government bond rate plus a real margin and varying with the long term bond rate for the first 10 years and then resetting it at the beginning of each Replacement Module, but it is important to recognise the risks associated with this approach. These risks may offset the advantages of the approach if there is not an adequate recognition of them.
51. Of course, setting the WACC and applying it to the RAB in the building block approach does not in any way guarantee that NBN Co can earn the WACC. An important consideration is the likely constraints on demand at the price ranges set that will limit NBN Co's ability to achieve a sufficient cash flow to earn the WACC. Substitutes, such as alternative networks, will place a ceiling on the price it can charge and may mean the set WACC becomes irrelevant. By way of example, our understanding is that a number of regulated businesses (e.g. water) are not earning their WACC based on the RAB. In this circumstance the WACC, however set, does not influence expected cash flows as revenue is insufficient to 'cover' it.
52. We also reiterate an important point made in our December 2011 report, that there is an argument that it is better to err on the side of being generous in setting the risk margin (WACC). This argument is based on the social cost of the WACC being set too 'high' being lower than the social cost of under-investment if the WACC is too 'low'. This view has been expressed by the Productivity Commission and the Commerce Commission as summarised below. Unfortunately we have not seen any research that specifies the relative loss functions associated with an 'overstatement' or 'understatement' of the WACC that enable a formal analysis of this issue.
53. In this regard, the Productivity Commission suggests that there is a trade-off between the social cost of under-investment resulting from a WACC being set that is 'too low' and the private benefit of it being set 'too high':

*"The possible disincentives for investment in essential infrastructure services are the main concern. In essence, third party access over the longer term is only possible if there is investment to make these services available on a continuing basis. Such investment may be threatened if inappropriate provision to access, or regulated terms and conditions of access, lead to insufficient returns for facility owners. While the denial of monopoly pricing of access also imposes costs on the community, they do not threaten the continued availability of the essential services concerned. Thus, over the longer term, the costs of inappropriate intervention in this area are likely to be greater than the cost of not intervening when action is warranted."*²

*"However given the asymmetry in the costs in under and over compensation of facility owners, together with the informational uncertainties facing regulators, there is a strong principle case to 'err' on the side of investors. The challenge is how to render this principle operational without creating new problems."*³

"... given the cost of inappropriate intervention and the practical difficulties of intervening efficaciously, it is important that access

² Productivity Commission, "Review of the National Access Regime," Position Paper March 2001 p xv111-xix

³ Ibid p 71

*regulators are not overly ambitious. The costs potentially associated with efforts to fully remove monopoly rents might suggest that the focus of regulators should be a more modest one of reducing demonstrably large rents. Similarly, the extensive information required to base access prices on precise assessments of firms' costs, and the attendant risk of mistakes, might provide a case for less intrusive approaches, involving some rules of thumb."*⁴

54. A similar view is expressed by the New Zealand Commerce Commission,⁵ which provides the following explanation for estimating a standard error around an estimate of the WACC and selecting the 75th percentile WACC to use in price determinations:

"The reason for the Commission adopting a cost of capital estimate that is above the mid-point is that it considers the social costs associated with underestimation of the cost of capital in a regulatory setting, are likely to outweigh the short-term costs of overestimation. That is, the Commission is acknowledging that where there is potentially a trade-off between dynamic efficiency (i.e. incentives to invest) and static allocative efficiency (i.e. higher short-term pricing), the Commission will always favour outcomes that promote dynamic efficiency. The reason being that dynamic efficiency promotes investment over time and ensures the longer term supply of the service, which thereby promotes the long-term interests of consumers.

On this basis the Commission considers it appropriate to apply a point estimate for the cost of capital for the DPP and CPP that is based on the 75th percentile."

55. On these grounds we recommend erring on the high rather than low side of estimates of the risk margin (and WACC) and are of the view that this would still be 'reasonable'.

⁴ Ibid p71

⁵ Commerce Commission, "Input Methodologies (Electricity Distribution Services) Draft Reasons Paper" June 2010 p 315

Comparability with other Regulatory Rates

"Given the changes to NBN Co's approach to the WACC component of its SAU, could you also please confirm that the conclusions made in your December 2011 report (those which are not affected by the elements discussed above) remain valid. In particular, could you please confirm your conclusions in relation to:

- o the effective WACC applied for regulatory purposes to other utilities and telecommunications companies;"

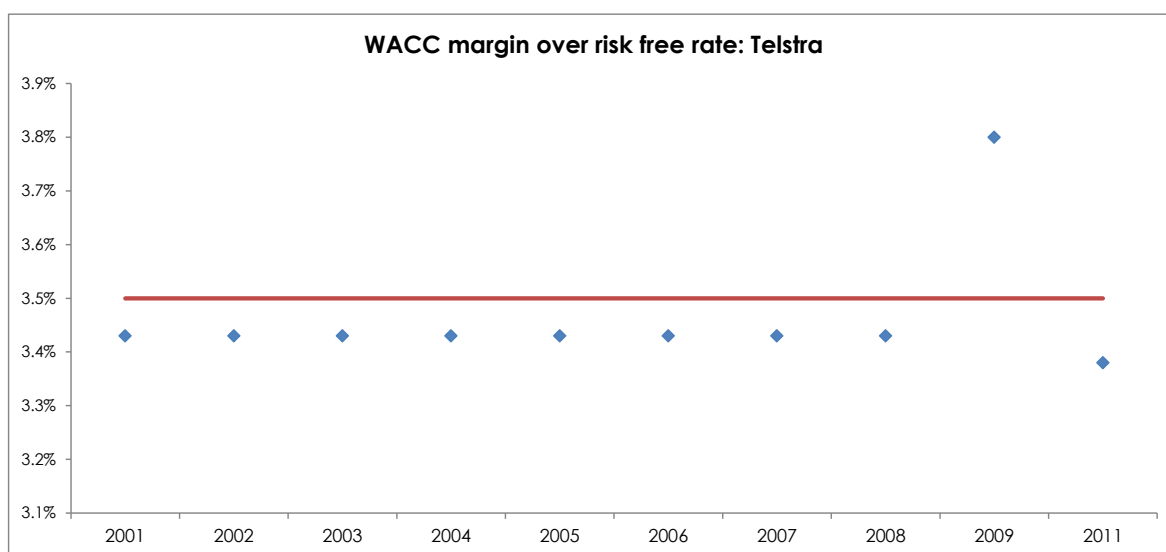
56. The Table and Figures below summarise data collected on the WACC risk premium for:

- a) Telstra regulated pricing determinations; and
- b) Other utility regulated pricing determinations (the data table is in Appendix 1).

Telstra regulated pricing determinations

57. The plain vanilla WACC risk premiums above the nominal risk free rate as assessed for Telstra since 2000 are presented in Figure 1 with the underlying data in Table 1. Also shown is the 350 basis point proposal for NBN Co as the straight line. We have not discovered any updates since our last report.

FIGURE 1 REGULATORY MARGIN OF WACC ABOVE RISK FREE RATE FOR TELSTRA



Source: ACCC determinations

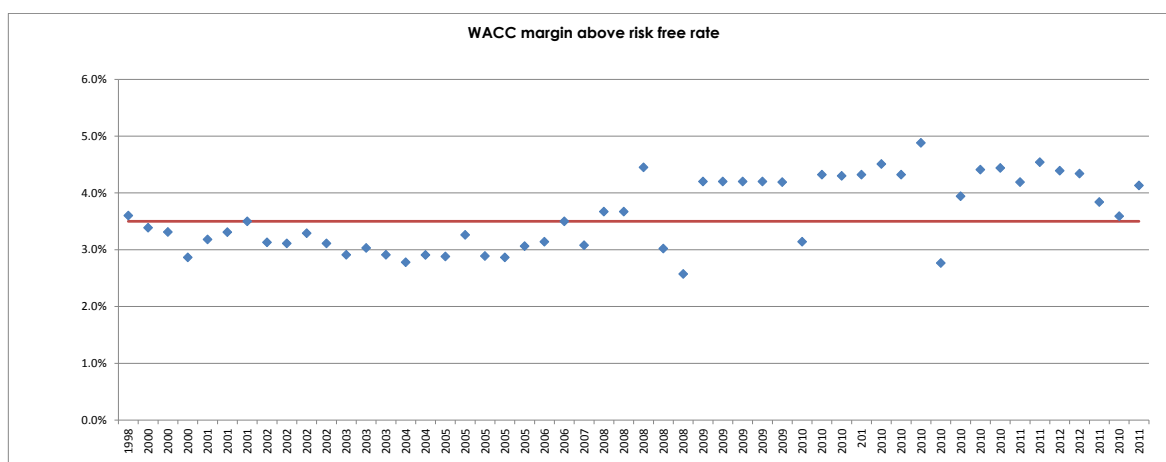
TABLE 1 REGULATORY MARGINS OF WACC ABOVE RISK FREE RATE FOR TELSTRA

| Year | 2000-01 | 2001-02 | 2002-03 | 2003-04 | 2004-05 | 2005-06 | 2006-07 | 2007-08 | 2008-09 | 2011-14 |
|-----------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| D/V ratio | 40% | 40% | 40% | 40% | 40% | 40% | 40% | 40% | 40% | 40% |
| Risk-free (rf) | 6.23% | 5.87% | 5.90% | 4.83% | 5.82% | 5.15% | 5.82% | 5.82% | 6.35% | 5.16% |
| Risk premium | 6% | 6% | 6% | 6% | 6% | 6% | 6% | 6% | 6% | 6% |
| Asset beta | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| Equity beta | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.7 |
| Tax rate (e) | 30% | 30% | 30% | 30% | 30% | 30% | 30% | 30% | 30% | 30% |
| Debt premium | 1.02% | 1.02% | 1.02% | 1.02% | 1.02% | 1.02% | 1.02% | 1.02% | 1.95% | 2.06% |
| Issuance cost | 0.08% | 0.08% | 0.08% | 0.08% | 0.08% | 0.08% | 0.08% | 0.08% | 0.08% | 0.08% |
| Gamma | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.45 |
| WACC (post-tax vanilla) | 9.66% | 9.30% | 9.33% | 8.26% | 9.25% | 8.58% | 9.25% | 9.25% | 10.15% | 8.54% |
| WACC (post-tax vanilla) less risk | 3.43% | 3.43% | 3.43% | 3.43% | 3.43% | 3.43% | 3.43% | 3.43% | 3.80% | 3.38% |

Source: ACCC determinations

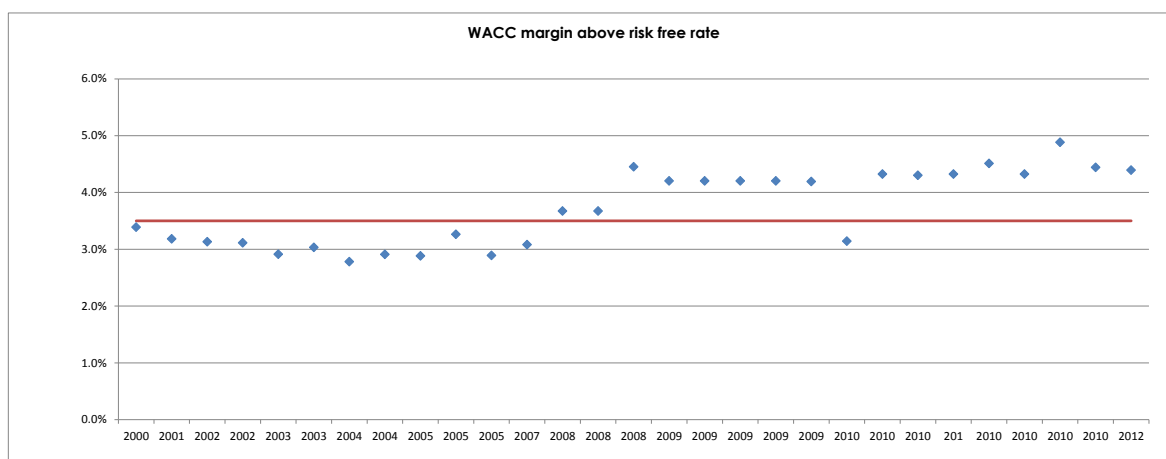
58. It is apparent from these data that the primary variable leading to a change in WACC has been the risk free rate. The WACC margin above this rate has been a steady 343 basis points until the decisions relating to the 2008-09 and 2011-14 periods.
59. This stability has in turn come about because the beta and MRP have been stable thereby providing a stable ERP and the DRP has been stable. In the most recent two decisions the beta of equity has fallen from 0.8 to 0.7 compared with a rise in the DRP.
60. This pattern of WACC margins above the risk free rate is in sharp contrast with that in electricity, gas and water determinations. A number of these are captured in Figure 2 and in the Table in the Appendix.

FIGURE 2 WACC MARGIN ABOVE RISK FREE RATE: ELECTRICITY, GAS AND WATER



61. It is evident that the margins have varied much more than for Telstra. The horizontal line is the proposed 350 basis points for NBN Co for the first 10 years. The average is 358 and the median is 335. The impact of the GFC is evident with the WACC margin rising commensurate with the increase in the debt risk premiums. Electricity dominates the group in terms of the number of determinations for which we have data. Figure 3 shows this subset again with the proposed 350 basis points for NBN Co shown as the horizontal line. The average for the data is 374 basis points and the median 393 basis points. The equivalent summary statistics for the gas and water sectors are 350 basis points for the mean and 331 basis points for the median. It can be seen from the data table in the appendix that the beta is generally higher than 0.7 used for Telstra and the gearing is higher at 60% rather than 40%. Nevertheless the graph highlights the variability in the WACC risk premium over time.

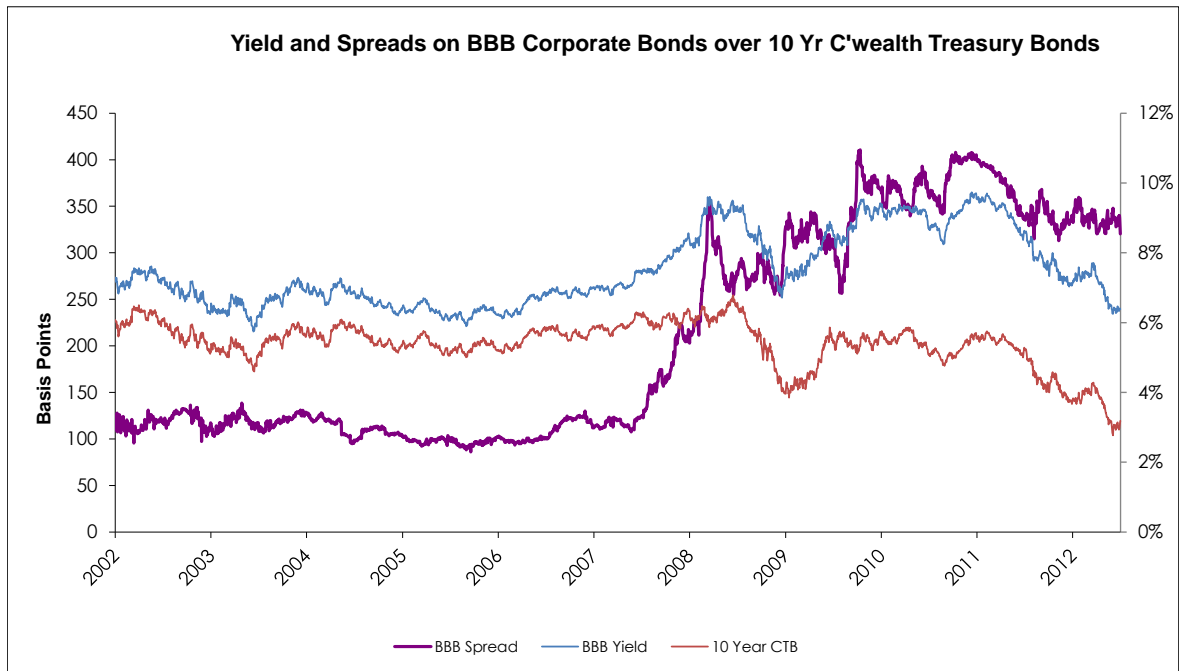
FIGURE 3 WACC MARGIN ABOVE RISK FREE RATE: ELECTRICITY



62. A reduction in the equity beta for networks, largely since 2010, has worked to reduce the WACC risk premium as has the reduction in the risk free rate however the primary driver of change has been changes in the debt risk premium ["DRP"]. This can be seen from Figure 4. It shows the yield on both BBB rated corporate bonds and on Commonwealth Treasury Bonds ["CTB"] as well as a debt risk premium being the difference between the two.⁶
63. It is apparent that the rise in the DRP corresponds with the rise in the WACC risk premium in Figure 3.
64. We also highlight that, apart from a brief change to 6.5%, the regulatory authorities have maintained a market risk premium of 6% when estimating a cost of equity using the CAPM. As a result the gap between the debt and equity risk premium has narrowed substantially and in one case become negative (a QCA SEQ Water decision). In our view this does not make sense.
65. Risk in capital markets has increased since the GFC, as evidenced by an increase in implied volatility in prices of options on the stock market index. We note also that there has been an increase in spreads on other financial instruments relative to 10 year CTB since the GFC. By example, this is apparent in Figure 5 which shows the spread on AAA rated State Government debt as well as the spread on the interest swap rate index – we return to discuss this further later
66. The use of a stable MRP by regulators in light of the relatively recent increase in 'observable' spreads, and the use of a stable 350 basis points added to the prevailing risk free rate, will therefore under-estimate the prevailing WACC risk premium in our view. This may not or may not be the case when a replacement module is instigated in the future.

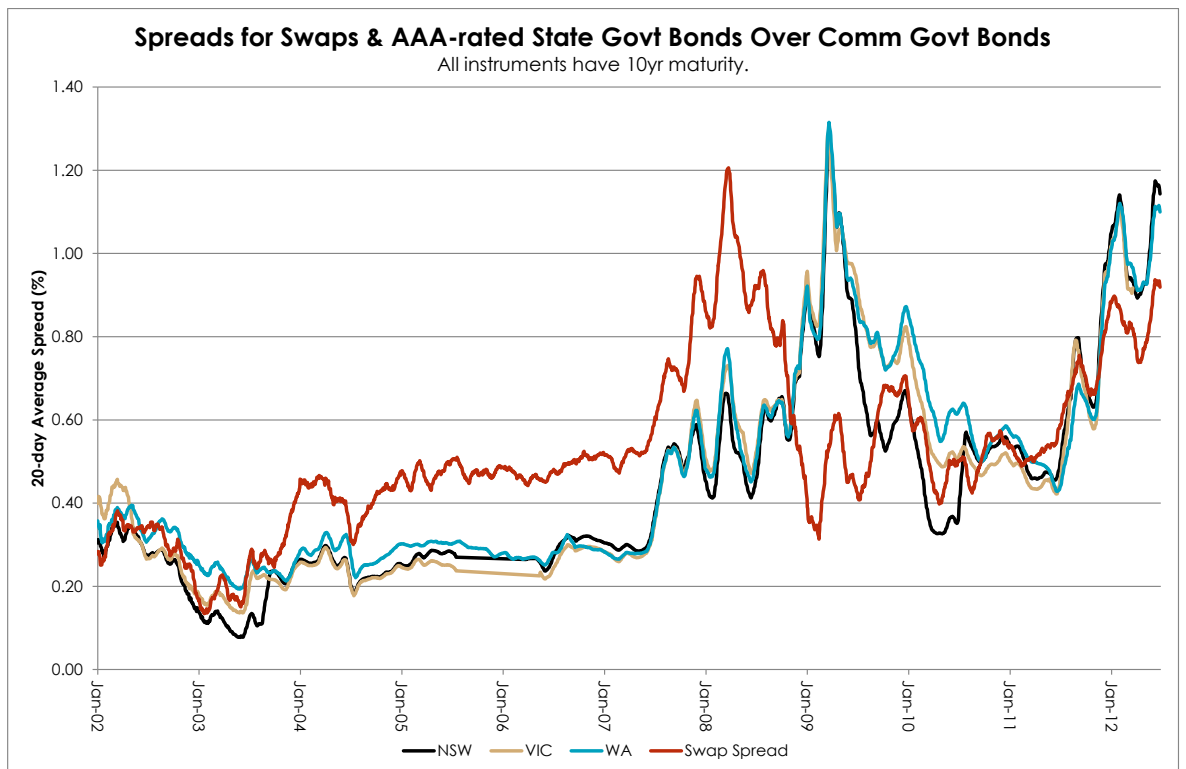
⁶ There is a slight mismatch in the maturity of the two sets of data and therefore in the debt risk premium but this does not affect the logic of our argument.

FIGURE 4 YIELDS AND SPREAD FOR BBB RATED BONDS



Source: Bloomberg, VAA Analysis

FIGURE 5 SPREADS ON LOW RISK DEBT



Source: Bloomberg, VAA Analysis

67. The conclusions from this **historical review** are:

- The Telstra WACC risk margin has been quite stable at 343 basis points until recently when it has changed due to due revision of the debt risk premium and the beta of equity;
- Other regulatory determinations show volatility in the WACC risk margin with recent levels generally above both the Telstra WACC risk margin and the proposed 350 basis points for NBN Co for the first 10 years. However the equity beta is higher, gearing is at 60 and the assumed debt rating is circa BBB;
- The regulatory WACC risk premium may be understated under current market conditions; and
- The WACC risk premium can be expected to be variable rather than fixed over time.

68. The important question is whether the 350 basis points reflects the margin that investors require at the time the capital is raised to finance the long term assets i.e. to ensure a zero NPV investment. Whether this is the case is a matter of fact at the time. In our view it is at the lower end of a reasonable range.

Assessment of risk margin for NBN Co

"Given the changes to NBN Co's approach to the WACC component of its SAU, could you also please confirm that the conclusions made in your December 2011 report (those which are not affected by the elements discussed above) remain valid. In particular, could you please confirm your conclusions in relation to:

- o 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 your review, could you please consider any impacts that the historically high spread which currently exists between Commonwealth Government Securities and other low risk assets, such as NSW Government issued TCorp bonds, may have on your conclusions in relation to NBN Co's risk margin (see note at Attachment 3)."

Best Estimate of WACC

69. We have assessed a WACC and resultant risk margin of the WACC as at 2 July 2012. We have accessed market data to estimate the WACC for NBN Co.
70. In this case we have been consistent with regulatory practice of using 10 years as the regulatory horizon. In effect we assume NBN Co will hedge the interest rate risk for the regulatory period of 10 years and will re-hedge at the beginning of each Replacement Module for the duration of that period. In this regard it faces additional roll-over risk relative to a 30 year funding arrangement. We also note that the remaining life of the assets (and SAU) will have diminished at the commencement of each Module and be less than 30 years suggesting the period of the WACC is less than 30 years.
71. On a conventional approach we estimate the current premium to be circa 420 basis points. This assessment will change with time as a result of changes in the inputs. The inputs used and the risk margin are captured below.

TABLE 2 INPUTS TO WACC ESTIMATION

| Input | Value | Comment |
|---------------------|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Risk free rate | 3.0% | Average of 20 days yields to 2 July 2012 on 10 year Commonwealth Treasury |
| Beta of equity | 0.7 | As used by ACCC for Telstra |
| Market Risk Premium | 7.0% | Uses current one year MRP of 10.5% transitioning to a long term average of 7.0% over 10 years. Current MRP derived by applying a constant premium per unit risk to implied volatility of 22.7% for 1 year options on ASX 200 index. Constant premium per unit risk is 7.0%/14% where 14% reflects long term market volatility. |
| Debt Risk premium | 3.1% | Spread on A rated, 7 year bonds (from Bloomberg) plus 21 basis points to extend to 10 years |
| Gearing | 40% | As used by ACCC for Telstra |
| Outputs | | |
| Cost of Equity | 7.9% | Uses CAPM |
| Cost of Debt | 6.1% | |
| Plain Vanilla WACC | 7.2% | |
| WACC risk margin | 4.20% | |

72. By way of further comment on some of the inputs:

- We used the 10 year CTB rate as an estimate of the risk free rate (3.01%). As noted later, this is at the low end of recent history and is certainly understated relative to the average risk free rate use in estimating the MRP⁷.
- 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.
- We have selected a **Market Risk Premium** of 7%. We have presented argument for a 7% risk premium in a number of expert papers.⁸ In essence the arguments for this are:
 - The long term average should include an allowance for the value of franking tax credits and the upper end of the range 6 – 7% best captures the historical record in this regard (see the Bishop paper referenced in footnote 9 for a graph depicting the historical record as it has evolved since 1990 using data from 1883 and 1958 respectively);
 - The current forward rate is well above the historical average as is informed by examining higher than average debt risk premiums looking out at least 7 years, by noting the decline in share prices and by examining the forward view on implied market risk derived from the price of options on the ASX 200;
 - The analysis above provided an equivalent geometric average MRP of 7.5% which we rounded down to 7.0 to be conservative.

⁷ We have used a 10 year horizon in this report compared with a 30 year horizon in our prior report. In the prior report we assumed the risk margin was to be set for 30 years and estimated a 30 year risk free rate and MRP. The revised regime is more consistent with regulatory practice in Australia which focusses on inputs to the WACC with a 10 year horizon. There was high measurement error in our 30 year estimate due to the lack of CTB's of this maturity. We have argued for the 10 year horizon elsewhere (see Officer and Bishop 2008 next footnote), largely due to more reliable data to estimate the inputs e.g. the depth of the market in 10 year CTB.

⁸ See for example:

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

- The **debt risk premium** is based on the view that infrastructure businesses generally borrow for at least a 10 year term given the difficulty of borrowing for the life of the assets. This means exposure to roll-over risk.
73. The plain vanilla WACC is estimated as 7.2% with a risk margin above the risk free rate of 420 basis points (rounded). A risk margin as discussed on page 8 should be added to this.

Our view is that the appropriate MRP, using a 10 year risk free rate, is at least 7% under current circumstances. However regulatory determinations adopt an estimate of 6% as is apparent from Appendix 1. If this lower rate was used in place of our estimate of 7% the risk margin would be 375 basis points. Given the standard error associated with estimates of WACC the mark-up of 350 basis points would be within a reasonable confidence interval around the point estimate of 375 basis points.

Impact of High Spreads on 'Low Risk' Financial Instruments

74. The instructions also ask us to consider any impacts the historically high spread that currently exists between CGS and other low risk assets may have on our conclusions in relation to NBN Co's risk margin. This higher spread is apparent in Figure 5 above.
75. The spread between CTB yields and other low risk securities (assets) such as bank bills, 'swaps' and 'state paper' are due to risk differences, largely reflecting default risk, and liquidity ('nearness to cash') and can also reflect changes in investor's risk aversion. Neither the spreads nor the reasons for a spread are constant and it can be difficult to clearly and precisely distinguish between the reasons for the spread at any point of time.⁹
76. A related issue to the impact on the risk margin is the use of the 10 year Commonwealth Government Bond yield as a measure of the 'risk free rate' in calculating the WACC and as the base for adding 350 basis points as an estimate of NBN Co's WACC.
77. It is a mistake to believe the CAPM has been used in any 'normative' sense (the model is judged by its theoretical underpinnings) in any of the regulatory hearings. The use of the model has been 'positive', the model is judged by its predictability or usefulness to predict outcomes. Therefore the 'risk free rate' is simply a short hand for a benchmark that is a low risk liquid security with liquidity (the latter is necessary if it is to act as a timely benchmark). The 'market portfolio' is another risky benchmark that is readily identifiable and 'measurable'. Although this is not to suggest that it is unambiguous as to what stocks make up the portfolio but to our knowledge this has never been an issue in the regulatory hearings, giving further strength to the assertion that the 'CAPM' has been used as a positive instrument and its usefulness should not be judged by the relevance or elegance of the assumptions underlying the model.
78. To our knowledge the 'risk free rate' in regulatory hearings has been the yield on a 10 year CTB with only an occasional deviation to the yield on a 5 year CGS. To change from such a rate would open the estimates and the derivation of a WACC for NBN Co to a whole new area of measurement and conjecture.
79. In our view, it is appropriate to use the yield on 10 year CGS's as the estimate of the prevailing risk free rate in the calculation of the WACC, however, it is important that the market risk premium also reflect prevailing conditions. The market risk premium

⁹ We note argument that there has been increased demand for CTB's by overseas investors in recent time thereby potentially changing the liquidity premium - see for example RBA, "Statement on Monetary Policy", May 2012

will be influenced by the expected return on the market and the prevailing risk free rate. As noted earlier, the current risk free rate is below the implicit average risk free rate used to calculate the historical MRP of 6%. Consequently the current MRP will be higher than the historical average if the expected return or the required return on the market, compensating for the risk, has not changed significantly. In fact at various periods during the GFC there is strong evidence that the compensation for 'market risk' significantly increased which would also cause an increase in the MRP.

80. We recognise the challenge in obtaining agreement about how to obtain a point estimate for the MRP. We have used a method to adjust the MRP for prevailing conditions but we recognise there are other approaches e.g. use of a dividend growth model to obtain a forward estimate of expected market returns and deduct the prevailing risk free rate. From our review of work in this area, it also predicts a higher MRP than the historical 6%. The use of a stable MRP by regulators and the stable 350 basis points added to the prevailing risk free rate will therefore under-estimate the prevailing WACC risk premium of 350 basis points in our view. This may not or may not be the case when a Replacement Module is accepted by the ACCC and in operation.

Reasonableness of Assumptions for Tax Allowance: Interest Cost of Debt and Gamma

81. The instructions also ask us to confirm that the conclusions made in our December 2011 report remain valid in relation to whether the following assumptions that have been used by NBN Co for the purpose of calculating the net tax allowance within the Long Term Revenue Constraint Methodology in the Initial Regulatory Period are reasonable:
- return on debt (inclusive of debt raising costs) = the actual interest expense recorded in NBN Co's statutory accounts for the relevant financial year; and
 - a gamma = 25%.
82. The SAU outlines that, for the Initial Regulatory Period, the tax calculation in the building block approach will estimate the tax savings arising from interest being tax deductible using the actual interest rate on outstanding debt.
83. Typically the tax savings used for this purpose will be estimated using the opportunity cost of debt that is used in the estimate of the WACC to ensure a consistent forward view of cash flow estimates and the required rate of return.
84. The proposed approach will lead to a mismatch calculated in this way and those arising from using the opportunity cost of debt used to estimate the WACC. However, it is challenging to estimate the magnitude and materiality of any error in advance. The error will be the difference between the opportunity cost of debt and the actual cost multiplied by the effective tax rate (gamma adjusted). It can be positive or negative. **This will be immaterial until all tax losses are used.**
85. Without careful modelling we are unable to inform our hypothesis that the error will be small and relatively immaterial.
86. We are aware that the 0.25 [gamma factor], as used in the calculation of the tax allowance in the Initial Regulatory Period, is consistent with a recent decision made by the Australian Competition Tribunal based on the most recent research available to it. We have reviewed this research and have no grounds for disagreeing with the decision, despite it being lower than our expectation.

87. Given that the ACT provides an opportunity for AER decisions to be appealed we are comfortable with gamma being set in this way.

Appendix 1: Details of WACC's in Regulatory Decisions: Electricity, Gas and Water

| Industry | Business | Authority | Report date | Risk free rate (Nominal) | Market Risk Premium | Gearing | Equity beta | Cost of Debt | Cost of Equity | Nominal Vanilla WACC | WACC (vanilla) less Risk-free rate |
|-------------|-------------------------------|------------|-------------|--------------------------|---------------------|---------|-------------|--------------|----------------|----------------------|------------------------------------|
| Gas | Transmission Vic | ACCC | 1998 | 6.00% | 6.00% | 60% | 1.20 | 7.20% | 13.20% | 9.60% | 3.60% |
| Electricity | Distribution Victoria | ORG | 2000 | 6.19% | 6.00% | 60% | 1.0 | 7.69% | 12.19% | 9.58% | 3.30% |
| Gas | Distribution WA | OFFGAR | 2000 | 6.27% | 6.00% | 60% | 1.08 | 7.47% | 12.75% | 9.58% | 3.31% |
| Gas | Distribution NSW | IPART | 2000 | 6.44% | 5 - 6% | 60% | 0.9 - 1.1 | 7.44% | 12.10% | 9.30% | 2.86% |
| Electricity | Transmission Qld | ACCC | 2001 | 5.65% | 6.00% | 60% | 1.00 | 6.85% | 11.80% | 8.83% | 3.18% |
| Gas | Distribution SA | QCA | 2001 | 5.96% | 6.00% | 60% | 0.99 | 7.51% | 11.90% | 9.27% | 3.31% |
| Gas | Transmission SA | ACCC | 2001 | 5.61% | 6.00% | 60% | 1.16 | 6.81% | 12.57% | 9.11% | 3.50% |
| Electricity | Transmission SA | ACCC | 2002 | 5.17% | 6.00% | 60% | 1.00 | 6.39% | 11.17% | 8.30% | 3.13% |
| Electricity | Transmission Vic | ACCC | 2002 | 5.12% | 6.00% | 60% | 1.00 | 6.32% | 11.09% | 8.23% | 3.11% |
| Gas | Transmission Vic Main | ACCC | 2002 | 5.31% | 6.00% | 60% | 1.00 | 6.90% | 11.15% | 8.60% | 3.29% |
| Gas | Transmission Vic | ACCC | 2002 | 5.12% | 6.00% | 60% | 1.00 | 6.32% | 11.09% | 8.23% | 3.11% |
| Electricity | Transmission Murraylink | ACCC | 2003 | 5.46% | 6.00% | 60% | 1.00 | 6.32% | 11.44% | 8.37% | 2.91% |
| Electricity | Mainland Tasmania | OTTER | 2003 | 5.05% | 6.00% | 60% | 0.95 | 6.30% | 10.75% | 8.08% | 3.03% |
| Gas | Transmission NSW Main | ACCC | 2003 | 5.29% | 6.00% | 60% | 1.00 | 6.20% | 11.30% | 8.20% | 2.95% |
| Electricity | Distribution NSW | IPART | 2004 | 5.90% | 5.50% | 60% | 0.95 | 7.00% | 11.20% | 8.68% | 2.78% |
| Electricity | Distribution ACT | ICRC | 2004 | 5.62% | 6.00% | 60% | 0.90 | 6.87% | 11.02% | 8.53% | 2.91% |
| Electricity | Distribution SA | ESCOSA | 2005 | 5.80% | 6.00% | 60% | 0.80 | 7.40% | 10.60% | 8.68% | 2.88% |
| Electricity | Distribution Victoria | ESC | 2005 | 5.27% | 6.00% | 60% | 1.00 | 6.69% | 11.27% | 8.61% | 3.26% |
| Electricity | Distribution Qld | QCA | 2005 | 5.61% | 6.00% | 60% | 0.90 | 6.83% | 11.01% | 8.50% | 2.89% |
| Gas | Distribution NSW | IPART | 2005 | 5.70% | 5.5%-6.5% | 60% | 0.8 - 1.0 | 6.88% | 11.10% | 8.57% | 2.87% |
| Gas | Transmission WA Main | ERA | 2005 | 5.45% | 5%-6% | 60% | 0.8-1.33 | 6.55% | 11.45% | 8.51% | 3.06% |
| Gas | Transmission Qld | ACCC | 2006 | 5.70% | 6.00% | 60% | 1.00 | 6.94% | 11.70% | 8.84% | 3.14% |
| Gas | Distribution Qld | QCA | 2006 | 5.25% | 6.00% | 60% | 1.10 | 6.68% | 11.85% | 8.75% | 3.50% |
| Electricity | Transmission Queensland | AER | 2007 | 5.68% | 6.00% | 60% | 1.00 | 6.82% | 11.68% | 8.76% | 3.08% |
| Electricity | Transmission Vic | AER | 2008 | 6.09% | 6.00% | 60% | 1.00 | 8.20% | 12.09% | 9.76% | 3.67% |
| Electricity | Transmission Vic | AER | 2008 | 6.09% | 6.00% | 60% | 1.00 | 8.20% | 12.09% | 9.76% | 3.67% |
| Electricity | Transmission SA | AER | 2008 | 6.20% | 6.00% | 60% | 1.00 | 9.61% | 12.20% | 10.65% | 4.45% |
| Gas | Distribution Vic | ESC | 2008 | 6.05% | 6.00% | 60% | 0.70 | 8.19% | 10.25% | 9.07% | 2.97% |
| Water | Water Pricing Review Vic | ESC | 2008 | 6.23% | 6.00% | 60% | 0.65 | 7.98% | 10.13% | 8.84% | 2.57% |
| Electricity | Distribution NSW | AER | 2009 | 5.82% | 6.00% | 60% | 1.00 | 8.82% | 11.82% | 10.02% | 4.20% |
| Electricity | Distribution NSW | AER | 2009 | 5.82% | 6.00% | 60% | 1.00 | 8.82% | 11.82% | 10.02% | 4.20% |
| Electricity | Distribution NSW | AER | 2009 | 5.82% | 6.00% | 60% | 1.00 | 8.82% | 11.82% | 10.02% | 4.20% |
| Electricity | Transmission Tas | AER | 2009 | 5.80% | 6.00% | 60% | 1.00 | 8.81% | 11.80% | 10.00% | 4.21% |
| Electricity | Transmission NSW | AER | 2009 | 5.86% | 6.00% | 60% | 1.00 | 8.85% | 11.86% | 10.05% | 4.19% |
| Electricity | Transmission and Distribution | AER | 2010 | 5.68% | 6.50% | 60% | 0.80 | 7.45% | 10.88% | 8.82% | 3.14% |
| Electricity | Distribution Vic | AER | 2010 | 5.08% | 6.50% | 60% | 0.80 | 8.81% | 10.28% | 9.40% | 4.32% |
| Electricity | Distribution Vic | AER | 2010 | 5.65% | 6.50% | 60% | 0.80 | 9.35% | 10.85% | 9.95% | 4.30% |
| Electricity | Distribution Vic | AER | 2010 | 5.08% | 6.50% | 60% | 0.80 | 8.81% | 10.28% | 9.40% | 4.32% |
| Electricity | Distribution Vic | AER | 2010 | 5.14% | 6.50% | 60% | 0.80 | 9.19% | 10.34% | 9.65% | 4.51% |
| Electricity | Distribution Vic | AER | 2010 | 5.08% | 6.50% | 60% | 0.80 | 8.81% | 10.28% | 9.40% | 4.32% |
| Electricity | Metering Vic | AER | 2010 | 4.63% | 6.00% | 60% | 1.00 | 8.76% | 10.63% | 9.51% | 4.88% |
| Water | Water and sewerage SA | Govt of SA | 2010 | 6.17% | 6.00% | 55% | 0.80 | 7.27% | 10.97% | 8.94% | 2.77% |
| Water | Bulk water NSW | IPART | 2010 | 5.60% | 5.5%-6.5% | 60% | 0.8 - 1.0 | 8.40% | 11.25% | 9.54% | 3.94% |
| Water | Water Qld | QCA | 2010 | 4.91% | 6.00% | 60% | 0.66 | 9.69% | 8.85% | 9.35% | 4.44% |
| Electricity | Transmission Qld | AER | 2010 | 4.17% | 6.50% | 60% | 0.80 | 8.10% | 9.37% | 8.61% | 4.44% |
| Gas | Transmission Amadeus | AER | 2011 | 5.53% | 6.00% | 60% | 0.80 | 9.32% | 10.33% | 9.72% | 4.19% |
| Gas | Distribution | AER | 2011 | 5.40% | 6.00% | 60% | 0.80 | 9.77% | 10.20% | 9.94% | 4.54% |
| Electricity | Distribution | AER | 2012 | 3.89% | 6.00% | 60% | 0.80 | 8.00% | 8.69% | 8.28% | 4.39% |
| Gas | Transmission (Draft) | AER | 2012 | 4.21% | 6.00% | 60% | 0.80 | 8.24% | 9.01% | 8.55% | 4.34% |
| Gas | Transmission | ERA | 2011 | 3.80% | 6.00% | 60% | 0.80 | 7.01% | 8.60% | 7.64% | 3.85% |
| Water | Distribution SA | ESCOSA | 2010 | 3.79% | 6.00% | 60% | 0.80 | 7.73% | 8.59% | 7.38% | 4.28% |
| Water | Distribution | IPART | 2011 | 3.60% | 6.00% | 60% | 0.70 | 7.65% | 7.85% | 7.73% | 4.13% |

Source: Various regulatory documents retrieved from relevant websites. Numbers in red were calculated from the data captured from the documents

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) in addition to seats on the Boards of TAC and Transurban.

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 with offices in Melbourne, Brisbane and Adelaide and now operating in Tasmania.

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, Property, Rail, Retailing, Shipping & Transportation, Telecommunications, Water and Waste-water.

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; and 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).

APPENDIX: Letter of Instructions

20 September 2012

Mr Bob Officer and Mr Steve Bishop
Value Adviser Associates
Level 2, 65 Southbank Boulevard
Southbank Victoria 3006

Privileged and confidential

Dear Sirs

Further revised Brief to advise – Weighted average cost of capital in NBN Co's revised special access undertaking

We refer to our previous brief to Value Advisers Associates (**VAA**) of 9 June 2011 and the subsequent VAA report of December 2011 regarding aspects of the WACC methodology used in NBN Co's special access undertaking (**SAU**) lodged with the Australian Competition and Consumer Commission (**ACCC**) on 5 December 2011.

As discussed, NBN Co has revised certain aspects of its SAU to take account of ACCC and industry feedback. NBN Co intends to lodge a revised SAU with the ACCC and we have attached a version of that SAU for the purposes of completing your report (**Attachment 1**).

The purpose of this brief is to formally request an update to your December 2011 expert report in a manner that takes account of the relevant changes to the revised SAU.

In general terms, the revised SAU maintains the Weighted Average Cost of Capital (**WACC**) formulation of risk free rate plus 350 basis points that was proposed in NBN Co's previous SAU. However, NBN Co's revised proposal is that this formulation applies only for an initial 10 year regulatory period of a 30 year SAU (i.e. a period of approximately 10 years from the date of commencement of the SAU), with the adoption of WACC 'principles' to apply for consecutive regulatory periods of between 3 and 5 years over the remaining years of the SAU (i.e. the period between year 11 and year 30).

We note that while NBN Co's formulation of the nominal vanilla WACC for the initial 10 year period of the SAU does involve a recalculation of the risk free rate for each financial year of the period (1F.6.1), this is unlikely to have any direct impact on NBN Co's pricing for that period.

For the initial cost recovery period, the nominal vanilla WACC applies to the Initial Cost Recovery Account (**ICRA**) (1F.4.2) rather than to any revenue constraint. Because of this, there is no direct relationship between NBN Co's pricing and the WACC calculation.

In the unlikely event that NBN Co moves from the cost recovery period to the building block period during the initial 10 years (i.e., NBN Co has recovered its losses far earlier than anticipated), then a revenue cap will apply and the annual WACC calculation may then directly impact upon NBN Co's pricing. However, we do not consider that, even in this scenario, any significant price risk will be transferred to customers.

Under NBN Co's SAU, pricing for the initial 10 year period is characterised by:

- *pre-specified and fixed prices in the SAU which are to apply for the first 5 years of the SAU for all Reference Offers (1C.2) and Non-Reference Offers (1D.2);*
- *an individual price increase limit of CPI-1.5% which applies to prices of all Reference Offers (1C.4) and Non-Reference Offers (1D.4)¹⁰ from the expiry of the set price period (circa 5 years) until the end of the Initial Regulatory Period (circa 10 years);*
- *a set of pricing principles which NBN Co are obliged to adopt when setting prices of any new offers introduced during the Initial Regulatory Period (1D.6).*

These price constraints apply whether NBN Co is operating within or outside of the initial cost recovery period and, together with the high probability that NBN Co's losses will not be extinguished during the initial 10 year period, comprise a bulwark against any price effect arising from a recalculation of the WACC.

Request for expert advice

Given the discussion above, could you please provide us with your independent expert opinion on whether it is reasonable, having regard to the statutory criteria, for NBN Co to propose an approach in its SAU which adopts as part of the Long Term Revenue Constraint Methodology:

- *a nominal vanilla WACC formulated by reference to the mean yield on 10 year Commonwealth Government Securities (i.e. the risk free rate) plus 350 basis points for each financial year of a period of 10 years from the commencement date of the SAU (see clause 1F.6);*
- *a return on capital formulation calculated as the product of:*
 - *a nominal vanilla WACC, forecast for the Regulatory Cycle with reference to:*
 - *the risks involved in providing the NBN Access Service, Ancillary Services and Facilities Access Service;*
 - *a financing structure that meets benchmark standards as to gearing and other parameters for a similar going concern and reflects in other respects best practice;*
 - *a cost of debt and a cost of equity (determined for the Regulatory Cycle using a well-accepted financial model, such as the Capital Asset Pricing Model) that meet benchmark standards as to efficient financing of equity and debt for a similar going concern, having regard where appropriate to past, present and expected future financial conditions; and*
- *the opening value of the nominal RAB for year t, which is to be forecast consistently with the RAB Roll Forward equation set out clause 2D.7.1(b) and using*

¹⁰ Any new offers that NBN Co introduces during the initial regulatory period will become Non-Reference Offers and as such will also be subject to the individual price increase limit of CPI-1.5% (see 1D.6(c)).

the expected value of Capital Expenditure for the years in between when the forecast is made and year t,

to apply for consecutive regulatory periods of between 3 and 5 years from the end of the initial regulatory period until the conclusion of the SAU term at 30 years (see clause 2D.2.1(a)(iii)).

Given the changes to NBN Co's approach to the WACC component of its SAU, could you also please confirm that the conclusions made in your December 2011 report (those which are not affected by the elements discussed above) remain valid. In particular, could you please confirm your conclusions in relation to:

- *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 your review, could you please consider any impacts that the historically high spread which currently exists between Commonwealth Government Securities and other low risk assets, such as NSW Government issued TCorp bonds, may have on your conclusions in relation to NBN Co's risk margin (see note at **Attachment 3**).*
- *whether you consider that the following assumptions that have been used by NBN Co for the purpose of calculating the net tax allowance within the Long Term Revenue Constraint Methodology in the Initial Regulatory Period are reasonable:*
 - *return on debt (inclusive of debt raising costs) = the actual interest expense recorded in NBN Co's statutory accounts for the relevant financial year*
 - *gamma = 25%.*

*As you know, as an independent expert VAA will be required to observe the practice notice of the Federal Court of Australia (**FCA guidelines**) relating to expert witnesses. A copy of this practice note is attached to this brief (**Attachment 4**).*

We would be pleased to discuss any aspect of this brief once you have had the opportunity to review the material.

Yours sincerely

Webb Henderson



Angus Henderson

Partner