

on behalf of **MURRAYLINK Transmission Partnership**

18 July 2003

Sebastian Roberts
Acting General Manager, Regulatory Affairs – Electricity
Australian Competition & Consumer Commission
GPO Box 520J
Melbourne VIC 3001

Dear Mr Roberts

Application for Conversion to a Prescribed Service and Maximum Allowable Revenue

On behalf of Murraylink Transmission Partnership, Murraylink Transmission Company (“MTC”) appreciates the opportunity to respond to the issues raised in the Commission’s *Preliminary Review: Murraylink Transmission Company Application for Conversion and Maximum Allowed Revenue* of 14 May 2003 (“**Preliminary View**”) and the PB Associates’ report to the Commission *Murraylink: Review of Expenditure* of 3 July 2003.

MTC’s submission in response to the Preliminary View is contained in **Attachment 1** to this letter. It is supplementary to, and should be read in conjunction with, MTC’s *Application for Conversion to a Prescribed Service and a Maximum Allowable Revenue for 2003-12* of 18 October 2002 and its previous submissions to the Commission of 28 February 2003, 17 March 2003, 8 April 2003 and 30 June 2003.

This submission should also be read in conjunction with a number of expert reports that are contained in the attachments to this letter. MTC submits that these reports contain matters to which the Commission should have regard in the exercise of its discretion and when making its determination under clause 2.5.2(c) of the National Electricity Code. In particular, The Allen Consulting Group’s paper *Application for Conversion to a Prescribed Service: Commentary on the ACCC Preliminary View*, which is contained in **Attachment 2**, contains comments concerning most of the matters covered in this letter.

In this submission, MTC addresses matters associated with:

- Rationale for conversion;
 - Rationale for revenue determination;
 - Power transfer capability and development of additional augmentations;
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- Commercial discount rate;
- Base date;
- The calculations of Murraylink's gross market benefits;
- The selection and assessment of the alternative projects;
- MTC's actual operating and maintenance costs;
- Depreciation;
- Weighted average cost of capital and value of imputation credits;
- Service standards; and
- Pass-through rules.

MTC believes these matters to be the most important issues raised by the Commission in its Preliminary View. As always, we would be pleased to provide further information in relation to any of these issues that the Commission believes have a bearing on its determination of MTC's application.

Yours sincerely



Stéphane Mailhot
Chief Executive Officer
Murraylink Transmission Company

Attachments

1. Murraylink Transmission Company, Response to the Preliminary View, 18 July 2003
2. The Allen Consulting Group, Commentary on the Preliminary View, July 2003
3. Deloitte Touche Tohmatsu, Regulatory Test Discount Rate, 18 July 2003
4. TransÉnergie US, Impact of Discount Rate, Commencement Date, and Inflation Rate on Gross Market Benefits, 18 July 2003
5. TransÉnergie US, Impact of Increased Transfer Capability, 16 July 2003
6. Burns and Roe Worley, Reassessment of Capital Costs of Murraylink's Alternative Projects, 16 July 2003
7. Burns and Roe Worley, Response to PB Associates report, 11 July 2003

ATTACHMENT 1

**MURRAYLINK TRANSMISSION COMPANY
SUBMISSION IN RESPONSE TO THE PRELIMINARY VIEW**

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1. Rationale for Conversion

Opportunity to Convert

Murraylink Transmission Company (“MTC”) is pleased that the Commission has recognised in its Preliminary View that it was the NECA Working Group’s¹ intention, in endorsing and recommending the Safe Harbour Provisions², to provide a right for a market network service provider to apply for conversion, which would ensure that investment is not inefficiently inhibited.

The Commission’s approach in this regard is consistent with its previous statements when it authorised the changes to the National Electricity Code (“Code”) incorporating the Safe Harbour Provisions that no justification is required prior to reclassifying a market network service as a prescribed network service. As outlined in MTC’s letter to the Commission of 8 April 2003, MTC agrees that no justification is required. Further, the Commission’s approach is also consistent with the views previously expressed by The Allen Consulting Group in its report submitted by MTC on 8 April 2003, and this view is again confirmed in the report which is Attachment 2 to this submission.

Prescribed service

In its Preliminary View³, the Commission notes its view that the assessment of MTC’s Application for conversion involves a two step process: conversion and a revenue cap decision.⁴ The Commission goes on to propose “that conversion applications be assessed in accordance with certain provisions of the Code... [being clauses] 2.5.2(c) and 6.2.4”. MTC agrees with the Commission that this is the correct approach.

In relation to the first step, the Commission outlines the test it proposes to use in the exercise of its discretion as to whether Murraylink ought to be converted to a prescribed service as follows:

...does Murraylink exhibit characteristics that are consistent with the definition of a prescribed service? If Murraylink fits within the definition of a prescribed service, the Commission intends to allow it to be classified as a prescribed service (ie. convert), and then address the matter of a revenue cap for Murraylink.

The Commission then develops a ‘working definition’ of a prescribed service and applies that test to Murraylink.

¹ National Electricity Code Administrator (“NECA”) Working Group on Inter-regional Hedges and Entrepreneurial Interconnectors.

² NECA Working Group, *Entrepreneurial Interconnectors: Safe Harbour Provisions* (“Safe Harbour Provisions”), November 1998.

³ Australian Competition and Consumer Commission, *Preliminary Review: Murraylink Transmission Company Application for Conversion and Maximum Allowed Revenue* (“Preliminary View”), 14 May 2003.

⁴ Preliminary View, p. 14-20.

MTC agrees that the approach adopted by the Commission is relevant to the exercise of its discretion.

MTC notes that the third limb of the ‘working definition’, that a prescribed service is one that is not found to be contestable under clause 6.2.4(f) of the Code, is particularly pertinent in circumstances where it is a fundamental principle of the Code that services which are subject to regulation are only those which are not contestable. MTC concurs with the Commission that the formulation of the ‘working definition’, and the application of that definition to the facts of MTC’s application, is supported by the principles and objectives of the Code, particularly the Chapter 6 regime for regulation of transmission revenues, which are underpinned by Part IIIA of the *Trade Practices Act*.

The Regulatory Test

The Commission considers that the application of the Regulatory Test⁵ is relevant for its determination of a revenue cap for the converted network service.

It does so having regard to the objectives of the transmission revenue regulatory regime set out in clause 6.2.2 of the Code and particularly the need for the regulatory regime to promote an environment which fosters an efficient level of investment within the transmission sector.

The Commission notes that it is:

...of the view that the primary relevance of the regulatory test is its role in determining whether the “converted” network service constitutes an efficient investment for the purpose of a revenue cap determination.

The Commission’s view is that “the regulatory test is the usual process for determining the economic efficiency of a new network augmentation”. The application of the Regulatory Test provides the further benefit that a converting market network service provider will not be able to bypass the intent of the provisions contained in chapter 5 of the Code in relation to large new network assets.

MTC concurs with the Commission that the principles and objectives of chapter 6 of the Code support the application of the Regulatory Test in this way.

Faced with no criteria to guide it in the exercise of its discretion under clause 2.5.2(c) of the Code and uncertain Code provisions, the Commission has addressed the fundamental issue at the core of its discretion: whether, having regard to relevant considerations, Murraylink ought to be converted to regulated status.

Under the Code, and Part IIIA of the *Trade Practices Act* (pursuant to which the Code is approved as an Industry Access Code), services which are regulated are those which are not contestable. The Commission correctly concludes that, as Murraylink is not a contestable service, it ought to have regulated status.

⁵ Australian Competition and Consumer Commission, *Regulatory Test for New Interconnectors and Network Augmentations* (“**Regulatory Test**”), 15 December 1999.

Relevant considerations to the exercise of the discretion are also:

- whether Murraylink's circumstances fall within the intention behind clause 2.5.2(c) by reference to the report of the NECA Working Group;
- whether MTC's conversion application is consistent with the Commission's own indications at the time of the authorisation of the Code to incorporate the NECA Working Group's recommendations;
- that MTC ought not gain commercial advantage through by-passing the intent of the provisions in chapter 5 of the Code for the establishment of proposed new large network assets involving assessment under the Regulatory Test;
- the encouragement to transmission investment flowing from the option to convert; and
- the principles and objectives of the transmission regulatory regime set out in Chapter 6 of the Code.

MTC believes that the Commission has properly had regard to these matters. Particularly, MTC agrees that the process adopted by the Commission for assessing MTC's conversion application is consistent with the intent of the NECA Working Group. Furthermore, it is MTC's view that the Commission is correct in its application of the Regulatory Test to ensure Murraylink constitutes an efficient investment and that MTC does not gain a commercial advantage from the Safe Harbour Provisions through bypass of clause 5.6.6 of the Code or in its derived asset value. MTC agrees that a converted Murraylink will benefit electricity suppliers upstream and downstream of Murraylink, and subsequently, all users of those services. Finally, MTC also agrees that a fairly valued conversion will encourage investments in the National Electricity Market ("NEM").

The Commission has correctly concluded that Murraylink should be determined to be a prescribed service.

Ceasing to be market network service

While MTC remains of the view that it is most appropriate and open for the Commission to make a determination of the MTC Application that is conditional upon Murraylink's network service ceasing to be classified as a market network service, MTC notes that the Commission in its Preliminary View is of the view it has no power to make a final determination on MTC's application until Murraylink's current network service has ceased to be classified as a market network service.⁶

While it will coordinate with the Commission and NEMMCO⁷ to implement the necessary procedures, MTC does not consider that it is necessary for the Commission to delay its final decision until after Murraylink's network service ceases to be classified as a market network service. Rather MTC submits that it is within the Commission's power, most appropriate in

⁶ Preliminary View, p. vi.

⁷ National Electricity Market Management Company.

the circumstances of this Application, for the Commission to make a determination that is conditional upon Murraylink's network service ceasing to be classified as a market network service.

“Incremental benefits” approach

The Commission has correctly rejected the “incremental benefits” valuation methodology given that it would not achieve symmetry between the conversion of an existing asset and the assessment of a new network asset.⁸ MTC's Application and subsequent submissions demonstrate that the Murraylink, as a regulated interconnector, can deliver to the NEM a substantial level of gross market benefits and the Commission indicates that it is prepared to acknowledge these benefits for the purposes of determining Murraylink's regulatory cost. This is the correct decision, which can ensure that MTC will receive revenue that fairly reflects the gross market benefits Murraylink creates.

The Allen Consulting Group expands on this point in its paper in Attachment 2.⁹

2. Rationale for Revenue Determination

For the purposes of clarity, MTC very briefly reiterates the Commission's approach.

The Commission undertakes the following steps to assess MTC's proposal under the Regulatory Test and determine Murraylink's regulatory asset value.

- | | |
|--------|---|
| Step 1 | The transfer capability of the proposed interconnector is determined. |
| Step 2 | A view is formed as to the gross market benefits of Murraylink and the lowest cost alternative for a regulated interconnector. |
| Step 3 | The lowest cost alternative is identified as the project with the lowest regulatory cost. |
| Step 4 | If the lowest cost alternative provides positive net market benefits under most credible scenarios, the lowest cost alternative satisfies the regulatory test, and its capital value and O&M costs will set the applicant's regulatory asset value and O&M allowance. |

In relation to Step 1, the Commission confirms that:

.....it is essential to accurately assess the transfer capability of Murraylink so its economic value can be estimated from its market benefit analysis, and hence, the regulated revenue for MTC can be set.¹⁰

⁸ Preliminary View, p. 23.

⁹ Attachment 2, pp. 9-10.

¹⁰ Preliminary View, p. 25.

On the basis of advice from PB Associates and VENCORP, the Commission has accepted MTC's assessment of Murraylink's power transfer capability and that its market benefits, economic value and regulated value can be derived from its transfer capability.

However, in relation to Steps 2 and 3, the Commission has selected Burns and Roe Worley's ("BRW's") Alternative 3, with the exclusion of a phase-shifting transformer and undergrounding ("Alternative 3A"), as the lowest cost alternative to Murraylink and proposes to use Alternative 3A's estimated capital cost and operating and maintenance ("O&M") costs to set Murraylink's regulatory asset value. The Commission concludes, for the purposes of Step 4, that Alternative 3A satisfies the Regulatory Test given that the Commission's estimate of its regulatory cost is less than the Commission's lowest estimate of its gross market benefits.

MTC does not agree with the manner in which the Commission applies the Regulatory Test and the ODRC process for the purpose of determining MTC's revenue. In particular, MTC submits the following.

- The Commission has not applied an asset valuation methodology to Murraylink that is consistent with the Commission's currently defined and practiced approach to the ODRC valuations¹¹—the Commission has taken into account alternative projects that would be called upon to provide different levels of service delivery than Murraylink will be called upon to provide—and, thus, the Commission seeks to value Murraylink in a manner more onerous than the manner in which it values all other new and existing transmission assets in the NEM;
- The Commission also erred by constructing and applying a new conceptually incorrect asset valuation methodology—one that simply values Murraylink on the basis of the capital cost of an alternative project that provides a substantially lower level of technical service with no account being taken for the actual service Murraylink will be called upon to provide; and
- If it must apply a more onerous valuation methodology to Murraylink and take into account alternative projects with different streams of costs and benefits, the Commission should apply a sound theoretical framework that would lead the Commission to draw conclusions consistent with its objective to derive a regulatory cost that reflects Murraylink's gross market benefits.¹²

MTC submits to the Commission that MTC's valuation methodology set out in its Application—that takes account of alternative projects that provide same level of service delivery as Murraylink will be called upon to provide—is consistent with the Commission's

¹¹ Australian Competition and Consumer Commission, *Draft Statement of Principles for the Regulation of Transmission Revenues* ("Draft Regulatory Principles"), 27 May 1999, pp. xi-xii, 38-49. For the purposes of this submission, MTC assumes that the Optimised Depreciated Replacement Cost ("ODRC") valuation process is the same as the Depreciated Optimised Replacement Cost ("DORC") valuation process described in the Draft Regulatory Principles.

¹² Preliminary View, p. 23.

currently defined and practiced approach to the ODRC valuations and is most appropriate for the Commission to apply in determining MTC's revenue.

MTC discusses again and in more detail in section 7 of this submission its concerns as to the theoretical basis and application of the Commission's approach to its valuation of Murraylink.

3. Power Transfer Capability and Development of Additional Augmentations

TransÉnergie Australia ("TEA") conducted an assessment of Murraylink's power transfer capability and the implementation of a modest range of additional augmentations in the transmission network. This assessment was documented in TEA's report *Murraylink Transfer Capability Assessment for Market Benefit Analysis Studies*, which was included as Appendix A in MTC's Application of 18 October 2002.

In one of its reports to the Commission, PB Associates concurred with TEA's findings except in relation to Murraylink's power transfer capability during peak load periods when incremental generation is available in the Victorian region.¹³ PB Associates recommended further dynamic studies be performed in consultation with VENCORP to determine whether the full 220 MW transfer capability claimed by TEA is achievable, considering the additional augmentations proposed in the TEA report or similar enhancements.

TEA commissioned dynamic studies in consultation with VENCORP. In its letter to the Commission of 14 March 2003, VENCORP confirmed that:

- VENCORP's calculation of Murraylink's transfer capability is consistent with figures quoted by PB Associates when the necessary changes to the study case are taken into account; and
- Additional augmentations required for up to 220 MW Murraylink transfer capability are feasible.

TEA is working with VENCORP and TransGrid to better define the scope and costs of the augmentations and will advise the Commission in the near future.

We understand from the Preliminary View that the Commission concurs with this advice and proposes to include the full costs of the augmentations as future capital expenditure in deriving MTC's revenue requirement for the proposed regulatory period.¹⁴ However, the Commission notes that the inclusion of the augmentations may be subject to change as the Commission works toward understanding the precise level of overlap between MTC's proposed augmentations and "unbundled SNI".¹⁵

¹³ PB Associates, *Transfer Capability Review of Murraylink Application to ACCC*, 21 January 2003, p. 1.

¹⁴ Preliminary View, pp. 93-4.

¹⁵ For the purposes of this submission, MTC interprets the Commission's reference to "unbundled SNI" to mean a reference to augmentations designed to increase the capacity of the interconnector between the Snowy and Victorian regions.

MTC clarifies that only the NSW reactive support augmentations could potentially overlap with the scope of a project such as “unbundled SNI”. The other augmentation works are required independently of “unbundled SNI”.

As indicated in our letter of 30 June 2003, TEA advised MTC that all the additional augmentations necessary for Murraylink to achieve its 220 MW transfer capability during peak load periods when incremental generation is available in the Victorian region can be completed prior to the 2004-05 summer peak.

Implementation - Victoria

Our discussions with VENCORP now indicate that it is appropriate that the additional augmentations to be located in the Victorian region be facilitated by VENCORP and funded under the Victorian transmission development model.

Implementation - New South Wales

Our discussions with TransGrid are not completed at this time. While MTC and TransGrid are in agreement as to the short term need for the reactive support and its cost estimate, MTC and TransGrid have yet to address the detailed implementation plan and determine who performs and owns the works. Given the relatively small amount involved, both TransGrid and MTC feel that this will be resolved easily.

Recovery of Capital Cost

Commission has indicated the capital costs of the additional augmentations into MTC’s asset base at the time of their prospective commissioning. As expressed above, it is unlikely that MTC itself will develop the additional augmentations. However, if it does, MTC agrees with the Commission’s approach.

4. Commercial discount rate

For the purposes of determining the net present value of Murraylink’s gross market benefits, the cost of the alternative projects and Murraylink’s life-cycle O&M costs, MTC engaged Deloitte Touche Tohmatsu (“DTT”) to provide advice on the appropriate real commercial discount rate along with rates in relation to low and high case scenarios. DTT derived its recommended rates from its estimation of expected inflation, the value of imputation credits and the real risk-free rate, and from data derived from relevant Australian equities. In response to stakeholder comments, MTC sought from DTT further advice on the rates and DTT’s advice was contained in MTC’s letter of 28 February 2003 to the Commission.

As suggested by The Allen Consulting Group, the selection of an appropriate discount rate is important to any application of the Regulatory Test.¹⁶

¹⁶ Attachment 2, pp. 25-8.

In its Preliminary View, the Commission has taken a different view as to the expected level of inflation, the value of imputation credits and the real risk-free rate. MTC accepts the Commission's revised parameters and has sought DTT's advice as to how the Commission's conclusions affect DTT's calculation of the commercial discount rate. DTT's advice on this is contained in **Attachment 3**. In summary, DTT advises that, on the basis of parameters set by the Commission, the appropriate commercial discount rates are as set out in Table 1.

Table 1
Real commercial discount rate
(per annum)

Low Case	6.72%
Base Case	9.00%
High Case	10.27%

MTC has requested that TransÉnergie US ("TEUS") and BRW recalculate Murraylink's gross market benefits and the cost of the alternative projects using a 9.00% per annum real discount rate. MTC has also calculated the present value of its forecast O&M costs using a 9.00% per annum real discount rate.

5. Base date

When MTC lodged its Application of 18 October 2002, MTC and the Commission expected that the Commission's final determination could take effect in May 2003. Therefore, MTC arranged for its advisers to calculate Murraylink's gross market benefits, the cost of the alternative projects and its life-cycle O&M costs in May 2003 dollars. Where net present values were calculated, the requisite discounting was performed relative to 1 May 2003.

Given that the Commission's final determination is now likely to take effect in September 2003, MTC's advisers have now calculated Murraylink's gross market benefits, the cost of the alternative projects and its life-cycle O&M costs in September 2003 dollars. Where net present values have been calculated, the requisite discounting has been performed with reference to 1 September 2003.

6. Calculations of Gross Market Benefits

TransÉnergie US ("TEUS") has undertaken extensive market modelling to calculate Murraylink's gross market benefits in a manner consistent with the Commission's Regulatory Test.¹⁷ TEUS's original calculations were documented in its report *Estimation of Murraylink Market Benefits*, which was included as Appendix D in MTC's Application of 18 October 2002. Since that time, MTC has provided the Commission with additional submissions that explain the nature of TEUS's original results.

¹⁷ Regulatory Test, pp. 18-20.

In its Preliminary View, the Commission considered a range of matters associated with TransÉnergie US's calculation of Murraylink's gross market benefits.¹⁸ MTC notes that the Commission has concluded that Murraylink will deliver gross market benefits ranging from \$136 million to \$300 million under most credible scenarios, with the median being around \$190 million.

MTC requested that TEUS respond to the Commission's conclusion and the matters that the Commission took into account. TEUS provided to MTC its report of 30 June 2003, which is contained in MTC's letter of 30 June 2003 to the Commission.

Revised Gross Market Benefits Calculations

TEUS has now updated its advice on Murraylink's gross market benefits on the basis of a 9.00% per annum real discount rate and September 2003 dollars. TEUS's advice is contained in **Attachment 4**. In summary, TEUS advises that Murraylink's gross market benefits are as shown in Table 2.

	Gross Market Benefits	
	Value of Unserved Energy = \$10,000/MWh	Value of Unserved Energy = \$29,600/MWh
95% Probability of Exceedance ("POE") Value	\$180.5 million	\$256.8 million
Expected Value	\$215.5 million	\$331.2 million
5% POE Value	\$227.8 million	\$354.3 million

From these revised figures, MTC submits that the Commission should revise its conclusion in its Preliminary View as to the level of gross market benefits that Murraylink will deliver to the NEM.

MTC recognises the need for the Commission to resolve the issue of uncertainty in relation to the calculation of a transmission asset's gross market benefits. In particular, the Commission has designated that Murraylink's regulatory cost must reflect a project that provides market benefits under most (although not all) market development scenarios, which is similar to the test set down in the Regulatory Test.¹⁹ As endorsed by The Allen Consulting Group, probability theory provides a basis for attaching different levels of confidence to estimates of gross market benefits.²⁰ MTC submits that TEUS has provided the Commission with the information it needs to determine the level of gross market benefits that Murraylink or its alternative projects will deliver given the Commission's required level of confidence. With such information, the Commission may derive a project's net market benefits with a similar

¹⁸ Preliminary View, pp. 39-47.

¹⁹ Preliminary View, pp. ix-x, 30 & 60.

²⁰ Attachment 2, pp. 13-4.

level of confidence. MTC submits also that the application of a confidence level would suffice for and, in fact, would be superior to, the Commission's interpretation of the Regulatory Test that a project may satisfy the test if it provides market benefits for most (although not all) market development scenarios.²¹

Value of Unserved Energy

For the purpose of MTC's Application and calculating Murraylink's gross market benefits, TEUS had previously assumed a value of unserved energy in May 2003 dollars equivalent to "VoLL" as defined in the Code, presently set at \$10,000/MWh. TEUS noted in its advice to MTC of 30 June 2003 that the Commission had acknowledged that VENCORP now adopts a Value of Customer Reliability (VCR)²² of \$29,600/MWh for the purpose of transmission planning.

MTC concurs with The Allen Consulting Group that VENCORP's VCR of \$29,600/MWh is a more appropriate value of unserved energy for the purpose of MTC's Application and calculating Murraylink's gross market benefits than VoLL, the NEM wholesale spot price cap.²³

Impact of Increased Transfer Capability

In our letter of 30 June 2003, MTC put forward technical analysis by TEA, TEUS and BRW as to the technical appropriateness of including phase shifting transformers in the AC alternative projects. TEUS has now had the opportunity to determine the economic implications of not including phase-shifting transformers in the AC alternative projects, that is, the extent to which the gross market benefits of the AC alternatives would be reduced by the consequent decreased power transfer capability. In a second piece of advice in this submission contained in **Attachment 5**, TEUS documents its calculation of the economic benefits associated with the power transfer capability made possible by the phase shifting transformer in Alternative 3 to be to \$66.1 million for the base case.²⁴ TEUS's calculations provide further support for MTC's view that phase shifting transformers are necessary to ensure that the alternative projects are not suboptimal.

MTC concurs with TEUS's calculations and submits them to the Commission for the Commission's consideration.

²¹ Attachment 4, p. 3.

²² VENCORP, *Response to Submissions: Final Report – Value of Unserved Energy to be used by VENCORP for Electricity Transmission Planning*, 23 May 2003.

²³ Attachment 2, p. 28-9.

²⁴ Based on a value of unserved energy equal to \$29,600/MWh, in September 2003 dollars, and calculated as a net present value using a real discount rate of 9.00% per annum.

7. Selection and Assessment of the Alternative Projects

Theoretical Framework

In its Preliminary View, the Commission signals that:²⁵

[f]or interconnectors that deliver net market benefits to the market the Commission will set an opening asset value approximating an Optimised Depreciated Replacement Cost (ODRC) valuation.

The Commission also states how it proposes to apply an ODRC valuation to Murraylink in a manner consistent with the Regulatory Test and with the manner in which it values other transmission assets:²⁶

...the Commission will take into account the cost and configuration of what it considers to be the lowest cost option for a regulated interconnector that provides a certain level of gross market benefits. The Commission considers that this is consistent with the intent of the Regulatory Test and with ODRC valuation process that the Commission uses to value and/or revalue transmission network assets.

The reality is that valuing an asset such as Murraylink on the basis of “the lowest cost option for a regulated interconnector that provides a certain level of gross market benefits” is far more onerous than ODRC valuation process defined in the Commission’s Draft Regulatory Principles and that the Commission uses to value other transmission assets, or the Regulatory Test.

The Commission’s Draft Regulatory Principles define depreciated optimised replacement cost²⁷ as follows.

The DORC of a network is the sum of the depreciated cost of assets that would be used if the system were notionally reconfigured so as to minimise the forward looking costs of service delivery.

The Commission has not previously interpreted the ODRC (or DORC) of a network to mean the sum of the depreciated cost of assets that would be used if the system were notionally reconfigured so as to minimise the forward looking costs of a different level of service delivery than the network being valued will be called upon to provide.

Thus, the Commission has not applied an asset valuation methodology to Murraylink that is consistent with the Commission’s previous and well-understood approach to the ODRC valuation. The Commission has taken into account alternative projects that would be called upon to provide different level of service delivery than Murraylink, and, thus, the Commission seeks to value Murraylink in a manner more onerous than the manner in which it values all other new and existing transmission assets in the NEM.

²⁵ Preliminary View, pp. ii and 3, with similar references on pp. 39-40 and 93.

²⁶ Preliminary View, p. 24.

²⁷ Draft Regulatory Principles, p. xi.

For this reason, MTC submits to the Commission that MTC's valuation methodology set out in its Application—that takes account of alternative projects that would be called upon to provide same level of service delivery as Murraylink—is consistent with the Commission's currently defined and practiced approach to the ODRC valuations and is most appropriate for the Commission to apply in determining MTC's revenue.

Further, MTC submits that the Commission also erred by constructing and applying a new conceptually incorrect asset valuation methodology—one that simply values Murraylink on the basis of the capital cost of an alternative project, Alternative 3A, that would called upon to provide a substantially lower level of technical service—with no account being taken for the actual service that Murraylink will be called upon to provide.

While the Commission has not defined what “necessary” means for the purposes of selecting the configuration of the lowest cost alternative project, MTC takes the Commission to mean that it is only appropriate to include in the lowest cost alternative those components that are necessary for the interconnector to operate in a safe and reliable manner.²⁸ This meaning is inconsistent with the intent of the Regulatory Test itself, which is to identify the project that *maximises* net market benefits. This meaning also ignores the intent of the Draft Regulatory Principles, which provides for prudent capital expenditures—that is, expenditures for which the cost is less than the benefits generated—to be included in the asset base.²⁹

If it must apply a more onerous valuation methodology to Murraylink and take into account alternative projects with different streams of costs and benefits, as is the case with the Commission's consideration of Alternative 3A, the Commission should apply a sound theoretical framework that would lead the Commission to draw conclusions consistent with its objective to derive a regulatory cost that reflects Murraylink's gross market benefits as the Commission intends.³⁰

In its paper that MTC submitted to the Commission on 8 April 2003, The Allen Consulting Group signalled that the application of a service-adjusted ODRC valuation approach would require a more complex level of analysis than the Commission's previous and well-understood approach to the ODRC valuation that MTC had applied.³¹ Given that the Commission intends to apply a service-adjusted ODRC valuation to Murraylink, MTC asked The Allen Consulting Group to expand upon how this more complex analysis would need to be undertaken to construct a conceptually correct ODRC valuation framework, and The Allen Consulting Group has done this in its most recent paper.³²

The expanded ODRC valuation framework set out by The Allen Consulting Group enables the Commission to determine Murraylink's regulatory asset value in a manner that:

²⁸ Preliminary View, p. 58.

²⁹ Draft Regulatory Principles, p. xi.

³⁰ Preliminary View, p. 23.

³¹ The Allen Consulting Group, *Application for Conversion of Murraylink to a Prescribed Service: Commentary on the Economic Issues*, April 2003, pp. 15-6.

³² Attachment 2, pp. 18-20.

- recognises the net market benefits that service-adjusted alternative project could provide and the gross market benefits that Murraylink does provide; and
- enables both these things to be taken into account when determining Murraylink's regulatory asset value.

Similarly, and while this is not foreshadowed in the Preliminary View, The Allen Consulting Group highlights that the Commission's consideration of time-adjusted alternative projects would also be a major departure from its current practice. Having said that, if the Commission does vary from its Preliminary View and intends to consider time-adjusted projects, The Allen Consulting Group sets out the manner in which this can be done appropriately to recognise the different net market benefits that a time-adjusted alternative project could provide. In addition, MTC has analysed the extent to which the costs, gross market benefits and net market benefits of the alternative projects would change if their commissioning dates are adjusted into the future. MTC has found that significant market benefits provided by the projects, including all the Riverland deferral benefits, would be foregone if the projects are delayed. Subsequently, the capital cost savings generated by deferring the projects only just compensate for the benefits foregone.

MTC maintains its position that the scope and timing of the alternative projects put forward by BRW are appropriate. In particular, this conceptual framework confirms why it is appropriate to take into account the implication of including, or not including the phase shifting transformers in the AC alternative projects.³³

Recognition of the Requirement for Controllability

In considering the issue as to whether the alternative projects should include flow controllability, the Commission also needs to consider whether removing the cost of the assets required to provide flow controllability from Murraylink's regulatory value is consistent with the intention of the Safe Harbour Provisions.

The Safe Harbour Provisions as incorporated in the National Electricity Code require any market network service provider to establish an independently controllable two-terminal link, and, thus, to install the equipment required to provide this service potential.³⁴ MTC has incurred this cost because the National Electricity Code mandated that feature.

A decision by the Commission to ignore the cost associated with this feature on account of it not being "necessary" in an AC network would mean that, upon conversion, the regulatory value of the asset would always involve the writing-off of the controllability part of the asset. This would weaken the extent to which the Safe Harbour Provisions reduce the risk of investment faced by market network service providers, as sought by the ACCC. MTC submits that the Commission should take this factor into account.

³³ Attachment 2, pp. 20-4.

³⁴ National Electricity Code, clause 2.5.2(a)(5)(B).

Configuration and Costs of BRW's Alternative Projects

MTC engaged BRW to select and assess Murraylink's alternative projects in a manner consistent with the Commission's Draft Regulatory Principles. Its selection and assessment of Murraylink's alternative projects were documented in BRW's report *TransÉnergie – Murraylink: Selection and assessment of alternatives*, which was included as Appendix F in MTC's Application of 18 October 2002.

In response to issues raised by the Commission's consultants and stakeholders, MTC has provided to the Commission additional information from BRW to clarify and reinforce BRW's original assessment.

In its Preliminary View, the Commission concurs with the view that the Regulatory Test does not require an assessment of alternative projects that provide the "exact same level of technical service" as Murraylink. Generally, the Commission considers that the range of projects specified by BRW is appropriate.

However, the Commission stated that it³⁵:

- concurs with MTC's proposed undergrounding for Alternative 1, but at this stage does not believe that undergrounding would be required for Alternatives 2 and 3;
- believes that controllability is not necessary for regulated interconnectors in the NEM and the cost of the AC alternative projects should be adjusted to reflect removal of the phase shifting transformers and their associated spares;
- does not believe that an efficient costing of the contingency component would be based on anything other than a P50 analysis; and
- estimates the annual O&M costs of the alternative projects to be 1.5% of the capital costs of those projects.

The justification for the inclusion of phase shifting transformers, the unit costs of undergrounding, and the appropriate means for estimating the O&M costs of the alternative projects is dealt with in MTC's interim submission to the Commission of 30 June 2003.

The following parts of section 7 deal with the following matters of significant importance to the configuration and costing of Murraylink's alternatives:

- the incorporation of probable environmental impact mitigation measures in the alternative projects;
- the explicit incorporation of owner's risk in the cost of the alternative projects in lieu of contingency; and

³⁵ Preliminary View, pp. 55-60.

- the revised project costings and related matters.

Major Environmental Impact Mitigation Measures

When BRW selected its alternative projects, it identified the possibility that major environmental impact mitigation measures would need to be incorporated into the projects' scopes and costings. This is because Alternative 1 would travel through in the Bookmark Biosphere including Calperum Station and Ramsar wetlands, areas of national significance. Alternatives 2 and 3 would travel through areas around Red Cliffs constrained by agricultural use and other infrastructure, the highly valued Murray-Sunset National Park in Victoria, and areas adjacent to the Murray River of aboriginal heritage value at the appropriate crossing sites.

BRW's original project costing took into account a simple probabilistic assessment of the need for undergrounding developed by environmental consultants Kellogg Brown and Root ("KBR"). KBR put forward what it believed to be the expected extent of undergrounding for each alternative given the likely outcomes of the environmental approvals processes.

KBR was well qualified and well recognised in Australia for giving such advice. It advised the Victorian Government on Basslink, it understands in detail the local conditions in the Riverland and Sunraysia areas having undertaken the community consultations and environmental impact assessment for Murraylink, and it has extensive experience in seeking approvals across all the relevant jurisdictions—the Commonwealth and the States of Victoria, South Australia and New South Wales.

For its Preliminary View, the Commission took account of an interpretation of the New Zealand ODV Handbook³⁶ and sought evidence of legal requirements for undergrounding. On the basis of a letter from Planning SA, the Commission accepted parts of KBR's advice and rejected other parts.

In relation to the New Zealand ODV Handbook, the Commission says:

The Commission considers that although similar rules to the ODV Handbook do not exist in Australia, these are reasonable considerations for the valuation of underground transmission assets.

In doing so, the Commission says:

Essentially, the Handbook states that an underground cable will be valued at the cost of an overhead line, unless there is specific evidence that a local authority could not grant consent for overhead transmission lines, or a legal obligation for underground cables exist.

On this basis, the Commission says it is appropriate for the Commission to be guided only by the legal requirements that are relevant in each particular case—which we shall refer to as the Commission's "**legal requirements test**".

³⁶ New Zealand Ministry of Economic Development. *Handbook for Optimised Deprival Valuation of System Fixed Assets of Electricity Line Businesses* ("**New Zealand ODV Handbook**"), October 2000.

While MTC acknowledges the Commission's efforts to identify an appropriate mechanism for dealing with uncertainties as to the environmental impact mitigation measures to be included in the various alternative projects, it considers that the Commission has erred in its approach in its Preliminary View. Moreover, MTC contends that measures required to deal with the environmental requirements are not appropriate to be dealt with on an "all or nothing" basis. Instead, the probabilities that undergrounding or other environmental impact mitigation measures would be required in order to address environmental requirements for alternative projects should be assessed and applied to the overall cost of the alternative projects.

The approach taken by the Commission in respect of the New Zealand ODV Handbook has a fundamental error in that the Handbook does not, as stated by the Commission, prescribe a legal requirements test in respect of the inclusion of undergrounding.

The relevant provision in the New Zealand ODV Handbook is as follows:

... if a distribution [transmission] line consists of underground cables these must be valued as overhead lines of the required capacity unless there is specific evidence that the local authority would not, in normal circumstances, grant consent for overhead reticulation, or that a non-standard contract or a legal obligation requiring the installation of underground lines exists.³⁷

Thus, the New Zealand ODV Handbook approach contains two alternatives:

- that the local authority would not, in normal circumstances, grant consent for overhead reticulation; or
- that a non-standard contract or a legal obligation requiring the installation of underground lines exists.

The New Zealand ODV Handbook does not prescribe **only** a legal requirements test, as has the Commission.

The Commission focuses only upon the second alternative in this test and in so doing appears to have misconstrued the New Zealand ODV Handbook approach. The Commission states that the New Zealand ODV Handbook contains "reasonable considerations for the valuation of the underground transmission assets". But it does not explain why it should then only focus upon the second limb as an exhaustive test without regard to whether the local authority would consent to overhead reticulation.

The New Zealand ODV Handbook makes the uncontroversial assertion that the cost of undergrounding should be included where the second alternative is satisfied—that is, where the asset owner faced a contractual or legal obligation to underground. However, construed correctly, the Handbook also provides that, where there is no such obligation, there is a need to consider whether a local authority—or, in the Australian context, the relevant approval body—would not, in normal circumstances, grant consent for overhead reticulation.

³⁷ New Zealand ODV Handbook. p. 70.

The methodology in the New Zealand ODV Handbook relates to the assets of electricity businesses that are in service. In contrast, in this application the Commission is undertaking a valuation exercise of a transmission asset after conversion to regulated status by reference to hypothetical alternative projects. The hypothetical nature of the alternative projects increases the uncertainties associated with determining the environmental impact mitigation measures that would need to be incorporated into the projects.

In dealing with these uncertainties, the alternative projects must be costed as if they were developed as real projects that are subject to the same risks as projects that would actually be developed. All regulated transmission projects include environmental impact mitigation measures necessary for them to gain their environmental and planning approvals. Many transmission projects in Victoria, South Australia and New South Wales incorporate extensive and costly (major) environmental impact mitigation measures—they have extended line routes to avoid sensitive areas, they may contain more costly technology, and many incorporate various levels of undergrounding.

The reality is that no legislation or government policies in any of the relevant jurisdictions explicitly mandate when and what major environmental impact mitigation measures will be required in transmission projects. The extent of measures required for each project depends upon the outcome of long and intensive community consultation and environmental assessment processes, the specific matters of local, state and national significance, the balance of impacts and costs, and the judgements of the approval bodies—often Ministers. Recognising this framework is consistent with a proper construction of the New Zealand ODV Handbook.

Consequently, approval bodies are unable to give definitive rulings as to the outcomes of these processes before those processes have been completed. This is especially the case for hypothetical projects. Planning SA's letter of 3 April 2003 to the Commission demonstrates this, for example, when Planning SA states "[t]he level of environmental risk and cost implications of a river crossing will be taken into consideration when deciding whether undergrounding would be required in this circumstance".

The Commission should also recognise that, in practice, approval documents themselves rarely specify all the major environmental impact mitigation measures necessary for a project to gain approval. The absence of such specifications in approval documents does not indicate that these measures would not have been required had they not been incorporated into the proposed project design prior to approval.

As indicated by BRW³⁸, in practice, proponents may incorporate major environmental impact mitigation measures in proposed projects throughout the design process:

- at the initial design stage;
- during consultation with the local community, environmental experts and government agencies before and during the environment and planning approval processes; and

³⁸ Attachment 6, Appendix, p. 4.

- very occasionally, as a result of explicit conditions that an environmental or planning approval body may impose.

We have discussed with Commission staff the case of Basslink and whether a legal requirement for environmental impact mitigation measures arose for that project from the *Coastal Management Act 1995* ("CMA"). MTC wishes to confirm that no such legal requirement arises from the CMA. The consent issued by the Victorian Minister for Environment under section 37 of the CMA relates to the development of Basslink on "coastal Crown land". That is, it authorises the horizontal directional drilling of Basslink under the coastal dunes and beach and the laying of the cable on the seabed in Victorian waters. Basslink's requirement for undergrounding on the Gifford coastal plain was specified in an amendment to the Wellington planning scheme approved by the Victorian Minister for Planning. In no way does the CMA consent have any bearing on the decision to require undergrounding on the coastal plain (which is private farmland, not crown land). It should be noted that both of the CMA consent and Wellington planning scheme amendment were issued on the basis of the Minister for Planning's assessment of Basslink under the *Environment Effects Act 1978*.

The Minister for Planning required Basslink to include a further 6.5 km of undergrounding, as recommended by the Basslink Joint Advisory Panel ("JAP"), as "an appropriate measure to avoid visual impacts in the coastal zone".³⁹ In other words, the Minister made a judgement, based on the JAP's recommendations, that this additional undergrounding was appropriate in order to minimise the visual impacts of Basslink on the coastal plain. Interestingly, the Minister also acknowledged, but did not specifically require, additional major environmental impact mitigation measures already proposed by the proponents during the assessment process, in particular, a metallic return cable.

MTC believes that the Commission should consider the JAP's reasons for recommending that this section of Basslink be placed underground, which were as follows⁴⁰:

- The Gifford coastal plain is flat, therefore providing little or no scope to use other transmission line design or landscaping measures to mitigate visual impact.
- The Coastal Land Use Policy in the Wellington planning scheme, which specified that the scale and height of buildings should complement the coastal environment, should be acknowledged insofar that it recognised the "importance of the coastal plain and the need to retain the landscape characteristics of that area...". This is a policy that guides the exercise of discretion by a responsible authority under Victoria's planning legislation—it is not a "legal requirement".
- No significant visual evidence of the power cable would be apparent to persons accessing McGaurans Beach if it was placed underground.

³⁹ Minister for Planning, *Basslink Electricity Interconnector Assessment*, September 2002, p. 6.

⁴⁰ Basslink Joint Advisory Panel, *Basslink proposed interconnector linking the Tasmanian and Victorian electricity grids: Final Panel Report*, June 2002, pp. 167-9.

- Basslink Pty Ltd had proposed 6.9 km of underground for its alternative, preferred, Old Rosedale Road alignment for environmental (not visual) reasons. The JAP felt there was an argument in favour of introducing parity between the two alignments and requiring 6.5 km for its preferred route.

The JAP also stated that undergrounding for a minimum distance of 5 km inland from the coast was chosen as the "defining distance" on the grounds that for a 5 km field of view the visual impact of the towers was "considered insignificant".⁴¹

In relation to Basslink, the environmental assessment and approval involved the following process.

- The JAP decided that undergrounding at the coast was appropriate, primarily on the basis of mitigating visual impact, and recommended 6.5 km of undergrounding. Note that native vegetation was not a relevant consideration for Basslink's coastal crossing, as the area is open farm land.
- The Minister for Planning accepted JAP's recommendation, and the reasons for its recommendation, in her assessment.
- Having regard to the Minister for Planning's assessment, the Minister for Planning approved an amendment to the Wellington planning scheme which allowed Basslink to be built provided there is 6.5 km of undergrounding at the coast. The Minister for Environment also issued the CMA consent based upon the Minister for Planning's assessment, but the CMA consent has nothing whatsoever to do with the issue of undergrounding on the coastal plain.

In its Preliminary View, the Commission indicates that MTC perceived that potential (not actual) opposition to overhead transmission lines provided sufficient imperative for it to develop Murraylink as an underground cable and that MTC's views regarding environmental and community opposition to an overhead transmission line may not be exact. MTC wishes to assure the Commission that its first-hand experience of strong community opposition to overhead power lines is very real. All relevant stakeholder submissions to the Commission, including those from Mildura and Wentworth Councils, support MTC's experience.

When MTC commenced development of Murraylink, it encountered determined community resistance at meetings with individual and groups of representatives, including those from state and local government agencies, farms and towns. All were extremely concerned about the impact of overhead lines upon native vegetation, land use, heritage values and the visual amenity of the Riverland and Sunraysia areas. After considering the strong community opposition to overhead power lines it experienced, MTC made a decision to place the Murraylink line underground. Consequently, the Victorian Minister for Planning determined that MTC did not need to proceed with a full environment impact assessment process. Instead, Murraylink's environmental impacts were assessed and its planning approvals made possible through processes under the Victorian *Planning and Environment Act 1987* (planning

⁴¹ *ibid.*, p. 168.

permits issued by Mildura City Council) and the South Australian *Development Act 1993* (development authorisations issued by the Development Assessment Commission). MTC's development application and its supporting Development Application Report reflect MTC's decision to place Murraylink's line underground and contains a detailed environmental assessment of Murraylink in that form.⁴²

Even when MTC proposed Murraylink as an underground line, MTC continued to experience resistance to its plans on environmental grounds, as documented in its Development Application Report. In refining its development proposal, MTC made a number of additional concessions to gain its development consent. For example, given significant concerns about Murraylink's impact upon the few remaining areas of remnant vegetation habitat, MTC's cable installation contractor developed new continuous cable laying equipment to limit its impact to within a 4 metre right of way and to minimise vegetation removal.

In its letter to the Commission of 3 April 2003, Planning SA notes correctly that Murraylink's development consent does not require Murraylink to be placed underground. It does however, require Murraylink to be built in accordance with the design contained within its development application. The Commission should not construe from Murraylink's development consent to mean that, if MTC had not proposed undergrounding initially, its environmental assessment and planning approval processes would not have resulted in major and costly environmental impact mitigation measures being incorporated into the Murraylink project. In fact, advice to MTC from a range of qualified experts and government officials strongly suggests the contrary.⁴³

In its Preliminary View, the Commission has accepted that the Bookmark Biosphere and Ramsar wetlands are environmentally sensitive. The Commission has also indicated that it believes that, while Alternatives 2 and 3 transverse populated areas and farming communities a similar imperative for these transmission lines to be undergrounded as in a densely populated area. Again, advice to MTC from the same range of qualified experts and government officials strongly suggests that the areas traversed by Alternatives 2 and 3 are very sensitive from an ecological, social, economic and heritage perspective.

Consequently, in the case of the alternative projects, the Commission should recognise that there is a material probability that major environmental impact mitigation measures would be required for the alternative projects. The Commission would be aware that there are appropriate modelling techniques designed to deal with probabilities of this type. That is why MTC engaged BRW and Worley to conduct a process to determine the possible outcomes and their probabilities, and to incorporate the results in BRW's probabilistic cost model.

In conjunction with Freehills and KBR, BRW and Worley:

⁴² Kinhill Pty Ltd, *Murraylink Application Report* ("**Development Application Report**"), February 2000—MTC provided this publicly available report to Commission staff in March 2003.

⁴³ The advice includes that from KBR on 16 October 2002, which was included in MTC's Application, and the advice of participants of Worley/BRW Workshop contained in BRW's report to MTC of 14 July 2003 contained in Attachment 6 of this submission.

- prepared documentation that described the routes of the alternative projects and provided it to government officials and a range of highly experienced and qualified environment and industry experts; and
- conducted a workshop in which these people considered specific segments of each line route in terms of the local conditions, the environmental assessment and planning processes that would apply, and previous projects that dealt with similar issues.

The environment and industry experts selected the probable environmental impact mitigation outcomes for each segment and assessed the probability of each outcome as if it was a real project. Worley then analysed and quantified the workshop outcomes and BRW produced revised project costings that reflect the correct probabilities that major environmental impact mitigation measures would be required.

The results of this process mean that MTC can better confirm to the Commission:

- the sensitive areas associated with the alternative projects;
- the types of environmental impact mitigation measures that are likely to be necessary if those projects were actually constructed—including undergrounding, poles rather than towers, or realignment; and
- how these results affect the costings of the alternative projects.

Revised Alternative Project Costing and Related Matters

MTC is pleased to provide BRW's report in which it provides revised costings in September 2003 dollars for the alternative projects to take account of Worley/BRW's analysis of environmental impact mitigation measures, contingency, and the revised real discount rate in **Attachment 6**.

When BRW made its original assessment of the cost of the alternative projects to an asset owner, it chose to include a P75 contingency. In its report of 27 February 2003, Dr Patrick Tuohey, Director Risk Management of Worley explained that contingency is added to project costs to take account of such things as uncertainties in the level of definitions of scope, omissions from the estimate, exchange rate uncertainties etc., and that P75 is consistent with industry practice and considered to be quite lean.

In its Preliminary View, the Commission indicated its belief that an efficient costing of the contingency component would not be based on anything other than a P50 costing.⁴⁴

In response to the Commission's Preliminary View, BRW engaged a nationally recognised cost engineering specialist, Mr Peter Downie, to review BRW's project costing and risk assessment and to advise on the appropriate application of contingency to determine the cost of the alternative projects. Mr Downie is Chairman of the Australian Cost Engineering

⁴⁴ Preliminary View, p. 59.

Society and President of the Australian Section of the Association for the Advancement of Cost Engineering International. Mr Downie's conclusions are set out in BRW's report contained in Attachment 6. As a consequence of Mr Downie's advice, BRW made an assessment of owner's risk, an area of risk previously incorporated implicitly in the project costs by the use of a P75 contingency.

In a brief separate advice (**Attachment 7**), BRW provides its response to points that PB Associates raised in its report of 3 July 2003 in relation to the cost of phase shifting transformers and a perceived error in BRW's original report.

MTC submits that these reports contain matters to which the Commission should have regard when making its determination under clause 2.5.2(c) of the Code.

MTC notes that some speakers at the Commission's Public Forum on 8 July 2003 made assertions as to other alternative projects for which it was contended a lower cost would apply. MTC does not accept those assertions but cannot respond until it sees the written submissions said to support them. MTC will respond to those submissions as soon as it has had an opportunity to view them.

8. Murraylink's Forecast Operating and Maintenance Costs

MTC provided its original forecast O&M costs to the Commission with MTC's Application of 18 October 2002. On the basis of substantially new and more accurate costing information becoming available to MTC, it provided a revised O&M cost forecast to the Commission on 8 April 2003. The Commission engaged PB Associates to conduct a high level review of MTC's revised O&M forecast and PB Associates conclusions are set out in PB Associates' report of 3 July 2003 and the Commission's Preliminary View. PB Associates indicated that it did not conduct in-depth investigations and expressed its professional opinion on limited information.

PB Associates confirmed as appropriate the major costs contained in MTC's O&M forecast. To the extent that PB Associates indicated that some of MTC's forecast costs were higher than it expected, its findings are qualitative and general rather than quantitative and specific. As such, they are difficult to MTC to respond to effectively. Having said this, MTC makes the following comments on PB Associates' conclusions:

- MTC's forecast staffing levels are appropriate for MTC's detailed assessment of the level of management effort it will require;
- On the basis of PB Associate's comments, MTC has reviewed its plans for filter circuit breaker replacement and refurbishment and intends to replace a third of them every five years and refurbish the others at that time;
- MTC's corporate costs will be independent of its circuit breaker replacement and refurbishment plans; and

- PB Associates findings in relation to MTC's level of fixed costs relative to other TNSPs such as TransPower takes no account of the unusually high proportion of its O&M costs dedicated to connection charges, a fixed cost that is beyond MTC's control.

PB Associates also recommended that follow-up be undertaken. MTC would be pleased to cooperate with any additional review the Commission deems necessary at the earliest possible time. In the meantime, MTC will submit separately to the Commission another revised forecast of its O&M costs to take account of the second and third points above. The present value of this revised forecast will be \$47.63 million in September 2003 dollars using a 9.00% real discount rate.

9. Weighted Average Cost of Capital & Imputation Credits

In its Application, on the basis of advice from Professor Bob Officer, MTC proposed to the Commission that it receive a post tax nominal return on equity of 12.15% and a Vanilla weighted average cost of capital of 9.00%.

The Commission has proposed in its Preliminary View, to provide MTC with a post tax nominal return on equity of 11.17% and a Vanilla weighted average cost of capital of 8.45% on the basis of its different view as to the real risk free rate, expected inflation, the cost of debt margin and the appropriate equity beta. The Commission has also proposed to recognise the value of imputation credits as 50% rather than the 45% proposed by MTC.

While MTC continues to support the view that the parameters put forward in Professor Officer's advice are appropriate, MTC recognises that the Commission's proposed return on capital and value of imputation credits for MTC is consistent with the Commission's previous decisions and MTC would expect the Commission's final determination to also be consistent with these numbers.

10. Depreciation

In its letter of 8 April 2003, MTC confirmed that, under normal operating conditions and the maintenance plan currently budgeted in MTC's operating and maintenance budget, Murraylink's HVDC equipment is designed to have an operational asset life of 40 years.

In its Preliminary View, the Commission applied asset lives that might relate to one of the alternative projects for the purpose of calculating Murraylink's depreciation allowance. The choice of the lengths of the assets lives should not affect the present value of the depreciation allowance. However, as that the lengths of the asset lives chosen by the Commission are longer than those of Murraylink, MTC believes the Commission's approach unnecessarily disadvantages MTC.

As The Allen Consulting Group states in its *Commentary on Economic Issues*:⁴⁵

The role of the regulatory depreciation allowance ... is to return [the ORDC value] to the investor in the regulated asset over its asset life. If a life in excess of the economic life of the actual asset is used to determine the depreciation allowance, then the whole of the investment would not be expected to be recovered over its life, and hence the expected present value of the income stream would be below the regulatory asset value.

MTC's initial capital cost included a number of costs associated with gaining a regulated revenue. Given that the Commission's regulatory determination will expire at the end of the regulatory control period, it is appropriate for these costs to be recovered over the regulatory control period.

11. Service Standard

Consistent with the Commission's draft decision on the South Australian Transmission Network Revenue Cap⁴⁶, MTC proposed in its Application that part of MTC's allowed revenues be placed "at risk" as an incentive to meet a benchmarked service standard. In the case of Murraylink, circuit availability captures all of the appropriate service standards and MTC proposed a mid-point target for this service standard of 97% with a "dead-band" zone for circuit availability.

Since MTC issued its application, the Commission has released a report into services standards by Sinclair Knight Merz⁴⁷, commissioned PB Associates to review MTC's services standard proposal⁴⁸, and published its draft guidelines on services standards⁴⁹. On 28 February 2003, MTC provided to the Commission important information for the purpose of considering MTC's service standard and corresponding target.

On the basis of advice from PB Associates, the Commission concluded in its Preliminary View that only circuit availability is required for a transmission system comprising only a single circuit interconnector, and that circuit availability be subdivided into planned availability, forced unavailability during peak periods and forced unavailability during off-peak periods. Further, the Commission concluded that a target be set for each that represents a cumulative unavailability of 1.77%.

The Commission appears to have overlooked the additional information that MTC provided to the Commission on 28 February 2003. For this reason, MTC presents that information again and represents that the Commission take it into full account.

Scope of circuit availability

⁴⁵ Attachment 2, p. 30.

⁴⁶ Australian Competition and Consumer Commission, *Draft Decision: South Australian Transmission Network Revenue Cap 2003-2007/8*, 11 September 2002, pp. 124-6.

⁴⁷ Sinclair Knight Merz, *TNSP Service Standards*, November 2002.

⁴⁸ PB Associates, *Review of MTP Service Standards*, 23 December 2003.

⁴⁹ Australian Competition and Consumer Commission, *Draft Decision: Statement of Principles for the Regulation of Transmission Revenues – Service Standards Guidelines*, 28 May 2003

MTC supports PB Associates' finding that the circuit availability offered by MTC is the only appropriate service standard for Murraylink, inter-regional constraints on Murraylink's transfer capability due to conditions in the broader network are beyond Murraylink's control, and these inter-regional constraints, including those that result in an automatic run-back of the Murraylink power transfer, should not be taken into account for the measurement of Murraylink's circuit availability.

CIGRÉ reporting protocol

MTC supports PB Associates' finding that it is appropriate for MTC to adopt the protocol established by a CIGRÉ Working Group for calculating and reporting the availability of HVDC transmission systems: *Protocol for reporting the Operational Performance of HVDC Transmission Systems*.

Annual calculation of performance incentives

MTC is prepared to accept PB Associates' recommendation that its Murraylink performance incentive scheme be based on annual calculations.

Duration of planned outages

Section 3.3 of PB Associates' report confirms the need for Murraylink's yearly scheduled maintenance: 48 hours per year. In addition, monthly maintenance is required. Valve enclosures and the reactor room require inspection each month, and, for both, the system must be isolated, earthed and under access permit. Therefore, as there would be a minimum of 1.5 hours switching, isolation and restoration required, no less than 3 hours per month can be allowed for these routine maintenance inspections. This adds 3×12 , or 36 hours per year to scheduled maintenance, giving a total of $36 + 48 = 84$ hours per year (0.96%).

Duration of forced outages

When estimating the time to rectify forced (including unplanned) outages, in addition to the time quoted in the ABB Reliability and Availability Prediction, account should be taken of:

1. The time required to organise and mobilise equipment in the event of a forced outage, especially given Murraylink's remote location. In the event of an unplanned outage, travel times should also be allowed.
2. Switching times to isolate, earth and issue Electrical Access Permits ("EAPs") in accordance with the Victorian "Blue Book". At least 1.5 hours should be allowed for isolation, issuing of permits, cancelling of permits and restorations.

3. In the event of a replacement of a transformer, the time to complete the works, even with equipment mobilised and isolations completed, would be at least 24 hours.

MTC believes that PB Associates overlooked these factors.

Proposed total unavailability

MTC continues to propose a total energy unavailability of 3.00%, that is, 0.96% for planned outages and 2.04% for forced outages.

Proposed individual performance targets

PB Associates is mistaken in that there are 75 peak hours between 7 am and 10 pm on weekdays each week. MTC accepts PB Associates' recommendation that there be individual performance targets and proposes target values of 0.96%, 0.91%, and 1.13% for planned, forced peak and forced off-peak unavailability, respectively.⁵⁰ As such MTC's overall circuit availability target would be 97%. These targets are more realistic for Murraylink, given its location and the nature of Australian high voltage switching and isolation requirements.

Revenue at risk

MTC concurs with PB Associates that its performance incentive scheme for Murraylink should place 1% of MTC revenue at risk.

Review of targets

MTC supports a review of its performance targets after five years.

Force majeure events

Unavailability of Murraylink arising solely from *force majeure* events should be excluded from the calculation of Murraylink circuit availability. These would include events that are beyond the reasonable control of MTC or its contractors given that MTC has undertaken all reasonable cost-effective mitigation measures to avoid them. MTC anticipates agreeing with the Commission upon a list of *force majeure* events within these criteria.

MTC continues to believe that the most appropriate target for Murraylink's circuit availability is 97%. MTC accepts PB Associates' recommendation that there be individual performance targets and proposes target values of 0.96%, 0.91%, and 1.13% for planned, forced peak and forced off-peak unavailability respectively. These targets are more realistic for Murraylink,

⁵⁰ Unavailability in the body of the text is expressed as a percentage of total time. This is equivalent to saying that the forced peak and off-peak unavailability targets would be 1.31%, and 2.62% as percentages of peak and off-peak periods, respectively.

given its location and the nature of Australian high voltage switching and isolation requirements.

Unavailability of Murraylink arising solely from *force majeure* events should be excluded from the calculation of Murraylink circuit availability. These would include events that are beyond the reasonable control of MTC or its contractors given that MTC has undertaken all reasonable cost-effective mitigation measures to avoid them. MTC anticipates agreeing with the Commission a list of *force majeure* events within these criteria.

12. Pass-Through Rules

On 8 April 2003, MTC submitted to the Commission a set of pass-through rules modelled closely on those the Commission accepted for SPI PowerNet to ensure that it satisfied all the important features of an efficient and equitable mechanism.

In its Preliminary View, the Commission proposes to accept the pass-through rules that MTC has put forward subject to a number of relatively minor amendments. MTC accepts these amendments as reasonable.

July 2003

Report to Murraylink
Transmission Company

Application for Conversion of Murraylink to a Prescribed Service

Commentary on the ACCC Preliminary View

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1. Introduction and Overview

The Allen Consulting Group has been engaged by Murraylink Transmission Company (MTC) to provide commentary on some of the economic issues that are raised by the Australian Competition and Consumer Commission's Preliminary View on MTC's application for the services provided by the Murraylink project to be converted to a prescribed service,¹ and for the maximum allowable revenue for those services to be determined.² The report was prepared by Jeff Balchin, Director, from the Group's infrastructure regulation practice. The Group also prepared a report for MTC prior to the release of the Commission's Preliminary View,³ and reference is made to the earlier report, where relevant.

The Commission accepted many of the key economic principles included in MTC's application, and the earlier report written by the Group. In particular, the Commission accepted that permitting the Murraylink asset to convert to regulated status was consistent with the intent of the relevant provisions in the National Electricity Code, the earlier statements on this matter by the NECA working group and with the objectives of the National Electricity Code (and, in particular, the pursuit of economic efficiency). As noted in our earlier paper, permitting Murraylink's conversion to regulated status may provide substantial efficiency improvements to the National Electricity Market (NEM) by removing any incentive that MTC may have to withhold Murraylink's capacity and by providing a more certain environment for the planning and operation of the NEM. It was also noted that a key concern amongst stakeholders with permitting Murraylink's conversion – that they may end up 'paying twice' (through regulated transmission use of system charges) for part or all of the service potential provided by Murraylink was likely to be unfounded, given the approach to setting revenue caps outlined by the Commission in its draft Statement of Regulatory Principles.

The Commission also accepted that it was appropriate to use the same methodology for assigning a regulatory value to unregulated assets at conversion to regulated status as the Commission has used to value regulated assets generally. In particular, the Commission rejected the alternative valuation methodology proposed in other submissions that – in effect – its regulatory value should be set at a level such that all market participants benefit from Murraylink's *conversion* (rather than that participants benefit from its *existence*). It was noted in our earlier paper that such a valuation methodology would be a departure from the Commission's own statements on how it would value transmission assets in general – and assets converting to regulated status in particular – which may have an adverse effect on investor sentiment in the industry and ultimately economic efficiency. Moreover, it was also noted that, when analysed further, the 'incremental benefits' methodology is likely to have implications that are unreasonable to the owners of Murraylink, and also undermine the rationale for permitting conversion to a regulated interconnector.

Section 2 discusses these findings by the Commission, and notes again the reasons advanced in our earlier report that support these findings.

¹ Australian Competition and Consumer Commission, Murraylink Transmission Company Application for Conversion and Maximum Allowed Revenue: Preliminary View, May 2003.

² The terms 'prescribed service' and 'regulated interconnector' are used interchangeably in this report.

³ The Allen Consulting Group, Application for Conversion of Murraylink to a Prescribed Service: Commentary on the Economic Issues, Report to Murraylink Transmission Company, April 2003.

The actual asset valuation methodology adopted by the Commission differs to that proposed by MTC, however. In particular, the Commission rejected a further constraint that MTC had proposed on the valuation of Murraylink – that further constraint being that the total of the regulatory cost for the asset (that is, the regulatory asset value plus the discounted value of future operating and maintenance expenses) not exceed the central estimate of the market benefits that created by that asset. While this constraint was not operative given the Commission’s preliminary view on the optimised depreciated replacement cost (ODRC) of the Murraylink asset (with which MTC disagrees), the Commission has not given any guidance as to how it would set an appropriate regulatory asset value at conversion where the estimated ODRC value and present value of future operating expenses were likely to *exceed* the central estimate of the market benefits created by that asset, but where some specified regulatory asset value (below the estimated ODRC value) exists at which the asset would be expected to provide net market benefits.

MTC’s original application accepted that it would be unreasonable to value the asset at its ODRC value where this would lead to regulated charges exceeding the market benefits created. MTC’s proposal was that the regulatory cost for the project would be capped at the central estimate of the market benefits created. Considered in terms of valuation, this methodology implied using the central estimate of gross market benefits as the economic value constraint in an asset in an Optimised Deprivation Value (ODV) valuation. Considered in terms of an ex ante application of the regulatory test, this methodology would imply that the financiers of the asset would bear any subsidy required for the project (notionally) to pass the regulatory test. This additional constraint on the valuation of an asset converting to regulated status is considered reasonable – and a valid application of the ODV methodology – and should be given further consideration by the Commission.

One of the Commission’s concerns with MTC’s proposed ODV methodology was with the level of uncertainty associated with estimates of gross market benefits, and that it would like either more certainty with respect to the key inputs, or for some ‘headroom’ to be built into the assumptions for which a degree of uncertainty is inevitable. More confidence in many of the inputs can be obtained by placing more focus on the validity of the particular assumptions adopted, with the discount rate being one example. Where a degree of uncertainty over an input is inevitable, probability theory provides a basis for attaching different levels of confidence to estimates, provided that objective estimates of the probability associated with different outcomes are attainable. Probability theory avoids placing equal weight on outcomes that may have substantially different chances of occurring.

In a submission for MTC, TransÉnergie US has demonstrated that the assumption about future economic growth explains much of the variation in gross market benefits, and for which it is possible to attach probabilities. The TransÉnergie US proposal to derive the estimate of gross market benefits that is consistent with different levels of confidence in the economic growth assumption – which would allow the Commission to select a level of ‘headroom’ on a robust and transparent basis if headroom is required – is supported. It is noted, however, that the levels of confidence typically used in hypothesis testing (for example, 95 per cent confidence in the hypothesis) may not be directly relevant for the derivation of the ‘headroom’. It is also noted that the requirement for ‘headroom’ in the estimate of gross market benefits is inconsistent with a correctly-estimated ODV valuation – for which the expected value of the relevant benefits and costs is the appropriate input.

A number of presentations at the public forum also raised the *optimal timing* of an alternative project to Murraylink as a matter to be considered when setting a regulatory value for Murraylink. While the optimal timing of a project is a relevant concern when applying the regulatory test (that is, in an *ex ante* sense to a project that is not yet in existence), we are unaware of such considerations being analysed when setting the regulatory value of existing assets – including where such a value is set using an ODRC methodology. Our previous paper commented on some of the practical constraints that regulators face when applying any method to value and re-value assets, and by implication, the higher standards being implied in some submissions for the setting of a regulatory value for Murraylink than have been applied by the Commission in setting the regulatory value of existing transmission assets.

Nevertheless, if the Commission wishes to take account of the optimal timing of an alternative project to Murraylink when setting the regulatory value for Murraylink, this factor can be considered within the framework of a conceptually-correct ODRC methodology. In particular, it is demonstrated that – if it were optimal to defer the hypothetical alternative project to Murraylink – the use of the optimal-timing-adjusted-ODRC value methodology would imply setting a regulatory cost for Murraylink equal to the estimated gross market benefits provided by the Murraylink project, less the net market benefits associated with the optimal project (that is, the maximum projected net market benefits), discounted back into today's dollars. The use of an optimal-timing-adjusted-ODRC value methodology is considered to be the most appropriate methodology for taking account of optimal timing of investment, should the Commission consider this criterion to be appropriate.

The valuation-related issues set out above are discussed in **section 3** of this report.

A further major conceptual issue raised by the Commission's estimate of the ODRC value for Murraylink is related to its treatment of the increased transfer capacity arising from the flow controllability that Murraylink provides.⁴ The Commission accepted the positions expressed by some stakeholders that the flow control service potential is 'not necessary'⁵ for regulated interconnectors and that 'the NEM has traditionally been built using AC technology'.⁶ Consistent with this, the Commission reduced the ODRC value of Murraylink by \$19 million to remove the cost of the assets required to provide this service potential (note that this adjustment contained a technical error, and that the adjustment consistent with the Commission's intention was \$17.8 million).⁷ The Commission also accepted MTC's preliminary estimates of the value of the increased transfer capacity associated with flow controllability as being between \$20 million and \$25 million (although, as noted below, MTC's more detailed analysis subsequent to the Preliminary View suggests that a better estimate of the incremental benefits from the increased transfer capability associated with flow controllability is \$66.1 million).⁸

⁴ The Commission's estimate of the ODRC value for Murraylink also raised a number of other important issues, such as the extent of undergrounding of assets that a profit-maximising entity would either be required – or choose – to undertake and the appropriate contingency allowances for costing alternative projects. These matters are addressed in other submissions on behalf of MTC.

⁵ ACCC, Preliminary View, p.58.

⁶ ACCC, Preliminary View, p.58.

⁷ This matter is discussed in section 4.3.

⁸ This figure assumes a value of unserved energy of \$29,600 per MWh. An assumed value of unserved energy of \$10,000 per MWh would imply incremental benefits of \$43.5 million.

However, when analysed according to the conceptual underpinning of an ODRC valuation, the Commission's decision to exclude the cost of providing the flow controllability service potential was incorrect, since the incremental benefits of the increased transfer capability associated with flow controllability are greater than the incremental cost required to provide those benefits. The optimised replacement project – which is the starting point for an ODRC valuation – is the one that would provide the greatest net benefit to the market. The criteria for selecting the optimised replacement asset are identical to those applied in an *ex ante* sense when applying the regulatory test. An ODRC value is then derived by adjusting the cost of the optimised replacement asset to reflect any differences in the forward-looking benefits and costs associated with the optimised and actual asset.

- Accordingly, on the values accepted by the Commission, it should have concluded that the optimised asset would include flow controllability, as the benefits of adding this function (\$20 million to \$25 million) would have exceeded the incremental cost (of \$17.8 million, corrected).
- Moreover, MTC has investigated further the incremental benefits and costs associated with the provision of flow controllability since the release of the Commission's Preliminary View, which demonstrate that the net benefits associated with flow controllability are higher than suggested by MTC's preliminary estimates, referred to above. In particular, MTC's more detailed assessment of the additional transfer capability associated with flow controllability – and the market benefits associated with that additional transfer capability – suggest that controllability would increase gross market benefits by approximately \$66.1 million.

It is also noted in the report that, even if the optimised replacement project for Murraylink did not include flow controllability, a conceptually-correct ODRC valuation would imply that the value for Murraylink should be set higher to reflect the additional benefits that Murraylink would provide to the market compared to the optimal asset. Lastly, it is noted that the Commission's decision not to reflect the benefits of flow controllability in the regulatory asset base for Murraylink may make it privately profitable for MTC to reduce the level of service it provides, even though this would come at the cost of substantial benefits to the market, which is a perverse incentive. These matters are discussed in **section 4**.

Section 5 then discusses a number of other issues arising from the Commission's Preliminary View, as follows:

- *Discount rate used to estimate market benefits* – it is noted that it would be desirable for the Commission to express its opinion on the appropriate discount rate for this task given that it remains relevant for the asset valuation methodology MTC considers appropriate, because – when used in the regulatory test – it can change the ranking of projects that have different timings of expected benefits, and because the regulatory test also requires a view to be taken as to whether any of the projects would pass the regulatory test – for which the absolute estimate of present value of market benefits is relevant. The cost of capital associated with unregulated projects in the electricity supply industry that was estimated by Deloitte Touche Tohmatsu (based upon earlier work of Professor Officer) of **9.00 per cent** (real, pre tax) is assessed. It is concluded that this estimate is likely to provide a reliable estimate of the cost of capital associated with the unregulated activities in the Australian electricity supply industry. The change in discount rate from MTC’s original proposal (which was **9.25 per cent** in real, pre tax terms) reflects two changes, which were to use the value for franking benefits of 50 per cent of their face value and used by the Commission in its Preliminary View, and also to use the real risk free rate and inflation assumption that the Commission adopted in its Preliminary View. These changes are considered appropriate.
- *Appropriate Value of Unserved Energy Assumption* – it is noted that the VOLL input in MTC’s modelling of the market benefits actually is two separate inputs, namely the future price cap on the wholesale energy market (which is required to assess the extent and timing of future market entry), and the benefits to end-users from a reduction in supply outages (unserved energy). The latter value should reflect an unbiased estimate of the rise in consumer surplus associated with the reduction in expected unserved energy. The Commission’s comments in the Preliminary View, those it has made in previous matters and the views of VENCORP would suggest that the current wholesale price cap of \$10,000 per MWh is likely to *significantly understate* the customer value associated with increased reliability. A more appropriate proxy would be \$29,600 per MWh, which is the value that VENCORP uses in its own transmission planning activities. The use of the higher assumption about the customer benefits from improved supply reliability would raise MTC’s central estimate of the market benefits created by Murraylink from \$215.5 million to \$331.2 million.⁹
- *Regulatory Depreciation* – the appropriate life for calculating regulatory depreciation allowances is the economic life of the actual asset, rather than that of the optimised asset. This is necessary to ensure that the present value of expected future net income to the regulated asset equates to the regulatory asset base – the use of a longer life for an asset than its economic life may lead to investors suffering a financial shortfall. It is also noted that it is desirable for regulators to provide some flexibility over regulatory depreciation profiles in instances where a provider may have particular cash flow needs (noting that the regulatory depreciation profile does not affect the net present value of income associated with a regulated asset, merely the timing of cash flow).

⁹ These values reflect a real (pre tax) discount rate of 9 per cent, and are set in September 2003 dollars.

- *Assumption about Operating and Maintenance Costs* – consistency with the use of an ODRC valuation requires the use of a forecast of operating and maintenance expenses consistent with the actual asset rather than the optimal asset, as assumed by the Commission. The derivation of the benchmark for operating and maintenance expenses as 1.5 per cent of the capital cost of the project is unlikely to result in a reliable benchmark of operating and maintenance expenses. Any method that seeks to predict the efficient cost of operating and maintaining a network service from external data needs to take account of factors that cause the efficient cost of operating and maintaining different systems to differ. The use of only one explanatory variable for operating and maintenance expenditure is unlikely to account for such cost differences. It is also noted that there is substantial debate about whether it is possible to predict the efficient cost of undertaking an activity from external data given inadequacies in the information available, and the inherent statistical uncertainty associated with any econometric technique. An alternative – and more reliable – approach for deriving a view on the efficient cost of undertaking a particular activity is to place weight on what firms actually spend in situations where the firm has a commercial incentive to minimise cost, which is considered to be the case for Murraylink.
- *Assumption about the Extent of Environmental Impact Mitigation Measures Required* – the appropriate yardstick for the extent of environmental impact mitigation measures (such as undergrounding) to be assumed is the decision that would be taken by a profit maximising entity. That said, it may be difficult to determine the extent of measures that would be required for a hypothetical project given that the requirements are seldom observable in advance and, even when the actual decisions of approval bodies for comparable projects can be observed, it may be difficult to distinguish between *requirements* of an approval body and a proposal by a project proponent – which may only be made to satisfy the *expectations* (but not express requirements) of the relevant approval body. Given the uncertainty associated with approval bodies' likely explicit or implicit requirements, it is noted that the Commission may have no option but to undertake a probabilistic analysis of likely environmental impact mitigation requirements. Concerns the Commission may have about setting adverse precedents for the revaluation of other transmission assets could be avoided through the setting of constraints on the revaluation process. One possible constraint could be to treat the actual undergrounding of assets as *prima facie* evidence that undergrounding could have been required, but to consider that a transmission asset built without undergrounding did not require undergrounding.

2. Matters Accepted by the ACCC

The Commission's Preliminary View has accepted a number of important matters of principle that were advanced in our earlier report, and in MTC's application, two of the more important of which are:

- to accept that the ability for an MNSP to convert is consistent with the intention of the relevant clauses in the National Electricity Code and the Commission's own previous statements on the matter, and also that permitting Murraylink's conversion is likely to provide a number of benefits to the market; and
- to adopt the same methodology for assigning a regulatory value to converting assets as the Commission has used to value regulated assets generally – in particular, the rejection of the valuation method based upon the 'incremental benefits' of conversion, as had been advanced in other submissions.

Observations on these findings are made in turn.

2.1 Ability to Convert to a Regulated Interconnector

In its Preliminary View, the Commission accepted that the intention of clause 2.5.2 was to provide a market network service provider with the right to convert to regulatory status in order to ensure that investment is not inefficiently inhibited.¹⁰ It also noted that:¹¹

[b]y reducing the risks of investment faced by MNSPs, conversion encourages transmission investment in the NEM.

In addition, the Commission also noted that its own consideration of clause 2.5.2 when it was proposed for authorisation would have created an expectation that conversion would be an option:

the authorisation of the Network Pricing and MNSP code changes containing the conversion provisions provided a signal that conversion would be a possible option for an MNSP, and that the Commission would consider conversion on a case by case basis.

In addition, the Commission also accepted that the conversion of Murraylink to regulated status would be likely to result in efficiency gains, and:¹²

benefit electricity suppliers upstream and downstream of Murraylink, and subsequently, all users of those services.

These findings of the Commission are consistent with the advice in our previous report.

¹⁰ ACCC, Preliminary View, p.15.

¹¹ ACCC, Preliminary View, p.15.

¹² ACCC, Preliminary View, p.22.

In our earlier report, it was noted that the ability for a market network service to convert to a regulated interconnector was included in the National Electricity Code prior to Murraylink's construction, the Commission's statements as to how it would apply Chapter 6 to value assets in general already had been made, and that it would be expected that a reasonable investor in the NEM would have taken such a clause and associated statements into account when making investments. As a consequence, it was concluded that it was difficult to maintain that the 'conversion clause' in clause 2.5.2 of the NEC is being used by MTC in a manner that was not envisaged when the relevant clause was inserted in the NEC.¹³

The more general question is whether such a 'conversion clause' is appropriate was also considered.¹⁴ It was noted that the ability for a market network service provider to capture the market benefits that it provides to the market – and hence the profitability of these projects – depends critically on both the efficiency of the NEC provisions and the administration of those provisions. The administration of the regulatory test was identified as an important variable for a project's financial success, as well as other provisions, such as the level of the wholesale market price cap, the extent of locational signals in the market and the time intervals and other assumptions reflected in settlements.

It was concluded that, given the risk associated with the development and administration of the NEM rules – particularly while unregulated interconnectors are in the 'experimental' stage – it is not unreasonable for a 'conversion clause' to exist for MNSPs and that, without such a clause, it may well be that such investments could not be justified.

Our previous report also considered the market benefits that may flow from the conversion of Murraylink to regulated status.¹⁵ It was concluded that, when analysed objectively, the conversion of Murraylink to a regulated interconnector may enhance efficiency, and potentially enhance efficiency substantially. Two routes through which efficiency may be advanced were identified.

First, it was noted that its conversion to a regulated interconnector would remove any incentive or ability that MTC may have to withhold Murraylink's capacity from the market, and thus permit savings in the cost of generation. Secondly, it was noted that operating Murraylink on an open access basis may also provide for a more certain environment for the planning of the national electricity grid. This reflects the fact that all of Murraylink's capacity (subject to the relevant power system constraints) would be available for the independent market operator to use in a manner consistent with the solution to the (known) system optimisation algorithms, rather than the available capacity being determined by MTC's bidding behaviour.

On the last point, it was noted that the arguments of other parties to other related matters would suggest that Murraylink's conversion to a prescribed service may remove a barrier to the commercial feasibility of the unbundled SNI project proceeding in the absence of the SNI interconnect.

¹³ ACG, op cit, p.8.

¹⁴ ACG, op cit, pp.8-9.

¹⁵ ACG, op cit, pp.4-5.

Our earlier paper also addressed a key concern of market participants that the conversion of Murraylink could result in them ‘paying twice’ through regulated transmission use of system charges for the same service potential.¹⁶ An implicit assumption behind this is that a project that duplicates the service provided by Murraylink may be built and also recovered (as a prescribed service) through such charges. It was noted that – even if the service potential of the Murraylink asset was duplicated – the Commission’s approach to setting revenue caps as described in its draft Statement of Regulatory Principles should shield customers from the cost of such an inefficiency, through the application of its ODV/ODRC valuation methodology.¹⁷ That said, the conversion of Murraylink to regulated status should reduce the chance that its service potential would be duplicated, as noted already above.

2.2 Rejection of the ‘Incremental Benefits’ Valuation Methodology

In its Preliminary View, the Commission rejected an alternative asset valuation methodology proposed by some of the stakeholders to set the asset value for Murraylink such that all market participants benefit from Murraylink’s *conversion* (rather than that they benefit from its *existence*). This was referred to in our earlier paper – and by the Commission – as the ‘incremental benefits’ valuation method.

A key concern of the Commission was to encourage symmetry between the treatment of an existing asset converting under section 2.5.2 of the Code, and a new project being assessed under chapter 5. It noted that the ‘incremental benefits’ valuation method was not:¹⁸

the appropriate method for achieving symmetry between the processes used by MNSPs who apply for conversion, and transmission augmentations proposals made under chapter 5 of the code. The Commission considers that as the conversion option has been included in the code, the measurement of market benefits of an interconnector should be aligned to the intention of the regulatory test as closely as possible.

Therefore the Commission considers that it should determine the market benefits that result from having Murraylink operate as a prescribed service in the NEM.

The Commission’s decision to reject the ‘incremental benefits’ test and instead to consider the market benefits created by Murraylink’s existence (rather than its conversion) is consistent with our previous report. It is also noted that the approach to measuring market benefits accepted by the Commission, and the principle of symmetry with the regulatory test, is consistent with MTC’s proposed asset valuation methodology.

¹⁶ ACG, op cit, p.18.

¹⁷ Australian Competition and Consumer Commission, Draft Statement of Regulatory Principles, May 1999.

¹⁸ ACCC, Preliminary View, p.23.

In our earlier report, it was noted that the Commission had already made a number of statements about the method it would apply to determine the regulatory value of electricity transmission assets in general, as well as specific statements about how it would derive a value for an interconnector that converted from a market network service to a regulated interconnector.¹⁹ It was noted that those statements would have led a reasonable person to expect that the Commission would apply the same process and rules for setting revenue caps – including for regulatory asset values – to all regulated networks, irrespective of whether the network was an existing regulated network, or an asset converting to a regulated asset. One of the purposes of such statements by regulators is to provide investors with the degree of certainty about future regulatory decisions that is required to attract capital into the industry – the future regulatory valuation of assets being of key importance. Accordingly, it was noted that resiling from such commitments may have an adverse effect on investor sentiment in the industry generally, and eventually on economic efficiency.

In addition, it was also noted that, when analysed further, the ‘incremental benefits’ valuation methodology was found to have implications that are unreasonable to the owners of the converting asset, and which may undermine the original intention for permitting conversion to a regulated asset.²⁰ In particular, it was demonstrated that the ‘incremental benefits’ methodology has the effect of rewarding the owner of a converting asset for all of the market benefits that the asset creates, *except* for the benefits it was unable to capture when operated as a market network service provider. As a main justification for permitting conversion arises from the difficulty that a market network service provider may have in capturing all (or even a substantial share) of the benefits it creates, such an outcome would be counter-intuitive. It was also noted that there is little justification for – in effect – valuing assets such that participants who currently ‘free ride’ upon the benefits created by a market network service provider continue to receive the benefit from ‘free riding’ in perpetuity.

¹⁹ ACG, op cit, pp.5-7.

²⁰ ACG, op cit, pp.10-11.

3. Asset Valuation Methodologies

3.1 Introduction

This section addresses the rationale for the asset valuation methodology that MTC proposed in its original application – an Optimised Deprival Value valuation – and comments on the observations the Commission made on that methodology in its Preliminary View. The section then discusses how the Commission could address its key concern with the valuation method proposed by MTC, which was its concern with respect to the apparent uncertainty in the market benefit estimates and its apparent desire for a degree of ‘headroom’ in the net market benefits implied by the chosen regulatory asset value. Lastly, the section discusses a further issue for asset valuation that may arise from a consideration of the optimal timing of the hypothetical alternative projects to Murraylink. These issues are addressed in turn below.

3.2 Rationale for MTC’s Proposed Asset Valuation Methodology – ODV

While the Commission accepted the principle that an asset converting from an MNSP to a regulated interconnector should be valued on the same basis as existing regulated assets – and in particular, that an ODRC valuation should be used – the Commission did not accept MTC’s proposal that the estimated market benefits provided by the asset should provide another constraint on the asset value. The Commission position on this matter was expressed as follows.²¹

The Commission is not convinced that defining the gross market benefit as the economic value of Murraylink is appropriate or consistent with the intent of the regulatory test. That is, a backward deduction of the regulatory test to determine an economic value in which the NPV of opex is subtracted from the gross market benefit is not consistent with the intent of the regulatory test. The Commission therefore proposes to determine the regulatory asset value based upon the lowest cost alternative, which is akin to an ODRC method.

The Commission also noted that one of the factors important to its decision on MTC’s application was whether Murraylink was expected to deliver net market benefits:²²

A regulatory test assessment requires an augmentation to maximise the net present value of the market benefit having regard to a number of alternative projects. This chapter compares the cost of alternative projects with Murraylink. This will facilitate the Commission’s decision making process ... [because] ... the Commission must determine whether Murraylink will deliver net benefits to the market

²¹ ACCC, Preliminary View, p.40.

²² ACCC, Preliminary View, p.48. The actual statement by the Commission (which was not quoted above) defined net market benefits as ‘gross market benefits less the lifecycle operating costs’, which is in error. Net market benefits are gross market benefits (in present value terms) less the cost of the project (also discounted), the latter of which comprises capital costs and lifecycle operating costs (discounted). MTC has referred to the total cost of the project (ie capital costs and discounted lifecycle operating costs) as the ‘regulatory cost’.

From the discussion above, it would appear that the Commission was concerned to ensure that a project that cost an amount equal to the cost of the optimum alternative project would deliver net market benefits (that is, gross market benefits in excess of that cost). However, on the Commission's assumptions about the cost of the alternative projects – which MTC considers inappropriate – the ODRC value for Murraylink was less than the forecast of gross market benefits,²³ and so the Commission did not have to consider how the net market benefits constraint would be applied in cases where the forecast of gross market benefits was less than the cost of the optimum alternative project.

Accordingly, it is not clear from the Commission's Preliminary View how the Commission would set a regulatory value for an asset for which the estimated total cost of the optimal project was considered to exceed the central estimate of the gross market benefits. For MTC's initial application this issue was relevant because on MTC's central estimates of the cost of the alternative projects and future market benefits, the sum of the ODRC for Murraylink and present cost of future operating expenses would *exceed* the expected gross market benefits.

MTC recognised in its initial submission that it would be unreasonable for the estimated ODRC value for the optimal project to set the regulatory asset value for Murraylink, as this would imply that the regulatory cost of the project (the sum of the capital cost and discounted future operating costs) would exceed the market benefits created.

Rather, MTC's proposed methodology implied imposing a further constraint on the asset value, which was to cap the regulatory cost of the asset at the central estimate of its gross market benefits. Considered in terms of valuation, this methodology implied using the central estimate of gross market benefits as the economic value constraint on an asset in an Optimised Deprivation Value valuation. Considered in terms of an *ex ante* application of the regulatory test, this implied that to the extent that a subsidy to the project would have been required for it to create net benefits and so pass the regulatory test, then that subsidy would be provided by (ie the additional cost would be borne by) the financiers of the Murraylink asset, rather than other market participants.

The valuation methodology proposed by MTC is considered a valid application of the Optimised Deprivation Value methodology to an interconnect, and would be consistent with the requirements of Chapter 6 of the National Electricity Code. It is also noted that the use of gross market benefits as the economic value of a DC interconnector in an ODV estimation is consistent with the requirements for such valuations in New Zealand, the handbook for which provides as follows:²⁴

The EV of the link should be assessed in terms of its value to the system. This involves an assessment of what the system costs (i.e. both generation and transmission) would have been in the absence of any link, or with a link of different size or specification.

Moreover, this methodology results in the financiers of the project – rather than its customers – bearing the consequences of any early building, oversizing or similar concern with the actual asset in place. An implication of this method, however, is that the absolute value of the forecast market benefits remains relevant to the determination of the regulatory value for an asset converting to regulated status.

²³ The range for the market benefits that the Commission appeared to accept was \$136 million to \$300 million, with the median around \$190 million (ACCC, Preliminary View, p.47, all in present value terms). The total cost of the lowest cost alternative project was \$131.37 million (ACCC, Preliminary View, p.59, also discounted).

²⁴ Ministry of Economic Development (NZ), Handbook for Optimised Deprivation Valuation of System Fixed Assets of Electricity Lines Businesses, October 2002, p.48.

3.3 Treatment of Uncertainty in the Estimation of Gross Market Benefits

The Commission's concern with Murraylink's application of the ODV methodology – that is, to use the central estimate of the gross market benefits as the economic value cap on the regulatory asset value – appeared to be with the level of uncertainty associated with the estimation of market benefits. The Commission accepted that where a forecast of the gross market benefits associated with an asset is used as a constraint on its regulatory asset value, the output required by the analysis is a single number, rather than a range, and expressed its concern with the use of a forecast of gross market benefits for this purpose as follows:²⁵

[t]he sensitivities provided do not confirm that the base case chosen to determine the regulatory asset value is robust but indicate that the single number chosen by MTC is subject to variability. As such, the Commission considers that based on MTC's determination of a regulatory asset base using the gross market benefits derived from the regulatory test, the regulatory asset base would vary according to the input assumption, sensitivities and market development scenario.

Further it must be recognised that there are a number of key assumptions in the regulatory test which has a direct and material impact on the estimation of market benefits. This highlights that the estimation of market benefits is highly sensitive to the assumptions adopted.

At the outset, it needs to be noted that the correct application of an ODV methodology as discussed in section 3.2 above requires the use of the *expected*²⁶ net present value of market benefits as the cap on the regulatory cost of the asset.²⁷ This is because the objective of the 'economic value' constraint in an ODV valuation – as the term suggests – is to set the cap at the *value* that a network element delivers. A key implication of mainstream corporate finance is that the market values of assets reflect the expected net present value of cash flow generated. As Cochrane notes in the preface to his widely-used advanced text on asset pricing:²⁸

Asset pricing theory all stems from one simple concept presented in the first page of the first chapter of this book: price equals expected discounted payoff. The rest is elaboration, special cases, and a closet full of tricks that make the central equation useful for one or another application.

However, the Commission's concerns suggest that it would like more comfort that the regulatory asset value adopted for Murraylink is likely to provide net market benefits – either more certainty with respect to the key inputs to the estimation of gross market benefits, or for some 'headroom' to be built into the assumptions for which a degree of uncertainty is inevitable. It is noted that the Commission's concern to ensure 'headroom' in the net market benefits implied by the regulatory value for Murraylink may be consistent with the regulatory test's requirement that a proposed project generate net market benefits in 'most (although not all) credible scenarios', although the precise meaning of this requirement is unclear. It is noted again, however, that the requirement for 'headroom' in the estimate of gross market benefits is inconsistent with a correctly-estimated ODV valuation, with the level of inconsistency increasing with the level of 'headroom' sought.

²⁵ ACCC, Preliminary View, p.42.

²⁶ Expected value refers to a mathematical expectation, which is the probability-weighted average of all possible outcomes. In this paper, the phrases 'central estimate' and 'expected value' are used interchangeably.

²⁷ The regulatory cost is the sum of the regulatory asset value and present cost of future expenditure.

²⁸ Cochrane, J.H., *Asset Pricing*, 2001 (Princeton University Press, Princeton) pp.xiii-xiv.

The issue of how the Commission may reduce the uncertainty associated with the forecast of the market benefits from a project was also addressed in our earlier paper.²⁹ In that paper, it was argued that more confidence in the resulting estimate could be obtained by undertaking fewer market development and other scenarios, and placing more focus on the validity of the particular assumptions adopted.³⁰ In particular, it was noted that there is a danger that merely expanding the number of scenarios that are modelled may not enhance the accuracy of the central estimate of the forecast of market benefits.

Regarding the inputs into the estimation for which a degree of uncertainty is inevitable, it is noted that probability theory provides a basis for attaching different levels of confidence to estimates, provided that objective estimates of the probability associated with different outcomes is possible. In particular, the use of probability theory avoids placing equal weight on outcomes that may have substantially different chances of occurring.

In a submission for MTC, TransÉnergie US has demonstrated that much of the variation in the forecast gross market benefits arises from the assumption about future economic growth, for which it is possible to attach objective probabilities. Accordingly, it has proposed using probability theory to derive an estimate of gross market benefits that is consistent with different levels of confidence in the economic growth assumption.³¹ To the extent that the Commission desires a level of ‘headroom’, this proposal to select the ‘headroom’ based upon a more robust and transparent level of confidence is supported.

Regarding the precise level of confidence (or ‘headroom’) that is targeted, it is noted that this is a matter upon which judgment needs to be exercised. It is noted, however, that the high levels of confidence typically used for statistical hypothesis testing (for example, a 95 per cent level of exceedence) are to ensure that a hypothesis is only accepted if it passes a high hurdle, and in the context where there are no real consequences from setting too high a hurdle and incorrectly failing to accept the particular hypothesis being tested.³² Such norms would not appear directly relevant to the question of the appropriate level of ‘headroom’ in the estimate of gross market benefits, as a very high hurdle would appear inconsistent with the requirements of the regulatory test (that is, the reference to ‘most [although not all] credible scenarios’), and because a decision that is considered unreasonable to MTC may have implications for investor sentiment and ultimately economic efficiency.³³ Moreover, it is noted again that the more ‘headroom’ that is built into the estimate of gross market benefits, the further away is the valuation methodology from a correctly-estimated ODV.

²⁹ ACG, *op cit*, p.17.

³⁰ By way of example, the Commission should be in a position to select a central estimate of the required discount rate, just as the Commission selects a single figure for the discount rate (or cost of capital) when setting regulated charges. MTC’s proposed discount rate is discussed in section 5.1.

³¹ TransÉnergie US, Comments on Murraylink Gross Market Benefit Issues, June 2003.

³² High levels of confidence are commonplace – and quite relevant – in industrial applications of classical statistical analysis. For example, it would be expected that a manufacturer would set a very low failure rate automotive components, given the comparatively small cost of rejecting a batch of components compared to the potentially high cost associated with defective components (ie product liability and/or negligence claims).

³³ Even when applying the regulatory test to proposed projects, understating gross market benefits (ie by requiring ‘headroom’) may imply that socially beneficial projects (that is, those which have an expected present value of benefits in excess of their expected present costs) would not pass the regulatory test and may not proceed.

3.4 Implications of Alternative ‘Project Timings’

A number of presentations at the public forum noted that the regulatory test requires alternative project timings to be considered,³⁴ and that this should be factored into the derivation of the regulatory asset value for Murraylink, although none have set out a detailed methodology for taking account of different timing assumptions when deriving a regulatory value for Murraylink.

Clearly, the optimal timing of a project is relevant when applying the regulatory test to the situation for which it was designed – when assessing and ranking the desirability of the set of possible alternative projects, all of which are hypothetical at that stage.³⁵ We are unaware, however, of any Australian energy regulator having taken account of the optimal timing of the ‘notionally reconfigured system’³⁶ when deriving the regulatory value for an asset in existence. Our previous paper commented on some of the practical simplifications of the ODRC valuation methodology that Australian energy regulators (including the Commission) have made when applying this methodology for other utilities.³⁷ The objective of those comments was to draw the Commission’s attention to the difference in standards that was proposed in some submissions for the valuation of the Murraylink asset compared to the valuation of the assets of other transmission network service providers. In this context, the Commission needs to consider whether such a difference in standards is consistent with the guidance the Commission previously has provided over the valuation of an asset conversion.

Nevertheless, should the Commission wish to take account of the optimal timing of an alternative project to Murraylink when setting the regulatory value for Murraylink, the effect of the optimal timing of – or rather, a potential delay in – the in-service date of the optimal replacement for the Murraylink asset can be analysed in the context of an ODRC valuation. The conceptual underpinning of an ODRC valuation – and the intuition behind the myriad of factors that may affect a conceptually correct ODRC value – are discussed in detail in section 4.1 of this report. It is noted in that section that the objective of the ODRC methodology is to estimate the price an unconstrained investor would pay for an existing asset given the option of constructing a new (and optimal) asset. The notional second-hand value for such an asset would reflect the cost of the ‘optimal’ new asset, but adjusted to reflect all of the differences in the forward-looking cost and service potential (benefits) between the old and new assets.

In principle, as well as possibly reflecting a different technology or route, it may also be optimal to defer construction of the new asset for a period. The only implication of considering the timing of investments when undertaking an ODRC valuation is that an additional set of potential differences in the costs and benefits between the existing and new asset would also need to be considered – those being the costs and benefits associated with the optimal asset being constructed at a different time to the actual asset. If it would be optimal to defer construction of the hypothetical optimal alternative to Murraylink, the additional differences in the costs and benefits between the optimal and actual assets that would be introduced by a consideration of optimal timing are as follows:

³⁴ Australian Competition and Consumer Commission Public Forum on the Murraylink Application for Regulated Status, Adelaide, 8 July 2003.

³⁵ The regulatory test attention to the optimal timing of a project recognises that it may be efficient to defer a project even after it was expected to deliver net market benefits, as the benefit from delay (ie avoiding the cost of financing and operating the asset) may exceed the cost of delay (ie the foregone gross market benefits).

³⁶ Australian Competition and Consumer Commission, Draft Statement of Regulatory Principles, May 1999, p.xi.

³⁷ ACG, *op cit*, pp.12-17.

- *Construction cost* – as the optimal asset would be constructed in the future, its cost would be reduced (when discounted back into today’s dollars), although this benefit from delay would be offset to the extent that construction costs were rising in real terms;
- *Forward-looking operating and maintenance costs* – for the optimised asset would not be incurred until the optimal asset commenced operation, and so would be lower than the cost of operating and maintaining the existing asset (when discounted back into today’s dollars), all else constant; and
- *Benefits* – as the actual asset would be providing benefits immediately – whereas the benefits provided by the optimised asset would be deferred until it commenced operation – the benefits provided by the actual asset would be higher, all else constant. Moreover, some of the benefits could be permanently foregone if the hypothetical alternative project were delayed (for example, a network augmentation that would have been deferred if the alternative project were constructed immediately may be immediately required if the alternative project were not constructed until some time in the future).

Analytically, the derivation of an ODRC for an asset – taking into account the optimal timing of the new asset – can be expressed as follows:

$$ODRC = \frac{ORC_T}{(1+r)^T} - \left(Costs^{Actual} - \frac{Costs^{Optimal}}{(1+r)^T} \right) + \left(GMB^{Actual} - \frac{GMB^{Optimal}}{(1+r)^T} \right)$$

where it is assumed that the optimal timing of the investment is in period T. If it were optimal to construct the hypothetical alternative project immediately, then T would take a value of zero. The other variables are as follows:

- ORC_T – is the cost of constructing the optimal asset in year T (and hence needs to be discounted by T periods to express as a year zero value);
- $Costs^{Optimal}$ – is the forward-looking cost of continuing to operate and maintain the optimal asset, discounted back to a year T value (and hence needs to be discounted by another T periods to express as a year zero value);
- $Costs^{Actual}$ – is the forward-looking cost of continuing to operate and maintain the actual asset, discounted back to a year zero value;
- $GMB^{Optimal}$ – is the gross market benefits of the optimal asset, discounted back to a year T value (and hence needs to be discounted by another T periods to express as a year zero value);
- GMB^{Actual} – is the gross market benefits of the actual asset, discounted back to a year zero value; and
- r – is the discount rate.

Rearranging these terms yields:

$$(ODRC + Costs^{Actual}) = GMB^{Actual} - \left(\frac{GMB^{Optimal}}{(1+r)^T} - \left(\frac{ORC_T}{(1+r)^T} + \frac{Costs^{Optimal}}{(1+r)^T} \right) \right)$$

The first term is what MTC has referred to as the regulatory cost of the project (assuming an ODRC value is adopted), and the term in parentheses is the net market benefits provided by the optimal project (that is, the maximum net market benefits), discounted back into today's dollars. Substituting these terms implies that the regulatory cost for Murraylink, based upon an optimal-timing-adjusted-ODRC value, can be expressed as follows:

$$Regulatory\ Cost^{Actual} = GMB^{Actual} - \frac{NMB^{Optimal}}{(1+r)^T}$$

That is, the regulatory cost is given by estimated gross market benefits provided by the Murraylink project, less the net market benefits associated with the optimal project (that is, the maximum projected net market benefits), discounted back into today's dollars.

The use of an optimal-timing-adjusted-ODRC value methodology is considered to be the most appropriate methodology for taking account of optimal timing of the alternative projects to Murraylink, should the Commission consider this appropriate.

Note that, as the estimate of an ODRC value involves the estimate of the (notional) market value of an asset, all of the values adopted for the relevant costs and benefits should be the *expected* values or costs, for the reasons set out at the commencement of section 3.3.

4. Application of an Optimised Depreciated Replacement Cost Methodology

4.1 Introduction

The Commission made a number of adjustments to MTC's estimates of the cost of the alternative projects to Murraylink, addressing such matters as the likely extent of undergrounding that a profit-maximising entity would undertake and the appropriate magnitude of contingency allowances. These matters are addressed in other submissions on behalf of MTC. However, the Commission's estimation of an ODRC value for Murraylink raises important conceptual issues, which are the criteria for selecting the optimal replacement for Murraylink (or, more accurately, for deriving the level of service potential that would be optimal).

Flowing from this issue, the Commission excluded the assets that were associated with the provision of flow control over the interconnect (namely, for the AC options, the phase shifting transformers), which is a service that Murraylink provides. It is demonstrated below that, had the Commission based its assessment of the alternative project on the project that maximises the net market benefit, the evidence that it accepted on the benefits and costs of flow controllability should have lead it to include flow controllability in the alternative projects selected. This conclusion is further reinforced by MTC's more detailed estimates of the additional transfer capability – and hence market benefit – associated with the use of phase shifting transformers.

4.2 Conceptually-Correct ODRC Value

The objective of an ODRC valuation is to estimate the maximum price that a person would be willing to pay for an existing asset, given the alternative of constructing a new asset. In effect, it is an estimate of the price that an asset would sell for if that asset was traded in a liquid second-hand market (like used cars). In such a market, the value for the existing asset would reflect the cost of a new – and optimum – asset, but would also reflect all of the differences in the forward-looking benefits and costs of associated with the existing asset, compared to the new asset (all discounted to a present value or cost).³⁸

³⁸ As we discussed in our earlier report (ACG, op cit, p.12), the Commission has discussed the theoretical foundations of the ODRC valuation in similar terms: Australian Competition and Consumer Commission, Draft Statement of Principles for the Regulation of Transmission Revenues, May 1999, pp.39-40.

It also follows that the ODRC value provides an estimate of the value that existing assets that are inputs to production would have in an industry whose products are traded in a competitive market. A person wanting to enter such an industry would consider buying an existing plant as well as constructing a new plant. When comparing these options, the person would compare the forward-looking costs and benefits of the existing plant and new plant, and be prepared to pay an amount for the existing plant equal to the cost of the new plant, adjusted for any differences in the forward-looking costs and benefits associated with the existing and new plant. Moreover, prices in (long run) competitive equilibrium should be consistent with providing a reasonable return on the cost of the efficient new entrant. Given the relationship between the new entrant's costs and ODRC discussed above, prices in a (long run) competitive equilibrium will also be consistent with providing a reasonable return on the ODRC value of existing assets.³⁹

The steps to derive the conceptually-correct ODRC value are as follows:

- First, to identify the asset that would be the optimum replacement for the asset in place – if it were to be constructed today – and to estimate the (full) cost of construction. This step is equivalent to applying the ‘regulatory test’ on the assumption that the asset for which the ODRC value is being estimated is not in existence.⁴⁰
- Secondly, to identify the differences in the forward-looking benefits and costs associated with the existing asset compared to the new (optimal) asset.
- Thirdly, to adjust the estimated cost of the optimal asset to deduct (or add on) the present value of the reduced (or increased) benefits associated with the existing asset, and to deduct (or add on) the present cost of the higher (or lower) forward-looking costs associated with the existing asset compared to the optimal asset.

In analytical terms, the derivation of an ODRC value can be expressed as follows:

$$ODRC = ORC - \sum_{t=1} \frac{Cost_t^{Actual} - Cost_t^{Optimal}}{(1+r)^t} - \sum_{t=1} \frac{Benefit_t^{Optimal} - Benefit_t^{Actual}}{(1+r)^t}$$

where *ORC* is the cost of the optimal replacement of the existing asset, *r* is the discount rate, and it is assumed for simplicity that all costs and benefits are received at the end of each year.

While in many instances the forward-looking cost associated with a new asset may be expected to be lower than that of an old asset (ie just as old cars cost more to maintain), and the benefits (service potential) associated with the new asset may be expected to be higher than that of an old asset (ie new cars tend to have more features than old cars), this need not always be the case.

³⁹ It is important to understand that an ODRC valuation seeks to replicate the second-hand value of assets, on the assumption that such a market existed. In practice, the presence of substantial sunk costs and economies of scale and scope implies that such a market does not exist - indeed, if a liquid second hand market for regulated assets did exist, then there would be no rationale for regulation. Moreover, it is also assumed that the notional purchaser of an asset is able to retain all of the benefits (and also bears all of the costs) associated with the relevant asset. The degree of structural separation in the Australian electricity industry implies that it is not always possible for the provider of an asset to capture all of the benefits created.

⁴⁰ If it were considered relevant to consider the optimal timing of the hypothetical replacement project, then step 1 would also require the optimal timing of the construction of the project to be identified. The appropriate formula for an optimal timing adjusted-ODRC valuation is set out in section 3.4 of this report.

In particular, where the existing asset is considered to be overbuilt (ie contains excess capacity), the optimal asset may be sized to meet a lower level of demand. In this case, the old asset may be able to meet the future growth in demand for little or no additional cost, whereas the new ‘optimal’ asset may require substantial augmentation. The present value of the cost savings of meeting the future growth in demand with the existing asset with should imply a higher ODRC value, all else constant.

Likewise, where an existing asset is considered to have service potential that would not be reflected in the optimal asset, the existing asset may deliver benefits in excess of its optimal replacement. Again, the fact that the existing assets provides benefits in excess of the optimal asset would be reflected in the value of the existing (or actual) asset in a liquid second hand market (were such a market able to exist). Hence, the higher level of service potential of the existing asset should imply a higher ODRC value, all else constant.

The assumption in the discussion above that the ‘optimal’ asset’s gross market benefits may differ from the benefits expected from the actual asset implies that the class of alternative projects that may be considered in a conceptually-correct application of the ODRC methodology need not be constrained to projects that deliver identical levels of service. This implication raises the question of what is the breadth of the projects that should be considered when applying the conceptually-correct ODRC methodology. The relevant constraint on the breadth of the alternative projects considered is that all should projects that are strong *substitutes*. The appropriate test for the degree of substitutability between two projects is the extent to which the existence of one project reduces the gross market benefits expected from the other project. Where the expected market benefits of two projects are largely independent, neither project can be considered an alternative for the other.

4.3 Application of the ODRC Valuation Methodology to ‘Flow Controllability’ of the Murraylink Asset

Part of the Optimal Project

The question of whether the optimal replacement project to Murraylink should include the cost associated with flow controllability can be assessed within the framework of a conceptually-correct ODRC methodology.

The Commission accepted that flow controllability would provide benefits to the market, and it also accepted MTC’s preliminary estimates that the benefits from this functionality would be in the range of \$20 million to \$25 million.⁴¹ The Commission also found that the incremental cost of this functionality for Alternatives 1, 3 and 4 was approximately \$19 million plus associated costs such as interest during construction, although this contained a technical error, and should have been approximately \$17.8 million for Alternative 3, and \$23.6 million and \$23.4 million for Alternatives 1 and 4, respectively.⁴² The fourth alternative (Alternative 2) was a DC link, and so it is not possible to unbundle the flow controllability functionality.⁴³

⁴¹ MTC has re-estimated the benefits – and costs – associated with flow controllability subsequent to the release of the Preliminary View, given the significance that these benefits acquired in that decision. MTC’s revised estimate is reported below.

⁴² Attachment 2 of the Letter from Mr Mailhot (MTC) to Mr Roberts (ACCC), 17 March 2003. Attachment 2 is a Letter from Mr Touzel (Burns and Roe Worley) to Mr Mailhot (MTC), 14 March 2003. This incremental cost is the difference in the BRW’s estimated net present cost of the project with and without phase-shifting transformers, and hence includes associated costs such as interest during construction. The

The Commission determined that Alternative 3 – but adjusted to remove the phase shifting transformers (and hence flow controllability) – would be the optimal hypothetical replacement for Murraylink. However, on the figures quoted above, the removal of phase shifting transformers reduced the cost of the alternative by \$19 million plus associated costs (although this should have been \$17.8 million), but reduced gross market benefits by between \$20 million and \$25 million. Accordingly, retaining the phase shifting transformers would have added more to gross market benefits than to cost – on the values adopted by the Commission – and hence, they should have been included in the optimal alternative project.

Moreover, MTC has subsequently had the opportunity to commission more detailed studies on the load flow consequences of adding phase shifting transformers to the alternative projects,⁴⁴ and the market benefits expected from the additional transfer capability.⁴⁵ Based upon this more detailed analysis, MTC's estimate of the increase in gross market benefits caused by the increased transfer capability associated with flow controllability is \$66.1 million.⁴⁶ This analysis provides further basis for considering that flow controllability should be considered to be part of the optimal project.

The Commission's Reasoning

In its discussion of the alternative projects, the Commission noted that it:⁴⁷

feels it more appropriate to be guided by what delivers the highest net benefits to the market

This principle espoused by the Commission is correct – and consistent with the conceptually-correct ODRC valuation described above; however, it was not applied by the Commission to derive the optimal replacement of the Murraylink asset. Rather, the Commission's stated basis for excluding the assets associated with this additional service potential was that, while controllability provides benefits to the market:⁴⁸

it is *not necessary* for regulated interconnectors in the NEM [emphasis added]

and it also noted that:⁴⁹

the NEM *traditionally* has been built using AC technology [emphasis added]

differences in the 'base cost' (ie expenditure on capital equipment only) with and without phase shifting transformers for Alternatives 1, 3 and 4 were \$22.6 million, \$16.7 million and \$22.6 million, respectively.

⁴³ Flow controllability allows additional power to be transferred over the interconnect than would otherwise be possible under even normal market conditions, but especially under peak load conditions (TransÉnergie Australia, Alternative 3 Capability Without Phase Shifting Transformers, June 2003). Accordingly, the presence or otherwise of flow controllability has a direct impact on the gross market benefits associated with a project.

⁴⁴ TransÉnergie Australia, Alternative 3 Capability Without Phase Shifting Transformers, June 2003.

⁴⁵ TransÉnergieUS, Impact of Increased Transfer Capability, July 2003.

⁴⁶ This figure assumes a value of unserved energy of \$29,600 per MWh. An assumed value of unserved energy of \$10,000 per MWh would imply incremental benefits of \$43.5 million.

⁴⁷ ACCC, Preliminary View, p.55.

⁴⁸ ACCC, Preliminary View, p.58.

⁴⁹ ACCC, Preliminary View, p.58.

Neither of these principles provides a reliable basis for the selection of the optimal replacement, as required as the starting point for an ODRC valuation. Indeed, it could be argued that no augmentations to the network are ever *necessary* (from a social point of view)⁵⁰ – but rather that they may deliver benefits that exceed their costs.⁵¹ Similarly, while prudent engineering practices should be encouraged, *tradition* is likely to be less relevant for the future, particularly as networks are increasingly designed to optimise trade across the national market, rather than to suit the needs of largely independent state-based systems. Specifically with respect to flow controllability, there is nothing novel about the ‘service’ provided by the relevant equipment – all that the relevant equipment does is to increase the transfer capability across a particular part of the network – especially under peak load conditions (and thus raise the ‘market benefits’ generated), which is the same function performed by the *traditional* Australian network elements.⁵²

What if Flow controllability Was Not Optimal?

In the discussion above, it was noted that the benefits and costs of adding flow controllability adopted by the Commission implied that a flow controllability should be part of the optimal asset – and so reflected in the cost of the optimal replacement (and hence in ODRC value directly). The question arises as to what allowance should be made for the flow controllability provided by Murraylink if the cost of this function exceeded the benefits and so was not part of the optimal replacement – for example, if the incremental cost of flow controllability \$70 million rather than \$17.8 million for the optimal project.

As discussed above, the extra functionality provided by Murraylink would not be irrelevant, if the ODRC valuation was undertaken correctly. As Murraylink would provide benefits above those of the optimal replacement, the notional purchaser of Murraylink would be prepared to pay an additional amount for the existing asset, reflecting the purchaser’s valuation of the additional service potential. Thus, the appropriate adjustment would be to add an amount to the cost of the optimised asset to reflect the present value of the additional benefits provided by the existing asset. Using the figures adopted by the Commission, the required upward adjustment to the ORC value would be \$22.5 million (using the midpoint of the Commission’s range). Using MTC’s latest – and more refined – estimates of the additional benefits associated with flow controllability would imply an upward adjustment of \$66.1 million.

It should be noted that the principle that an ODRC valuation should reflect the lesser of the benefits associated with a particular element of service potential or the incremental cost associated with that service potential, applies equally to all dimensions of service potential. For example, if it were decided that the transfer capability of Murraylink was excess to requirements – and so the optimal project embodied a lower level of transfer capability and a lower cost to reflect this – it would be necessary to add the incremental benefits associated with Murraylink’s additional capacity to the cost of the optimal (lower capability) project to derive the ODRC value for Murraylink.

⁵⁰ It is noted that service providers may have to undertake certain augmentations to meet the reliability requirements of the National Electricity Code – and so those augmentations may be necessary *from that provider’s point of view*.

⁵¹ Augmentations required to maintain reliability (for example, voltage levels) arguably would provide such a large benefit that their benefits need not formally be considered, which is consistent with the treatment of such projects in chapter 5 of the Code. However, interconnection projects seldom would provide the lowest cost option for such a service (and, indeed, may impact adversely upon reliability).

⁵² The experience with the use of phase shifting transformers in the US is discussed in a separate submission commissioned by MTC: TransÉnergie US, Murraylink – Overview of Benefits of Phase Shifting Transformers, June 2003.

Practical Application of ODRC Valuations

In our earlier report, it was noted that the ODRC valuation exercises in Australia typically have adopted a number of administrative simplifications.⁵³ In particular, it was noted that the optimisation step normally takes as given the existing network architecture, and merely asks whether a lower capacity network asset would suffice to meet current demand (for example, this may involve asking whether the demand served by a transmission line rated to 500 kV could be met with a transmission line rated to 330 kV).⁵⁴ The key operational principle is that the valuation exercise begins with the asset in place, and merely asks whether there is obvious gold-plating.

An equivalent application of this principle to the flow controllability function of Murraylink would be to commence the investigation with a project that provides the same functions as Murraylink, and to ask whether it contains any obvious gold-plating. Clearly, on the figures adopted by the Commission, the flow controllability function cannot be considered to be ‘gold plating’, as the incremental benefits from this function significantly exceed its incremental costs.

A Practical Perverse Incentive

If the Commission determines an ODRC value for an asset that is based upon the delivery of an inferior level of service, clearly it would be unreasonable – and inconsistent with the ODRC valuation – to expect the actual (higher) level of service to be delivered.⁵⁵ The assets that would be used to provide the flow controllability function in the Commission’s optimal project (Alternative 3) – phase shifting transformers – can be disconnected, moved and re-sold, albeit at a loss compared to their purchase price.⁵⁶ Accordingly, if an asset owner had constructed the AC link implied by Alternative 3 and installed a phase shifting transformer (and associated equipment) to provide flow controllability, but the Commission had excluded that component from the regulatory value of the asset,⁵⁷ the owner logically would disconnect and sell the phase shifting transformers, notwithstanding the benefits that flow controllability the service provides to the market (and which would exceed the cost of the components).

⁵³ A number of other simplifying assumptions are also typically made when applying the DORC valuation methodology in practice. As an example, as discussed above, one role of the ‘depreciation’ step in the DORC valuation is to allow for differences between the forward-looking cost of operating, maintaining and replacing the ‘old’ (ie existing) asset compared to that of a ‘new’ asset (in discounted terms). Notwithstanding the theory, it has become standard practice merely to apply straight-line depreciation to the ORC value to derive the estimate of DORC.

⁵⁴ ACG, op cit, p.15.

⁵⁵ Equally, it would be unreasonable – and inconsistent with the ODRC valuation – to set the other elements of the regulatory arrangements (such as targets in a service incentive regime) inconsistent with the asset’s actual level of service potential in these circumstances.

⁵⁶ The costs associated with transportation and installation (including associated civil works) are sunk and could not be recovered through a sale to a third party.

⁵⁷ It is assumed that the Commission would not expect the flow control functionality to be provided if the relevant assets were excluded from the regulatory asset base.

In the case Murraylink, while it is a DC link and therefore does not have phase shifting transformers, MTC has the opportunity to reduce its operating and maintenance costs and extend the life of the Murraylink asset by reducing its operating range and flexibility. While the value that MTC would realise from reducing the level of service provided by Murraylink would be well below the market benefits created by flow controllability, it would be in MTC's private interest to undertake such actions if the alternative was to obtain no reward from continuing to provide a higher level of service than that reflected in the 'optimal' alternative project. As the value that MTC would be able to receive from reducing its flexibility and operating range is likely to be much less than the market benefits that would be foregone, such an action – while privately optimal – would not be socially optimal. The most appropriate means of avoiding such a perverse incentive is to apply the ODRC valuation for Murraylink correctly, and to include in the ODRC valuation the lesser of the incremental cost or incremental market benefits associated with the flow controllability function.⁵⁸

⁵⁸ The 'perverse incentive' discussed above is just an illustration of an important principle for the value of regulated assets, which is that a lower bound for the regulatory value of any assets is the value of the asset in its next best use. For many regulated assets, this alternative value may be very low, and hence seldom constrain a regulatory valuation. However, for assets that can be transported and re-sold (such as electricity transformers) and assets for which viable alternative uses exist (for example, the land required for an airport or reserved for a future transmission terminal station could be used for a housing development) the value in an alternative use may be a binding (lower) constraint.

5. Other Issues

This section comments on a number of the other findings or assumptions that the Commission adopted in its Preliminary View, namely:

- the appropriate discount rate to use when determining the present value of market benefits from a project;
- the appropriate measure of the ‘value of lost load’ when estimating the market benefits from a project;
- the Commission’s calculation of the (regulatory) depreciation allowance for the Murraylink project;
- the Commission’s derivation of the operating and maintenance expenditure forecast for Murraylink; and
- the appropriate assumption about the extent of environmental mitigation measures required for the alternative projects.

These are discussed in turn.

5.1 Discount Rate Used When Estimating Market Benefits

In its Preliminary View, the Commission noted its previous position that the discount rate used to determine the present value of market benefits should reflect the cost of capital of private investment in the electricity sector, and appeared to accept that it should reflect the cost of capital for investment in the unregulated activities in the industry. The Commission also accepted MTC’s comments that, while some of the other relevant studies have used higher or lower values than that applied by MTC, it is not clear how those rates have been calculated and it would appear that some have been selected arbitrarily.

However, the Commission also agreed with comments from other stakeholders that the discount rate has proven to be an uncontroversial parameter in the (*ex ante*) application of the regulatory test to date, as it has only been used to rank alternative projects – with the absolute values not being relevant.⁵⁹ As a result, the Commission did not appear to express a concluded view on the appropriate magnitude of the discount rate.

⁵⁹ ACCC, Preliminary View, p.43.

Notwithstanding the fact that the discount rate has not been controversial in applications of the regulatory test to date, it is appropriate that the Commission provide its guidance on what it considers is an appropriate magnitude for the discount rate for estimating the market benefits from a project for three reasons. First, as discussed in section 3, it is considered that the market benefits created by Murraylink remain relevant to MTC's application, and so the Commission's view on the discount rate remains relevant for the current matter. Secondly, the discount rate would change the rankings of alternative projects where the time path of benefits differs, which may be an issue in future applications of the regulatory test. Thirdly, the absolute value for the market benefits need not always be irrelevant for the application of the regulatory test to a new project. Even if the discount rate does not change the ranking of alternative projects, the Commission may need to form a view whether any of a set of alternative projects are expected to deliver net market benefits. The use of an arbitrarily high discount rate for this analysis would imply that the market benefits would be understated (all else constant), which could imply that socially beneficial projects may not be approved and not proceed.

In our previous paper, it was noted that the cost of capital associated with an activity is equivalent to a price that investors require to devote their investment funds to an activity. However, unlike prices for most goods and services, the cost of capital cannot simply be observed, but *can only be estimated* from the available capital market information, interpreted through a well-accepted financial model. It was noted further that MTC's estimate of the 'commercial discount rate' was based upon available capital market information, interpreted through a well-accepted financial model. In particular, the capital asset pricing model was used, which is probably the most widely used model for estimating costs of capital in the world. It was noted that the comments in other submissions did not direct the Commission to alternative and superior estimates of the cost of capital associated with the relevant activities that reflect capital market information interpreted through a well-accepted financial model.⁶⁰

MTC's revised discount rate of **9.00 per cent** (in real, pre tax terms) that was prepared for MTC by Deloitte Touche Tohmatsu (based upon earlier work of Professor Officer) has been assessed,⁶¹ and it is concluded that this is a reasonable estimate of the cost of capital associated with the unregulated activities of the Australian electricity supply industry. The reasons for this conclusion are set out, in brief, below. It is noted that MTC originally proposed the use of a discount rate of **9.25 per cent** (in real, pre tax terms). The revision in the proposed discount rate reflects two changes, which were to use a 'gamma' value of 0.5 (rather than 0.45) consistent with the value the Commission used in its Preliminary View, and also to use real risk free rate and inflation assumptions consistent with the Commission's Preliminary View.

- As noted above, the capital asset pricing model has been used to estimate the cost of capital for the activity, which is a financial model that is widely used for this purpose.

⁶⁰ ACG, op cit, p.19.

⁶¹ R. R. Officer, A Cost of Capital for Murraylink, October 2002; Deloitte Touche Tohmatsu, Regulatory Test – Murraylink Discount Rate, October 2002; and Deloitte Touche Tohmatsu, Regulatory Test – Murraylink Discount Rate, April 2003.

- The proxies for the nominal and real risk free rates were derived from redemption yields on long dated Commonwealth Government securities, and the forecast of inflation was derived as the difference between these yields (using the Fisher transformation). This methodology provides a market-based estimate of the expected return on a risk free asset and future inflation, and is considered appropriate.
- The equity (market) risk premium used of **6 per cent** is consistent with the value commonly used by Australian regulators.
- The equity beta of **1.715** was derived as the average of empirically estimated equity betas for a proxy group of Australian firms, adjusted to be consistent with the target gearing level (of 60 per cent debt-to-assets). The proxy group of Australian firms included six firms, all of which have substantial interests in unregulated electricity activities (namely, electricity generation and retailing). As noted above, primary reliance on empirical evidence from capital markets on such matters as the degree of systematic risk for a project is appropriate.
- The debt margin of **1.5 percentage points** was derived on the basis of the indicative pricing for long-dated BBB+-rated Australian corporate bonds, with the assumed credit rating consistent with observed credit ratings for Australian generation companies. The use of indicative prices for Australian corporate bonds provides an updated, market-based proxy for the cost of debt financing such an activity. The level of gearing assumed – **60 per cent** debt-to-assets is understood to be consistent with the observed gearing levels of some of the firms in the industry. That said, a variation of the assumed gearing level across a reasonable range does not have a significant effect on the estimated regulatory test discount rate, once account is taken of the relationship between gearing and equity risk.
- The assumption about the magnitude of taxation payments – which has been derived by transforming a version of after tax WACC into a pre tax WACC – is more likely to overstate than to understate the taxation liabilities associated with the relevant activities. The assumption about the value of franking credits created – **50 per cent** of their face value – reflects the value that is commonly used by Australian economic regulators, and is consistent with the advice that we provide to regulators.

It is also noted that, when assessing the cost of capital associated with investment in the unregulated activities of the electricity supply industry, the Commission needs to exercise care to distinguish between the portion of risk that is relevant to the cost of capital associated with an activity, and the portion that is not. Much of the risk that is associated with the returns to a particular asset can be eliminated at no cost, merely by holding that asset together with a broad portfolio of other assets (that is, diversification). It is only that part of the volatility that cannot be eliminated by diversification – which is generally held to be the volatility associated with economy-wide events – that affects the cost of capital. As Brealey and Myers note in their corporate finance text:⁶²

(t)here are two kinds of risk – those that you can diversify away and those you can't. you can measure the non-diversifiable, or market, risk of an investment by the extent to which the value of the investment is affected by the changes in the aggregate value of all the assets in the economy. This is called the beta of an investment. The only risks that people care about are the ones they can't get rid of – the non-diversifiable ones. This is why the required return increases in line with its beta.

The estimate of the cost of capital discussed above is consistent with an estimate that reflects only the systematic portion of the risk associated with an activity.

⁶² Brealey and Myers, Principles of Corporate Finance, 4th Edition, McGraw-Hill, 1991, p.916.

5.2 The Appropriate Value of Unserved Energy Assumption

The Commission has discussed the assumptions that have been made about the ‘value of lost load’ in MTC’s modelling of the market benefits from the Murraylink asset. In this discussion, it noted both that MTC assumed that the ‘value of lost load’ was assumed to be maintained in real terms (rather than fixed at \$10,000 per MWh in nominal terms), as well as expressing agreement with the views of others that the figure of \$10,000 per MWh is only a cap on the wholesale market price – and may understate the true value (or loss to end-users) from unserved energy.⁶³

It is noted that, in MTC’s modelling of the market benefits, there are two quite different uses for an assumption about the ‘value of lost load’:

- the first is the level of the price cap expected to apply in the wholesale market in the future – which may affect the level of new generation entry (and related benefits, such as the predicted energy savings from interconnection) in the future; and
- the second is the actual loss estimated to be suffered by end-users (ie the loss of consumer surplus) that would result from an outage – which affects directly the estimated benefit to end-users from greater reliability.

The appropriate assumption for the first of these values is an unbiased forecast of what the future wholesale price cap. Currently, the price cap is \$10,000 per MWh and has been fixed at that level since April 2002. An assumption that the wholesale price cap is retained at \$10,000 per MWh over the indefinite future would appear to be an extreme assumption, as some allowance for inflation at least should be expected in the future (even if the price cap is just updated infrequently by discreet amounts). Moreover, it would be reasonable to assume that the concerns the Commission has accepted about the ability of retailers to manage wholesale price risk should decline over time as the market matures, and that the Commission will be able to raise the price cap closer to true value of unserved energy. Notwithstanding these comments, however, modelling undertaken for MTC suggests that the effect of varying the assumed price cap on the wholesale market on the forecast of market benefits are negligible.

The appropriate assumption about the second value set out above is an unbiased estimate of the rise in consumer surplus associated with a rise in reliability (that is, the reduction in unserved energy). In particular, if market benefits from a transmission project are calculated using a value for reliability that is lower than the true customer value of unserved energy, then socially optimal transmission projects may not proceed. As VENCORP has noted:⁶⁴

It is a matter of fact that if there is a material under-estimation of the value of unserved energy in transmission investment decision evaluations, then:

- those evaluations will provide decision signals that lead to an inefficiently low level of network investment; and
- the market as a whole will be foregoing transmission investment projects that deliver benefits in excess of their costs.

⁶³ ACCC, Preliminary View, p.45.

⁶⁴ VENCORP, VENCORP’s Response to Submissions on the Value of Unserved Energy Used in Electricity Transmission Planning, May 2003, p.4.

A possible objection to the use of a value for unserved energy that is greater than the wholesale market price cap when applying the regulatory test is that new transmission projects may be approved before generation options have had an opportunity to respond to the (artificially low) market price signals. However, as the relevant alternative projects for Murraylink comprise only transmission options,⁶⁵ possible distortions in the selection of the optimal alternative to Murraylink do not arise. Moreover, while the use of a value for unserved energy that is equal to the wholesale market price cap may achieve competitive neutrality between generation and transmission, it would not promote efficiency. Rather, if generation projects are artificially constrained, then transmission augmentations become all the more valuable to customers.

The wholesale price cap – VOLL – is only relevant for the value adopted for unserved energy to the extent that the cap is considered to be an estimate of the true loss of consumer surplus from an outage. It is noted that, in setting the current level of VOLL (price cap) for the national electricity market, the Commission considered a range of matters in addition to the loss of benefits to customers from an outage – such as a desire to reduce the risks borne by retailers and to limit price spikes to customers.⁶⁶ The Commission’s Preliminary View has also drawn attention to VENCORP’s view that the wholesale market price cap of \$10,000 per MWh understates the loss of value to consumers from unserved energy, and that the true value is approximately \$29,600 per MWh,⁶⁷ with which the Commission concurred.⁶⁸

The logical implication of the Commission’s statements is that – correctly – the estimate of the customer benefit from an increase in reliability should reflect an unbiased estimate of the loss expected, and that this is likely to exceed substantially the current wholesale market price cap. It is understood that modelling for MTC suggests that the central estimate of the reliability benefits associated with Murraylink (under the base case scenario) would rise by approximately \$116 million to \$331.2 million in present value terms if the loss of consumer surplus associated with an outage is assumed to be \$29,600 per MWh, as used by VENCORP.⁶⁹

5.3 Regulatory Depreciation Allowance

It is understood that the Commission has derived a regulatory depreciation allowance for the Murraylink asset using the economic life of the ‘optimal’ asset used in its ODRC calculation, which differs from (and exceeds) the expected technical life (and hence maximum economic life) of the actual Murraylink asset.

⁶⁵ Burns and Rowe Worley considered generation options when assessing the alternative projects to Murraylink, but found generation to be significantly more expensive than transmission options (for similar levels of deliverability into South Australia) and also to not deliver certain benefits (such as the deferral of transmission augmentation in the Riverland): Burns and Rowe Worley, *TransÉnergie – Murraylink Selection and Assessment of Alternatives*, October 2002, p.21.

⁶⁶ Australian Competition and Consumer Commission, *VoLL, Capacity Mechanisms and Price Floor: Application for Authorisation*, December 2000.

⁶⁷ VENCORP, *VENCORP’s Response to Submissions on the Value of Unserved Energy Used in Transmission Planning*, May 2003, pp.6-7, 15. It is noted that VENCORP uses its higher estimate of the value of unserved energy – \$29,600 – in its own transmission planning activities.

⁶⁸ ACCC, *Preliminary View*, p.45.

⁶⁹ VENCORP, *Electricity Network Planning Criteria*, July 2003, p.2.

As a matter of principle, the economic life that is used to derive a regulatory depreciation allowance should reflect the life of the actual asset, rather than a hypothetical asset. This follows from the fact that the regulatory value of an asset – whether determined as an ODRC value or according to any other methodology – represents the present value of future income to that asset, in the eyes of the regulator. The role of the regulatory depreciation allowance, in turn, is to return that capital to the investor in the regulated asset over its life. If a life in excess of the economic life of the actual asset is used to determine the depreciation allowance, then the whole of the investment would not be expected to be recovered over its life, and hence the expected present value of the income stream would be below the regulatory asset value. It also follows that investors in that asset would suffer a shortfall, and if applied generally, may discourage investment.

- To take an extreme example, if the expected economic life of the optimised asset was 100 years – and this is used to determine the regulatory depreciation allowance – but the actual asset were only expected to remain in service for 10 years, then investors would only expect to recover one-tenth of the value of their investment by the end of the asset's life (assuming that straight line depreciation is applied). Assuming that revenue from providing regulated services would cease at the end of the asset's life, the expected present value of the future income stream would be far less than the regulatory asset value, and investors in the asset would expect to suffer a substantial shortfall.

MTC has indicated to the Commission that the Murraylink asset is designed to have an operational life of 40 years.⁷⁰

It is also noted that there are benefits from regulators providing asset owners with some flexibility over the rate of regulatory depreciation, for example, to meet the cash flow needs of the project early in its life. Provided other variables are determined consistently, while an acceleration of the rate of depreciation for regulatory purposes permits an earlier return of invested capital, it does not increase the present value of the regulated revenue stream. Recognising this, a number of other Australian regulators have provided regulated entities with flexibility over the rate at which capital is return (ie the rate of regulatory depreciation). By way of example, the then Victorian Office of the Regulator-General has commented as follows:⁷¹

The Office has noted previously that there is a degree of uncertainty associated with any estimate of economic depreciation, requiring a view to be taken upon a number of future events. It has also noted that, if provided flexibility, regulated entities should have the incentive to propose a rate of regulatory depreciation that at least keeps pace with the rate of economic depreciation.

Accordingly, in past decisions, the Office has provided regulated entities with a degree of flexibility over regulatory depreciation, relying, in the first instance, upon the entities to undertake analysis and present a case to the Office as to the most appropriate regulatory depreciation method. The Office has also stated that, for reasons of computational simplicity, it would expect that the desired rate of regulatory depreciation would be approximated by one of the simple 'rules of thumb' that are used for financial accounting purposes.

The Office proposes adopting a similar approach to regulatory depreciation when assessing the distributors' price caps for the next regulatory period.

⁷⁰ Letter from Mr Mailhot (MTC) to Mr Roberts (ACCC), 8 April 2003, p.13.

⁷¹ Office of the Regulator-General (Vic), Consultation Paper No.1: Issues for Consultation, May 2001, p.47.

Indeed, the relevant provisions governing the regulatory depreciation allowance for transmission in the gas industry (which is also regulated by the Commission) specifically directs attention to a provider's cash flow needs when deriving the regulatory depreciation allowance:⁷²

8.35 In implementing the principles [on depreciation], regard must be had to the reasonable cash flow needs for Non Capital Costs, financing cost requirements and similar needs of the Service Provider.

A degree of flexibility over the time-profile (rather than value) of the future regulated revenue stream is likely to be particularly beneficial to stand-alone, 'greenfields' projects, by permitting the use of more efficient debt financing arrangements than otherwise may be available.

5.4 Operating and Maintenance Costs for Murraylink

In its Preliminary View, the Commission set the allowance for future operating and maintenance expenditure at 1.5 per cent of the cost of constructing the 'optimal' replacement asset for Murraylink as determined by the Commission (but see the discussion in section 4, above). In reaching this decision, the Commission made a number of statements on matters of principles, which were that:

- the operating and maintenance cost benchmark should reflect the cost of operating and maintaining the optimised asset rather than the actual Murraylink asset; and
- '1.5 per cent of replacement cost' is a reliable method of deriving a forecast of the cost of operating and maintaining a specific asset.

These two propositions are discussed in turn.

Appropriate Standard for Determining the Operating and Maintenance Benchmark

As discussed in section 4.1, the objective of an ODRC valuation is to estimate the price purchase would pay for an existing asset, given the option of buying a new (optimised) asset. The process of estimating and ODRC (if undertaken according to this objective) effectively reflects any differences between the characteristics of the existing and optimised asset in the ODRC value.

To be consistent with an ODRC valuation, therefore, any assumptions about future expenditure requirements, service levels or like matters should be consistent with the asset that is actually in place, rather than the optimised asset. It is noted, however, that the formula for estimating (correctly) a ODRC value for an asset (as set out in section 4.1) implies that the forward-looking characteristics (including operating and maintenance costs) of the optimised asset remain relevant.

⁷² National Third Party Access Code for Natural Gas Pipeline Systems.

Reliability of the '1.5 per cent of Replacement Cost' Methodology

There is a range of factors that will affect the cost of providing a particular network service, which in turn imply that the efficient cost of undertaking a particular network activity will vary between firms or areas. These factors include topography, customer density and load profiles, amongst others. Moreover, the level of future operating and maintenance expenditure will depend upon such matters as the age and make-up of the firm's installed capital.

Accordingly, any methodology for estimating the efficient cost of undertaking a regulated activity using external information needs to make adjustments for the factors that may cause costs to vary across firms or areas. The potential significance to regulators from failing to allow for a firm's unique operating conditions has been illustrated with the following case study:⁷³

PEG's benchmarking results have been applied in the regulation of gas distribution in North America. One interesting application is for Boston Gas, where we performed a benchmark evaluation of the company's gas delivery costs at the outset of its indexing plan. These studies showed that, while Boston Gas' unit cost was greater than the national average, this difference was largely matched by differences in the costs predicted by our statistical model. Boston Gas used these studies to argue that it should not be subject to an "accumulated inefficiencies" adjustment in its X-Factor since the benchmarking evidence indicated that it was not efficient. When the Commission disagreed, the company appealed to the courts. The courts ruled that there was no evidentiary basis for the accumulated inefficiencies adjustment.

Any method that seeks to predict the efficient cost of providing a particular network service – taking into account the factors that may affect that efficient cost – at the very least needs to take account of the main factors that can cause such cost differences. Desirably, both the factors that are considered to cause cost – and the size of the 'loading' estimated for each of those factors – should be derived using a transparent statistical analysis, utilising sufficient information on the cost and operating conditions of relevant firms for the estimates of the efficient cost to conform to normal standards of statistical reliability.

It is considered that the Commission's model for predicting the efficient cost of operating and maintaining the optimal replacement for the Murraylink asset are unlikely to meet either of the criteria set out above.

The use of only one explanatory variable – the cost of the replacement asset – would not be expected to address all of the relevant factors that may cause the efficient cost of operating and maintaining an asset to differ across firms and areas. For example, this excludes any influence of the relative importance of the mix of installed capital (for example, the relative share of transformers to transmission lines), it ignores cost drivers that may be more important for some of the asset types (such as line length for the share of the line cost), and ignores the influence of the relative remoteness of the Murraylink (or any replacement) asset. Moreover, this simple linear predictor of operating costs ignores any fixed portion of operating and maintenance costs. The Commission itself previously has warned about the difficulties of using such simple benchmarks to predict future expenditures:⁷⁴

⁷³ Pacific Economics Group, TXU Gas Distribution Operations and Maintenance Cost Performance: Results from International Benchmarking, September 2001, p.2 (available at www.esc.vic.gov.au).

⁷⁴ Australian Competition and Consumer Commission, South Australian Transmission Network Revenue Cap: Decision, December 2002, p.85.

The Commission is aware that several factors limit the usefulness of comparing transmission companies. These include varying load profiles, load densities, asset age profiles, network designs, local regulatory requirements, topography, climate and accounting practices. The Commission notes ElectraNet's argument concerning the specific characteristics of the South Australian electricity market and its impact on benchmarking. In its draft decision the Commission understood and accepted that comparisons based on a single benchmark were not very meaningful. It noted that opex/electricity transported would show ElectraNet, which has low load density, in an adverse light compared to other TNSPs. Conversely opex/number of substation would show ElectraNet, which has a relatively high number of substations, in a favourable light.

However, different ratios can provide an indication of the reasonableness of ElectraNet's opex. Therefore the Commission undertook its own benchmarking, considering several different ratios to make a general assessment of ElectraNet's proposed opex.

For the Murraylink (or any replacement) asset, the last of the factors identified above – the fixed element of operating cost – is particularly significant, given that Murraylink's forecast of future operating and maintenance costs include the payment of connection charges to other transmission network service providers. These payments are fixed, and would be similar to the connection charges associated with the Alternative projects.⁷⁵

Secondly, it is not clear that even the Commission's simple benchmark predictor of operating and maintenance costs has a sound empirical foundation. No detailed analysis of the relevant 'ratio' has been presented by either the Commission or its advisers, and so it is not clear whether it would pass any of the normal standards of statistical reliability.

One of the challenges to any attempt to predict the efficient cost of undertaking a particular network activity in Australia is the absence of a long and reliable set of observations on the costs (expenditure) and operating conditions of relevant regulated utilities.⁷⁶ Indeed, one of the current debates in Australian regulatory circles surrounds the extent to which it is possible to attempt to derive an estimate of the efficient cost of undertaking a regulated activity solely using information that is external to a particular regulated firm (ie rather than placing weight upon that firm's own costs).⁷⁷

The alternative approach to attempting to engineer a forecast of efficient operating expenditure is to place weight on what firms actually spend as an indicator of the cost of performing that activity. To the extent that the firm in question has a commercial incentive to minimise cost, then it is possible to draw an inference that the firm's actual level of expenditure is (approximately) efficient. Such an approach is consistent with the view that the role of incentive regulation is to provide regulated entities with a 'bribe' to reveal information that otherwise would be unknown to the regulator (in this case, the efficient cost of undertaking an activity), and then to use the information gained to improve the efficiency of the regulatory process (in this case, in the determination of expenditure forecasts).

⁷⁵ Burns and Roe Worley, BRW Response to Request for Advice on ACCC Preliminary View, June 2003, pp.6-7.

⁷⁶ This can be compared to the US, where the long history of economic regulation and detailed regulatory accounting requirements have led to a good database of information for such empirical work.

⁷⁷ A related strand to this debate is whether – even if Australia had the same database of information as that which exists in the US – it would even be desirable to attempt to set prices based upon only information exogenous to a particular firm given the inherent uncertainty associated with any econometric technique. This side of the debate would argue that the incentives produced by the use of 'exogenous' prices can practicably be created under a regulatory approach that places weight on a firm's actual costs, but with less risk to such matters as levels of long term investment and efficiency in related industries.

By way of example, such an approach was recently accepted by the Victorian Essential Services Commission (then the Office of the Regulator-General), which concluded on this matter as follows:⁷⁸

The Office considers that the most appropriate approach to establishing the starting point for distributors' operating expenditure benchmarks for the next regulatory period is to rely upon the observation that distributors have a commercial incentive to minimise their expenditure levels (subject to meeting supply obligations), and so use their actual expenditure level for this purpose. Accordingly, the Office agrees with the views expressed both by the AGA and the joint industry submission to the Productivity Commission's review of the National Access Regime that this approach is less resource intensive, and will also reduce substantially any risk associated with determining the new operating expenditure benchmark. The Office also agrees with the concerns expressed by the AGA and the joint industry submission as to the practical limitations of establishing external benchmarks for cost levels that take account of the unique circumstances of the individual distributors.

In the case of the Victorian gas distributors (the subject of the quote above), the 'commercial incentive' to minimise cost derived from the use of a price-capping regime coupled with a 'carry-over' of gains from efficiency gains, which provided the businesses with additional profit if they were able to reduce costs. MTC, similarly, has commercial incentives to minimise cost. To date it has been operated as an unregulated asset, and so would benefit directly from containing cost. Moreover, even with the option to convert to regulated status, it is unlikely that such a process would have promised any reasonable person the level of certainty over the recovery of incurred expenditure such that the firm could become complacent about its expenditure levels.

Accordingly, it is considered that the ACCC would be justified – and well advised – to place weight upon Murraylink's actual operating expenditure when deriving a forecast of future expenditure requirements. In the very least, it would be appropriate for Murraylink's actual expenditure levels to be taken as the point of departure for the Commission's benchmark assumption about the efficient cost of operating the Murraylink asset.

Moreover, the 'information' provided by Murraylink's actual expenditure on operating and maintaining the Murraylink asset could also be used in the ACCC's derivation of the efficient cost of operating and maintaining the alternative projects to the Murraylink asset. In particular, it would be possible to derive forecasts of the efficient cost of operating and maintaining the alternative projects by commencing with the efficient cost of operating the Murraylink asset, and then adjusting for an estimate of the differences in the cost of operating and maintaining the different types of asset. It is likely to be a more straightforward task to estimate the *difference* in the cost of operating the alternative projects compared to Murraylink asset than it is to estimate the *whole of the cost* of operating the alternative projects.

5.5 Extent of Environmental Impact Mitigation Measures Required for the Alternative Projects

A significant issue for the Commission's assumptions of the cost of the alternative projects to Murraylink is the environmental impact mitigation measures that should be assumed when estimating the cost of those projects. In the presence of a potential environmental concern, at least two responses are possible, which are either to change the line route or to underground sections of the line (which has a higher cost than installing above ground assets).

⁷⁸ Office of the Regulator-General (Vic), 2003 Review of Gas Access Arrangements – Position Paper, September 2001, p.51.

While the Commission accepted that it was appropriate to assume a degree of undergrounding along the route traversed by one of the alternative projects to Murraylink (Alternative 1),⁷⁹ the Commission was not convinced that any undergrounding should be assumed for the other relevant projects – Alternatives 2 and 3 – and made downward adjustments to the cost of these assets of \$36 million and \$56 million.⁸⁰ MTC’s cost estimates had assumed that 25 km of the 180 km line-length of each of these projects would be required to be undergrounded.

MTC’s initial application and its various submissions have provided evidence to the Commission regarding the likely views of the relevant approval agencies for each of the alternative projects selected, which is not addressed in this report. Rather, this report comments on three issues relevant to the assumptions that should be made about the extent of undergrounding that should be factored into the cost estimates for the alternative projects, which are:

- the appropriate test for deciding whether – and to what extent – undergrounding should be assumed for a particular route;
- how the uncertainty associated with possible undergrounding requirements may be dealt with; and
- the extent to which an decision about the extent of undergrounding for an alternative to the Murraylink project should set precedents for other assets.

These are addressed in turn.

The Test for the Extent of Undergrounding

In its discussion of whether a degree of undergrounding should be assumed when estimating the cost of the alternative projects to Murraylink, the Commission has noted that:⁸¹

it is appropriate for the Commission to be guided only by the legal requirements that are relevant to each particular case

The appropriate yardstick for the assessment of the efficient cost of the alternative projects is the decision that would be taken by a profit-maximising (or cost minimising) firm. Regarding how a profit-maximising firm may make decisions about whether or not to underground, it is considered that a difference in emphasis is appropriate to the test set out by the Commission.

⁷⁹ The Commission accepted MTC’s assumption that 30km of the 210km route of the Alternative 3 project would be undergrounded: ACCC, Preliminary View, p.57.

⁸⁰ ACCC, Preliminary View, p.59. These adjustments amounted to 18 per cent and 28 per cent of MTC’s estimates of the costs of these projects, respectively. However, as Saha International Energy Ltd pointed out, these figures are likely to overstate the cost savings from using above ground lines along these routes (if permitted) as the development costs (such as the cost of obtaining environmental approval) ‘would most likely be significantly greater without tactical undergrounding’: Saha International Energy Ltd, Review of Murraylink Transmission Company Pty Ltd’s Application of the Regulatory Test, Final Report to the ACCC, February 2003, p.61.

⁸¹ ACCC, Preliminary View, p.56.

In particular, unlike, say, a revenue cap, the requirements of the relevant approval bodies for a particular project may not be known in advance, but rather have a degree of uncertainty attached to them. For matters like the preservation of environmental amenity, this uncertainty is understandable, given the less tangible nature of these values. In addition, even when the actual decisions of approval bodies for comparable projects can be observed, it may be difficult to distinguish between *requirements* of an approval body and a proposal by a project proponent – which may only be made to satisfy the *expectations* (but not express requirements) of the relevant approval body. As KBR noted in its advice to MTC:⁸²

In undertaking an environmental assessment of proposals, proponents are required to address guidelines issues by the relevant statutory authority, and in particular, the need to clearly demonstrate that the proposal takes into account the sensitivity of the area to be impacted, and can be developed and operated in a manner which minimises the impact on the environment to the greatest extent practicable.

Accordingly, the reference to the ‘legal requirements’ needs to be broadened to take account also of the expectations of an uncertain regulatory regime, and also be careful not to exclude actions that may seem voluntary but were only taken in pursuance of such expectations.⁸³

Uncertainty about the Requirements for Undergrounding

Following from the discussion above, as with the other inputs required for the estimation of an ODR value for an asset in service, there is a degree of uncertainty associated with whether – and to what extent – the cost minimising alternative project would include sections of the route that are undergrounded.

We argued in our previous paper that an appropriate response to uncertainty in general is to analyse closely and refine a base case or central estimate for uncertain parameters – reflecting a view that well-reasoned analysis can substantially narrow a plausible range. It also reflected a concern that modelling exercises that merely expand the set of scenarios examined – and, in particular, which employ the use of sophisticated techniques for which reliable inputs are not available – is unlikely to improve the robustness of the resulting estimates.⁸⁴ We continue to hold these views.

However, for the assumption about the extent of undergrounding to be factored into the cost estimate for a project, there is a limit to the extent to which further reasoned analysis can refine and generate the most reasonable assumption. This reflects the fact that, for any given line section, the assumption will be either that undergrounding is undertaken, or that it is not – there is no midpoint between to which reasoned analysis can lead.

⁸² Kellogg Brown and Root, Murraylink Alternatives Assessment: Environment and Planning Issues, February 2003, p.2-2, Attachment 6 to Letter from Mr Mailhot (MTC) to Mr Roberts (ACCC), 28 February 2003.

⁸³ It may well be in situations that undergrounding may reduce total cost (or maximise net benefits), as it reduces development costs and reduce susceptibility to damage or unavailability due to lightning strikes or storms.

⁸⁴ ACG, op cit, p.17.

As we also noted in our earlier paper, the *conceptually correct* means of factoring in uncertainty into a benefit or cost estimate is to consider the expected value or cost. With respect to undergrounding, this would imply estimating the cost associated with installing underground and aboveground assets for each relevant line section, and weighting the different cost estimates by the probability of undergrounding being required. While such an approach requires a view on the probability of undergrounding being required – which cannot be observed and is subject to uncertainty – the probability of undergrounding is a matter upon which the Commission could make a judgement, on the basis of the relevant evidence. Even if the Commission assigns a low probability of undergrounding for each relevant line segment, the use of the expected cost associated with undergrounding would provide a closer estimate of the conceptually correct value than the case where the Commission ignored undergrounding in all cases where it was considered highly likely. It is also noted that the Commission has adopted the same approach for dealing with the uncertainty associated with capital expenditure forecasts in a recent review of revenue caps for a transmission network service provider.⁸⁵

Precedents for Other TNSPs?

The Commission would be expected to be concerned about the potential for its decision in relation to the extent of undergrounding for the alternative projects to the Murraylink asset to set wider precedents that may be considered undesirable. By way of example, the Commission referred to the comments of Powerlink, who noted that Commission's view on the extent of undergrounding that is factored into the alternatives to Murraylink would flow on to the determination of the replacement cost other transmission lines – and presumably into the regulatory values for existing assets.⁸⁶ Clearly, to the extent that the prospect of such a capital gain had not been deducted from the prior regulated revenue streams,⁸⁷ such a revaluation would provide a windfall gain to the transmission network owners at the expense of consumers, which the Commission – rightly – may wish to avoid.

Any regulatory approach whereby assets are revalued according to a hypothetical and new project will cause measurement problems, the potential for windfall gains or losses and uncertainty. However, to the extent that the Commission intends to re-set the regulatory value of transmission assets at an estimate of their ODRC value at the next or subsequent revenue cap reviews, the potential for windfall gains (or losses) – and uncertainty generally – can be reduced by imposing practical constraints – or simplifications – on the valuation methodology. As discussed in our previous report, it has been common for ODRC estimates in Australia to reflect a number of simplifying assumptions,⁸⁸ and the Commission itself has referred to the manual of simplifying assumptions that are used for this purpose in New Zealand.⁸⁹

⁸⁵ See, for example, Australian Competition and Consumer Commission, Decision: South Australian Transmission Network Revenue Cap, December 2002, pp.62-67.

⁸⁶ ACCC, Preliminary View, pp.54-55.

⁸⁷ To the extent that a future revaluation were expected, the implied capital gain should be deducted from the revenue stream that is factored into the revenue caps. The ACCC's Post Tax Revenue Model deals with the annual capital gain associated with the escalation of revenue (and the underlying asset base) for inflation in this manner.

⁸⁸ ACG, *op cit*, p.15.

⁸⁹ Ministry for Economic Development, Handbook for Deprival Value System Fixed Assets of Electricity Line Businesses, October 2000.

With respect to the extent of undergrounding assumed, a reasonable practical constraint would be to assume a level of undergrounding not exceeding that which exists in practice. Stated alternatively, this would imply adopting a presumption that undergrounding could be likely to represent the least-cost option in the cases where lines have actually been undergrounded. Such a practical constraint – or simplifying assumption – would have the advantage of reducing the impact of the uncertainty on regulatory asset values with respect to environment and planning requirements for hypothetical projects.

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18 July 2003

The Directors
Murraylink Transmission Partnership
Level 11
77 Eagle Street
Brisbane QLD 4000

Dear Sirs

REGULATORY TEST DISCOUNT RATE

SCOPE AND BASIS OF REVIEW

Deloitte Touche Tohmatsu (“Deloitte”) has been engaged by TransÉnergie Australia Pty Limited (“TransÉnergie”) on behalf of the Murraylink Transmission Partnership (“MTP”) to provide accounting and financial advice and support services to assist with the preparation of a regulatory application for the Murraylink transmission project (“Murraylink”). MTP’s application was provided to the Australian Competition and Consumer Commission (“ACCC”) on 18 October 2002.

As part of this application Deloitte provided a letter to MTP titled “Regulatory Test – Murraylink Discount Rate”, dated 16 October 2002 (the “Deloitte Letter dated 16 October 2002”), which developed an estimate of the base discount rate to be applied by MTP in performing the ACCC regulatory test as part of the process to obtain regulatory approval for Murraylink (the “Regulatory Test Discount Rate”). An estimate was also required of the low and high case scenarios around this base discount rate. The following table summarises the discount rates calculated in the Deloitte Letter dated 16 October 2002 (the discount rates are a real, pre-tax weighted average cost of capital (“WACC”)):

Discount Rate	
Low	7.76%
Base	9.25%
High	10.40%

Subsequently, MTP’s application was subject to a public submissions process and a number of submissions were made that referred to the Regulatory Test Discount Rates estimated. On 4 April 2003, Deloitte provided a second letter (the “Deloitte Letter dated 4 April 2003”) to MTP in response to the matters raised in submissions relating to the Regulatory Test Discount Rate, in particular comments made by National Economic Research Associates (“NERA”) in its report commissioned by TransGrid in relation to MTP’s application.

The following table summarises the discount rates calculated in the Deloitte Letter dated 4 April 2003:

Discount Rate	
Low	7.59%
Base	9.25%
High	10.18%

The ACCC released its preliminary view on MTP's application on 14 May 2003 (the "ACCC Preliminary View"). As a result, TransÉnergie has requested Deloitte to perform the following agreed upon procedure:

1. Provide an update to MTP as to the appropriate commercial discount rate to be adopted after updating the parameters underlying the Regulatory Test Discount Rate for the information contained in the ACCC Preliminary View.

This letter reports our findings in relation to this agreed-upon procedure.

Declarations and restrictions

The scope of our work is limited to the matters set out above and governed by the terms set out in our Consultancy Agreement with TransÉnergie dated 2 July 2002.

Our procedures and enquiries did not include verification work nor constitute an audit in accordance with Australian Auditing Standards ("AUS"), nor do they constitute a review in accordance with AUS 902 applicable to review engagements. Consequently, no assurance is expressed.

This report is for the sole use of MTP in accordance with the terms of reference established by you and as such cannot be relied upon or used for any other purpose without our express written permission. We accept no responsibility to any other person in relation to the contents of this report and no other person should rely upon any statement made in this report for any purpose.

Statements and opinions contained in this letter are given in good faith but, in the preparation of this letter, Deloitte has relied upon the information provided by MTP which Deloitte believes, on reasonable grounds, to be reliable, complete and not misleading. We have not corroborated the information received. Deloitte does not imply, nor should it be construed that it has carried out any form of audit or verification on the information and records supplied to us.

This letter should be read in conjunction with the Deloitte Letter dated 16 October 2002 and the Deloitte Letter dated 4 April 2003.

ASSUMPTIONS UPDATED

Base Regulatory Test Discount Rate

The following parameters underlying the Base Regulatory Test Discount Rate have been updated for the parameters contained in the ACCC Preliminary View:

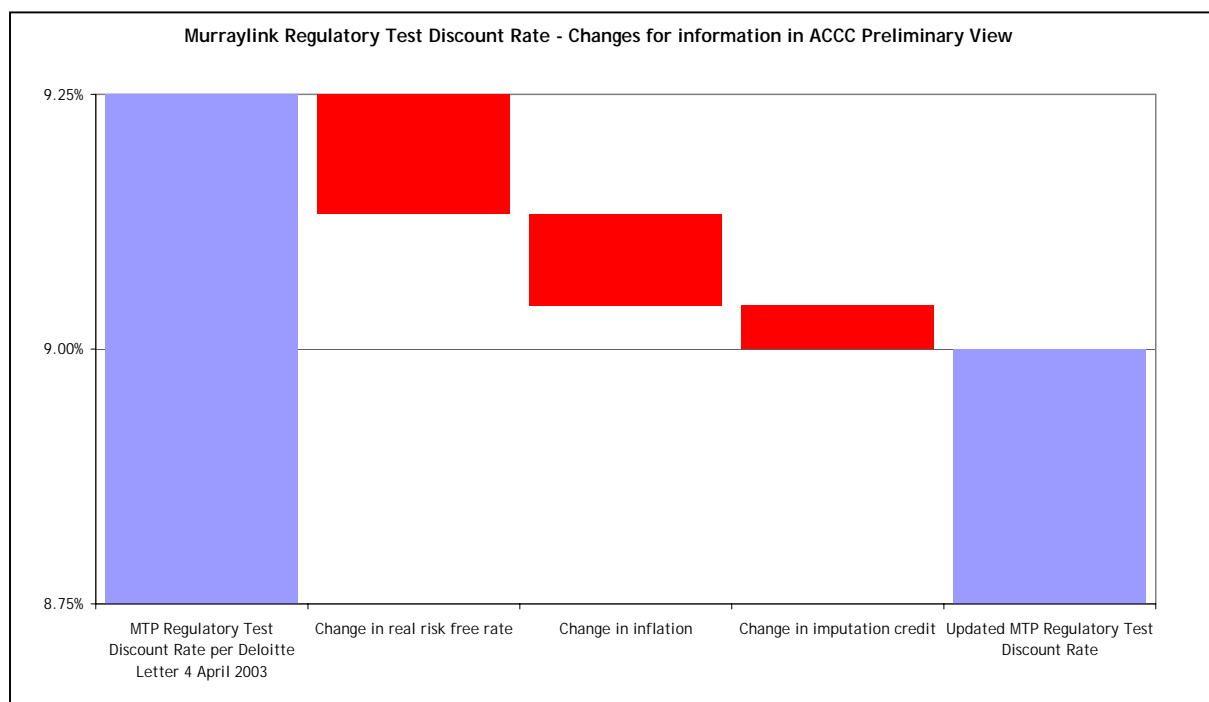
	Deloitte Letter dated 4 April 2003	Updated to ACCC Preliminary View	Change
Expected Inflation Rate	2.20%	2.11%	(0.09%)
Real Risk-Free Rate	3.13%	3.02%	(0.11%)
Value of Imputation Credits	45.00%	50.00%	5.00%

Comments

- The market risk premium and the debt funding ratio are consistent between the Deloitte Letter dated 4 April 2003 and the ACCC Preliminary View
- We note that the equity beta adopted in the ACCC Preliminary View of 1.0 reflects a value consistent with a 'regulated' participant. We have retained the equity beta of 1.715 adopted in the Deloitte Letter dated 4 April 2003 as the equity beta for a 'market' participant, consistent with the requirements of the Regulatory Test.
- The debt margin of 1.50% was not adjusted to the ACCC Preliminary View debt margin of 1.45%. The Deloitte Letter dated 16 October 2002 and the Deloitte Letter dated 4 April 2003 proposed a debt margin of 1.50% based on a BBB+ credit rating¹. The ACCC Preliminary View proposed a debt margin of 1.45% based on an A credit rating. Based on the analysis provided in the Deloitte Letter dated 4 April 2003, the credit rating of BBB+ is considered to be more appropriate for the purposes of the Regulatory Test Discount Rate, and hence the higher debt margin of 1.50% is unchanged.

¹ Refer to page 5 of the Deloitte Letter dated 4 April 2003.

The following chart highlights the impact of changes in the real risk free rate, expected inflation and the value of imputation credits on the Regulatory Test Discount Rate:



WACC parameter	Discount Rate	Change
MTC Regulatory Test Discount Rate per Deloitte Letter dated 4 April 2003	9.25%	
Change in Real Risk-Free Rate	9.13%	(0.12%)
Change in Expected Inflation	9.04%	(0.09%)
Change in Value of Imputation Credits	9.00%	(0.04%)
Updated Real, Pre-Tax Discount Rate	9.00%	

High Regulatory Test Discount Rate

The High Regulatory Test Discount Rate has increased from 10.18% in the Deloitte Letter dated 4 April 2003 to 10.27% following the decrease from 2.20% to 2.11% in the expected inflation in line with the ACCC Preliminary View.

Consistent with the methodology applied in the Deloitte Letter dated 4 April 2003 the remaining parameters are not relevant to the High Regulatory Test Discount Rate as it is based on a nominal cost of debt and nominal equity return.

Low Regulatory Test Discount Rate

In addition to the changes discussed in the Base Regulatory Test Discount Rate section above, the following changes were also made to the Low Regulatory Test Discount Rate in line with the parameters in the ACCC Preliminary View:

- Decrease in the debt premium from 1.50% to 1.45%

- Adjustment in the low case equity beta from 1.13 to 1.00
- Adjustment in the effective corporate tax rate from 30% to 20.65%

These changes result in the Low Regulatory Test Discount Rate decreasing from 7.59% in the Deloitte Letter dated 4 April 2003 to 6.72%. This rate of 6.72% is the real, pre-tax WACC as specified in the ACCC Preliminary View on page xi and is consistent with our approach of selecting the regulatory WACC as the Low Regulatory Test Discount Rate².

SUMMARY

In summary the Low, Base and High Regulatory Test Discount Rates have been adjusted in the following manner:

	Low	Base	High
Deloitte Letter dated 4 April 2003	7.59%	9.25%	10.18%
Adjustment to real risk free rate	7.53%	9.13%	No change
Adjustment to inflation	7.57%	9.04%	10.27%
Adjustment to value of imputation credits	7.47%	9.00%	No change
Adjustment to debt margin	7.44%	No change	No change
Adjustment to low case equity beta	7.00%	No change	No change
Adjustment to effective corporate tax rate	6.72%	No change	No change
Updated Discount Rates	6.72%	9.00%	10.27%

The updated parameters are summarized in the following table:

Variable	Murraylink - Low	Murraylink - Base	Murraylink - High
	Market Benefits	Market Benefits	Market Benefits
Expected Inflation Rate	2.11%	2.11%	2.11%
Real Risk-Free Rate	3.02%	3.02%	n/r
Nominal Risk-Free Rate	5.19%	5.19%	n/r
Debt Margin	1.45%	1.50%	n/r
Nominal Cost of Debt	6.64%	6.69%	9.00%
Real Cost of Debt	4.4%	4.49%	6.7%
Equity Beta	1.00	1.715	n/r
Market Risk Premium	6.00%	6.00%	n/r
Nominal Post Tax Return on Equity	11.19%	15.48%	n/r
Effective Corporate Tax Rate	20.65%	30%	n/r
Value of Imputation Credits	50%	50%	n/r
Nominal Pre Tax Return on Equity	12.48%	18.21%	18.00%
Real Pre Tax Return on Equity	10.15%	15.77%	15.56%
Debt Funding	60%	60%	60%
Real, pre-tax WACC (discount factor)	6.72%	9.00%	10.27%

Notes:

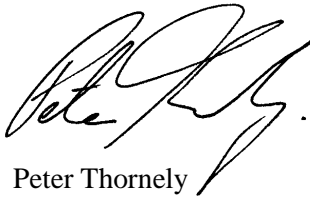
n/r: not required

² Refer to the Deloitte Letter dated 4 April 2003 page 6.

Should you have any queries or require any additional information please do not hesitate to contact Tim Emonson or myself of this office.

Yours sincerely

Deloitte Touche Tohmatsu

A handwritten signature in black ink, appearing to read 'Peter Thornely', with a stylized flourish at the end.

Peter Thornely
Partner

To Murraylink Transmission Partnership		Date July 18, 2003
Cc	Issued by J. B. Lowell	
Replaces	Subject Impact of Discount Rate, Commencement Date, and Inflation Rate on Gross Market Benefits	

Background

In October 2002 Murraylink Transmission Company (MTC) submitted an “Application for Conversion to a Prescribed Service and Maximum Allowable Revenue for 2003-2012” to the Australian Competition and Consumer Commission (ACCC). In its “Preliminary View – Murraylink Transmission Company Application for Conversion and Maximum Allowed Revenue”, the ACCC determined that changes to the inflation and various cost of money parameters initially proposed by MTC were appropriate. The cost of money parameters affect the calculation of the market discount rate, which impacts the calculation of gross market benefits. Furthermore, MTC’s original application presumed the commencement of regulated status on May 1, 2003, and this date is no longer achievable.

This memorandum presents the revised estimates of Murraylink’s gross market benefits that result from changing these assumptions.

Description of Analysis and Results

Table 1 presents the specific assumptions that are being updated. The revised market discount rate was calculated by Deloitte Touche Tohmatsu¹.

Table 1

	Assumptions	
	Original MTP Application	Revised to Reflect Preliminary View
Inflation	2.20%	2.11%
Commercial Discount Rate	9.25%	9.00%
Commencement Date	May 1, 2003	September 1, 2003

¹ “Regulatory Test Discount Rate”, memo to MTP from Peter Thornely of Deloitte Touche Tohmatsu, July 18, 2003.

Table 2 presents the revised gross market benefits reflecting these changes to the assumptions. The methodology used remains unchanged. No new market simulations using the PROSYM or MARS models were required, as the assumption changes do not affect generator dispatch or the estimation of competitive market equilibrium. The revised gross market benefits estimates are stated in September 2003 dollars as of September 1, 2003².

Table 2

		Gross Market Benefits			
		\$m			
		10000		29600	
Assumptions	Value of Unserved Energy				
	Inflation	2.20%	2.11%	2.20%	2.11%
	Commencement Date	1-May-03	1-Sep-03	1-May-03	1-Sep-03
	Discount Rate	9.25%	9.00%	9.25%	9.00%
Gross Market Benefit Results	95% Probability of Exceedence	173.9	180.5	245.1	256.8
	Expected Value	207.0	215.5	315.5	331.2
	5% Probability of Exceedence	219.6	227.8	338.7	354.3

² The 95% Probability of Exceedence (POE) and the 5% POE estimates using the original assumptions for inflation, commencement date, and commercial discount rate were presented to the Commission by TEUS at the Public Forum in Adelaide on July 8, 2003. All estimates in Table 2 include a downward adjustment of \$3.1m to reflect the impact of a January 1, 2005 implementation date for additional augmentations required to achieve Murraylink's full transfer capability.

Appendix A – Gross Market Benefits by Probability of Exceedance

Tables A1 and A2 below provide Murraylink gross market benefits using the revised inflation, discount rate, and commencement date assumptions for a range of probability of exceedance levels.

Table A1

Prob of Exceedance	Gross Market Benefits
\$29,600/MWH Value of Unserved Energy	
95.0%	256.8
90.0%	273.2
85.0%	284.3
80.0%	293.1
75.0%	300.7
70.0%	307.5
65.0%	313.8
60.0%	319.7
55.0%	325.5
Expected Value	331.2
45.0%	333.0
40.0%	334.8
35.0%	336.6
30.0%	338.6
25.0%	340.7
20.0%	343.0
15.0%	345.7
10.0%	349.2
5.0%	354.3

Table A2

Prob of Exceedance	Gross Market Benefits
\$10,000/MWH Value of Unserved Energy	
95.0%	180.5
90.0%	188.2
85.0%	193.4
80.0%	197.6
75.0%	201.2
70.0%	204.3
65.0%	207.3
60.0%	210.1
55.0%	212.8
Expected Value	215.5
45.0%	216.4
40.0%	217.4
35.0%	218.4
30.0%	219.4
25.0%	220.5
20.0%	221.8
15.0%	223.2
10.0%	225.1
5.0%	227.8

To Murraylink Transmission Partnership		Date July 16, 2003
Cc	Issued by J. B. Lowell	
Replaces	Subject Impact of Increased Transfer Capability	

Background

In October 2002 Murraylink Transmission Company submitted an “Application for Conversion to a Prescribed Service and Maximum Allowable Revenue for 2003-2012” to the Australian Competition and Consumer Commission (ACCC). The Application included several alternative projects that provided the same market benefits as Murraylink. In its “Preliminary View – Murraylink Transmission Company Application for Conversion and Maximum Allowed Revenue”, the ACCC determined that Alternative 3, an AC line from Red Cliffs to Monash, was the preferred alternative and would be used to determine Murraylink’s Regulatory Asset Value.

The Commission further indicated its belief that it was inappropriate to include the cost of phase shifting transformers (PSTs) in Alternative 3. Analysis completed recently by TransEnergie Australia (TEA)¹ has determined that without the controllability provided by PSTs, Alternative 3 would be unable to provide more than approximately 60% of Murraylink’s transfer capability into South Australia. Maximum transfer capability from South Australia to Victoria would be limited to approximately 90% of Murraylink’s capability.

Significant reductions in transfer capability will directly affect the value of the gross market benefits that Alternative 3 without PSTs (referred to herein as Alt3A) can provide. TEUS has estimated the market benefits of Alt3A to allow the value of the lost transfer capability to be quantified. The analysis and results are described below.

Description of Analysis

The TEA analysis indicates that due to the interrelationship between flows on Heywood and the parallel Alt3A interconnector, transfer limits over Alternative 3A would not be able to exceed 140 MW. In the PROSYM simulations to estimate energy benefits and market entry, the Alt3A limits were assumed to be constant over the entire year. This may overstate the benefits of the AC line, because at certain times actual limits will be lower (for example, during high Riverland load conditions).

¹ Memorandum from Brian Williams to Stéphane Mailhot, “Alternative 3 Capability Without Phase Shifting Transformers”, June 24, 2003.

TEUS simulated the energy and reliability benefits of Alt3A using the same modeling methods and assumptions used originally to estimate Murraylink's Base Case gross market benefits, with the following exceptions:

- wherever the transfer limits used for Murraylink exceeded the limits determined by TEA (140 MW), the lower TEA limits were substituted.
- Consistent with the changes in commercial discount rate, inflation rate, and regulated status commencement date as discussed in the letter from Stéphane Mailhot to the ACCC accompanying this submission, these results presume a discount rate of 9.0%, an inflation rate of 2.11%, and a commencement date of September 1, 2003. These assumptions result in Base Case gross market benefits of \$344.4m.

In all other respects, including the development of the Alt3A market entry schedule, the modeling procedures replicated the original Base Case analysis.

The lower transfer limits reduced the gross market benefits by \$66.1m, attributable to three different factors. First, energy benefits were reduced by \$16m. Second, the long-run equilibrium level of deferred merchant entry was reduced by 50 MW, lowering the market benefits by \$16m. Third, reliability benefits, measured as the reduction in unserved energy valued at \$29,600 per MWh declined by \$34m. Riverland deferral benefits were assumed to remain unchanged, although it is quite possible that the lower transfer capability of Alt3A might well shorten the deferral period and hence reduce the deferral benefit.

The total gross market benefit of Alt3A under Base Case assumptions, valuing unserved energy at \$29,600/MWh, was found to be \$278.4m. From this, TEUS concludes that the increased transfer capability made possible by the controllability provided by phase shifting transformers (which allows Alternative 3 to deliver power at levels equivalent to Murraylink) provides a benefit of \$66.1m ($= \$344.444\text{m} - \278.378m)².

Benefits of PSTs under the Extended Low Growth case (value of unserved energy = \$29,600/MWh) were found, in a similar manner, to be \$44.2m, the difference between the Extended Low Case gross market benefit of \$241.388m, and the extended Alt3A Low Case market benefits of \$197.232m. Benefits of PSTs under the High Growth case assumptions have not been evaluated by TEUS, but can reasonably be expected to be greater than or equal to the \$66.1m Base case estimate.

Similarly, with unserved energy valued at \$10,000/MWh, the total gross market benefit of Alt3A was found to be \$179.619m, as compared to the Murraylink case with benefits of \$223.135m. This implies a value of increased transfer capability of \$43.5m. For the Extended Low Growth case the value was \$32.3m ($= \$174.927\text{m} - \142.607m).

² Using the original assumptions of inflation = 2.20%, commercial discount rate = 9.25%, and a May 1, 2003 regulated status commencement date, the benefit of incremental transfer capability would be \$62.6m.

Table 1 summarizes the full range of estimates.

Table 1

Discount Rate	Inflation Rate	Commencement Date	Value of Unserved Energy \$/MWh	Case	Murraylink GMB \$m	Alt 3A GMB \$m	Value of Increm Transfer Capability \$m
9.00%	2.11%	1-Sep-03	29,600	Base	344.4	278.4	66.1
9.00%	2.11%	1-Sep-03	29,600	Extended Low	241.4	197.2	44.2
9.25%	2.20%	1-May-03	29,600	Base	328.0	265.4	62.6
9.25%	2.20%	1-May-03	29,600	Extended Low	230.7	188.8	41.9
9.00%	2.11%	1-Sep-03	10,000	Base	223.1	179.6	43.5
9.00%	2.11%	1-Sep-03	10,000	Extended Low	174.9	142.6	32.3
9.25%	2.20%	1-May-03	10,000	Base	214.2	172.7	41.5
9.25%	2.20%	1-May-03	10,000	Extended Low	168.6	137.7	30.9

An earlier conservative estimate of market benefits was submitted by TEUS in April 2003³, before having the benefit of TEA's June 24, 2003 analysis of Alt3A transfer limits. That preliminary estimate indicated the incremental value provided by PSTs was worth \$20-25m. After more detailed analysis, TEUS now believes that the figure of \$30.9m is the lowest credible bound for the range of incremental benefits provided by phase shifting transformers when added to a traditional AC interconnector between Red Cliffs and Monash.

The incremental cost of PSTs included in the original Alternative 3 is approximately \$17.8m⁴. Therefore:

- (a) the incremental benefits provided by the phase shifting transformer are highly likely to be nearly double the incremental cost;
- (b) the phase shifting transformers provide significant net market benefits; and
- (c) the phase shifting transformers are part of any optimized alternative to Murraylink.

³ "Preliminary View – Murraylink Transmission Company Application for Conversion and Maximum Allowable Revenue", 14 May 2003, p. 47.

⁴ Letter from BRW to MTC, 14 March 2003, submitted to ACCC on 17 March 2003

REASSESSMENT OF CAPITAL COSTS FOR MURRAYLINK ALTERNATIVE PROJECTS**MURRAYLINK TRANSMISSION COMPANY****Disclaimer, Limitation, Ownership and Confidentiality**

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**MURRAYLINK ALTERNATIVE PROJECT ENVIRONMENTAL IMPACT MITIGATION
WORKSHOP REPORT 5**



1 INTRODUCTION

In section 2.2.5 of its Preliminary View, the Australian Consumer and Competition Commission (“the Commission”) adjusted the alternative project capital costs submitted by the Murray Transmission Company (“MTC”). These costs had been based on Burns and Roe Worley’s (“BRW’s”) report *TransÉnergie-Murraylink Selection and assessment of alternatives* dated 16 October 2002. The adjustments made were based on the Commission’s consideration of issues associated with undergrounding and phase shifting transformers, as well as with the use of a contingency based on a P50 rather than P75 level. This consideration resulted in the associated costs being excluded for the phase shifting transformers and, with the exception of Alternative 1, for the undergrounding. Adjustments were also made to the associated interest during construction (IDC) and the profit and overhead components to reflect the impact of excluding the former costs.

BRW has provided previous advice on the inclusion of phase shifting transformers, and its implications for IDC and the profit and overhead components.¹ This report addresses the remaining issues associated with undergrounding and contingency, and reassesses the capital costs based on BRW and Worley’s response to these issues.

2 COSTING METHODOLOGY: P50 VERSUS P75

In section 2.2.5 of its Preliminary View, the Commission concludes that an efficient costing of the contingency component would not be based on anything other than a P50 analysis.

2.1 Independent Assessment Of Methodology

In responding to the Commission’s consideration, BRW sought an independent expert assessment of the appropriate determination and application of contingency to the alternative projects through the opinion of a nationally recognised cost engineering specialist, Mr Peter Downie. Mr Downie is Chairman of the Australian Cost Engineering Society (ACES) and President of the Australian Section of the Association for the Advancement of Cost Engineering International (AACE).

Mr Downie concluded that:

- The cost estimates for the alternative projects have been prepared against a defined scope and, whilst this is adequate for a selection of alternatives as carried out, the estimates do not adequately allow for risks associated with scope changes such as could arise from an EIS process (the greatest potential exposure) and other factors such as foreign exchange variations.
- The risks not adequately covered are owner’s risks as these are normally excluded from an EPC contract. An EPC contract for the works would be against a scope defined following completion of the EIS or approvals process.
- A P50 risk level would be appropriate for a clearly defined scope of works (such as would be included in an EPC contract for the lines and substations) provided that the estimate has been derived from records of historical actual costs and that a separate allowance is

¹ BRW’s letters to MTC dated 14 April 2003 and 30 June 2003.

made for the force majeure and other risks assumed by the owner including the uncertainty of scope change.

- Based on the above considerations, the estimate for the project selected as the basis for the valuation should be refined to assess the risks that could be associated with the EIS or approvals process and the potential environmental impact mitigation measures such as undergrounding. An assessment of owner's risks such as force majeure and foreign exchange exposure should also be made and added.

2.2 Reassessment of Capital Costs

BRW adopted these recommendations made by Mr Downie and used these to reassess the capital costs presented in the 16 October 2002 report. The two basic changes in methodology were:

- Assessment of an allowance for "owner's risk" to account for potential extension of time, force majeure, foreign exchange and other variations. These and other likely areas of owner's risks normally excluded from EPC projects of this nature were identified through the review of typical EPC contracts. Reasonable levels of the likelihood for these risks occurring were used in conjunction with the capital estimates to develop the owner's risk allowance. The potential prudent owners risk allowance was assessed at \$5.2 million for Alternatives 1 and 3 and \$6.2 million for Alternative 2. The additional \$1million allowance for Alternative 2 arose because of the greater foreign exchange risk associated with its additional imported component (DC converters). These allowances were included in the probabilistic risk model.

Mr Downie was consulted on both the process and assumptions made and he has provided a "sign-off" on this assessment. It should be noted that the largest potential risk identified was that associated with possible outcomes of an EIS process. This risk was deliberately excluded and has been treated separately in section 3.

- Determination of total capital costs based on a P50 risk level rather than P75. These costs were estimated using the probabilistic risk assessment Monte Carlo simulation. In this process specific contingencies have not been identified and they are implicit in the simulated total costs.

Revised P50 total capital costs for the alternative projects are indicated in Table 1 together with the equivalent P75 cost build-up from the 16 October 2002 report.

**REASSESSMENT OF CAPITAL COSTS FOR
MURRAYLINK ALTERNATIVE PROJECTS**

Table 1: Summary of alternatives attributes (original table)

Attribute	Alternative 1	Alternative 2	Alternative 3
Technical equivalence	Provides slightly lesser service than M/L.	Equal to M/L	Provides slightly lesser service than M/L
Original Report Methodology			
Base cost	\$235.5 m	\$190.2 m	\$189.4 m
Contingency	\$10.4 m	\$16.1 m	\$12.2 m
Total capital cost (P75 including IDC 9.25% disc rate, May '03 \$)	\$245.9 m	\$206.3 m	\$201.6 m
Revised Methodology			
Total capital cost (P50 including owners risk, IDC 9.25% disc rate May '03 \$)	\$245.6 m	\$203.0 m	\$201.5 m

3 REASSESSMENT OF CAPITAL COSTS FOR REVISED ENVIRONMENTAL IMPACT MITIGATION

As noted in the review by Mr Downie, the major potential risk to the total project cost is that associated with the potential level of environmental impact mitigation. This could include measures such as undergrounding, route deviations to avoid sensitive areas on alternative overhead line construction and alterations of technology, eg pole lines rather than tower lines. While there is a material probability of major environmental impact mitigation measures being incorporated in Murraylink's alternative projects, without the completion of the proponent's design and an EIS process, it is not possible to predict conclusively the extent and type of environmental impact mitigation measures that would be incorporated in the final project.

In the absence of such a process for a hypothetical project, a workshop was held on 23 June 2003 involving a range of experienced environmental advisers, government agencies, power industry representatives and community advocates to consider the alternative projects in more detail and the related potential environmental, social and community aspects. Based on this workshop, likely environmental impact mitigation measures were identified on a probabilistic basis for each segment of the routes. The results of this assessment were analysed by Worley and provided as inputs to the project risk model. A detailed report on this workshop is provided as Appendix A.

A Monte Carlo simulation was used to estimate revised total project costs at a P50 risk level and these are summarised in Table 2. For completeness and comparison with the 16 October 2002 report, O&M (unchanged) and total net present value costs have been included. At the request of MTC, total capital costs are also included based on a 9.0% real discount rate and at September 2003 price levels. In the latter case, the costs have been escalated at 4% per annum consistent with the escalation methodology used in BRW's costing of the alternative projects. Revised P50 total capital costs capital for the alternative projects are indicated in Table 1 together with the equivalent P75 cost build-up from the 16 October 2002 report. The costs are on the same basis as

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**REASSESSMENT OF CAPITAL COSTS FOR
MURRAYLINK ALTERNATIVE PROJECTS**

the costs included in the former report, i.e. with the original scope inclusive of phase shifting transformers, contractors' profit and overheads and IDC.

Table 2: Revised total capital costs based on outcome of environmental impact mitigation workshop

Attribute	Alternative 1	Alternative 2	Alternative 3
Technical equivalence	Provides slightly lesser service than M/L.	Equal to M/L	Provides slightly lesser service than M/L
Total capital cost (P50 including owner's risk, IDC 9.25% disc rate, May '03 \$)	\$261.0 m	\$215.7 m	\$214.6 m
O&M costs per annum	\$3.6 m	\$3.4 m	\$3.5 m
O&M net present over 40 years	\$39.9 m	\$37.7 m	\$38.8 m
Total net present cost (P50 including owner's risk, IDC 9.25% disc rate, May '03 \$)	\$300.9 m	\$253.4 m	\$253.4 m
Total capital cost (P50 including owners risk, IDC 9.0% disc rate Sept '03 \$)	\$263.3m	\$217.6 m	\$216.5 m
O&M costs per annum	\$3.6 m	\$3.4 m	\$3.5 m
O&M net present over 40 years (9.0% disc rate Sept '03 \$)	\$40.9 m	\$38.6 m	\$39.7 m
Total net present cost (P50 including owners risk, IDC 9.0% disc rate Sept '03 \$)	\$304.2 m	\$256.2 m	\$256.2 m

APPENDIX
MURRAYLINK ALTERNATIVE PROJECT
ENVIRONMENTAL IMPACT MITIGATION WORKSHOP
REPORT





Worley

Burns and Roe Worley

power & water expertise

**MURRAYLINK ALTERNATIVE PROJECT
ENVIRONMENTAL IMPACT MITIGATION WORKSHOP
MELBOURNE 23 JUNE 2003**

Murraylink Transmission Company

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EXECUTIVE SUMMARY

Murraylink Transmission Company (MTC) engaged Burns and Roe Worley's (BRW's) parent firm, Worley, to reassess the need for major environmental impact mitigation measures in the alternative projects. MTC has also engaged BRW to incorporate the results of Worley's analysis into its costing model for the alternative projects. This document provides the combined report of Worley and BRW.

Transmission lines can have significant environmental impacts upon flora and fauna, heritage values, the visual appearance, the land-use or other infrastructure in the areas through which they travel. All transmission lines are required to obtain some form of environmental and planning approval and all transmission lines include environmental impact mitigation measures that enable them to obtain those approvals, but that also increase their cost.

Worley gained input into its assessment of the likely environmental impact mitigation measures required for the routes of the alternative projects through a workshop involving a range of experienced environmental and government assessment advisors, community advocate and industry representatives. Worley recorded the outcomes from this workshop and analysed them on a probabilistic basis for each segment of the routes, including the potential cost impacts. Worley provided its analysis results to BRW as input to the risk assessment and costing model for the alternative projects.

The detailed analysis by the workshop resulted in recommendations for alternative mitigation measures to undergrounding in some route segments, e.g. route deviations and pole lines instead of towers. Based on a Monte Carlo simulation of the workshop outcomes, the detailed probabilistic assessment resulted in an increase in total capital costs ranging from \$12.7 to \$15.5 million when compared to the level of mitigation measures based solely on undergrounding and included in BRW's 16 October 2002 report *TransÉnergie – Murraylink: Selection and assessment of alternatives*.

1 INTRODUCTION

In October 2002, BRW prepared a report, *TransÉnergie – Murraylink: Selection and assessment of alternatives*, in which it documented its selection and assessment of alternative projects for Murraylink for the purpose of determining Murraylink's regulatory asset value. After considering a range of generation, demand-side management and transmission options, BRW selected and assessed 4 alternative projects and based its report in part upon advice from an environmental consultant, Kellogg Brown and Root (KBR), as to the most likely extent to which the alternative projects would need to include undergrounding as an environmental impact mitigation measure.

KBR was well qualified to provide such advice given that it is a highly experienced environmental consulting firm in all the relevant jurisdictions (the Commonwealth, Victoria, South Australia and New South Wales), has detailed knowledge of the local areas, has undertaken the environmental assessment and community consultation for

the development of Murraylink itself, and has advised the Victoria Government on the environmental assessment of Basslink.

Murraylink Transmission Company included the original BRW report as part of its application to the Australian Competition and Consumer Commission (ACCC) for Murraylink to be converted to regulated status.

In its Preliminary View on Murraylink's application, the ACCC:

- rejected Alternative 4 as not being sufficiently similar to Murraylink; and
- on the basis of advice from Planning SA, formed the view that:
 - an overhead line through the Bookmark Biosphere and Ramsar regions, similar to the route taken by Alternative 1, would be questionable from an environmental perspective; and
 - although Murraylink and Alternatives 2 and 3 traverse populated areas and farming communities, there is not a similar imperative for these transmission lines to be undergrounded as in densely populated areas.
- concurred with KBR's assessment of the need for undergrounding for Alternative 1, but at that stage, believed that there was insufficient evidence to suggest that undergrounding would be required for Alternatives 2 and 3.

MTC engaged BRW's parent firm Worley to reassess the need for major environmental mitigation measures in the alternative projects with the involvement of range of representatives from the community, the electricity network service industry, government agencies, and a number of relevant environmental and legal experts.

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 - although Murraylink and Alternatives 2 and 3 traverse populated areas and farming communities, there is not a similar imperative for these transmission lines to be undergrounded as in densely populated areas.
- concurred with KBR's assessment of the need for undergrounding for Alternative 1, but at that stage, believed that there was insufficient evidence to suggest that undergrounding would be required for Alternatives 2 and 3.

MTC engaged BRW's parent firm Worley to reassess the need for major environmental mitigation measures in the alternative projects with the involvement of a range of representatives from the community, the electricity network service industry, government agencies, and a number of relevant environmental and legal experts.

Worley is a leading provider of professional services to the energy, resource and complex process industries. Worley provides services for the full spectrum of a project's life from concept selection to front-end and detailed design on behalf of a blue chip client base. The Worley Group commenced operations over 25 years ago and now employs over 4,000 people in 39 office locations worldwide in the Asia Pacific, Middle East and United States.

Worley Safety and Risk Management is a provider of specialised risk management consultancy services. Using techniques based on proven, structured risk management processes, clients are provided with a range of services including:

- detailed safety and risk engineering of complex process plants, including the development of safety cases for major hazardous facilities;
- crisis management and emergency management systems and training (including emergency simulation); and
- project risk management systems, including qualitative and quantitative risk analysis.

Using quantitative risk analysis, Worley Safety and Risk Management produces detailed probabilistic mathematical models of projects, in terms of project cost and schedule and as such Worley is well qualified to carry out this reassessment of the environmental impact mitigation measures and their likely impact on costs for the alternative projects.

MTC has also engaged BRW to incorporate the results of Worley's analysis into its costing model for the alternative projects. This document provides the combined report of Worley and BRW.

2 DESIGN AND DEVELOPMENT OF A TRANSMISSION LINE

Transmission lines can have significant environmental impacts on flora and fauna, heritage values, the visual appearance, the land-use or other infrastructure in the areas through which they travel. The cost of any transmission line project depends substantially on the distance between its start and end points, its electrical requirements, and the extent to which environmental impact mitigation measures are incorporated into the project design. All transmission lines are required to obtain some form of environmental and planning approval and all transmission lines include environmental impact mitigation measures that enable them to obtain those approvals, but that also increase their cost. These measures could include, but are not limited to, avoidance of environmentally sensitive areas, adoption of poles rather than towers, and incorporation of tactical undergrounding.

Profit-seeking transmission line proponents have no wish to include costs in their projects that are not justified. However, it is apparent from recent experience of transmission line development in Australia, that transmission line proponents examine the potential environmental impacts that their proposed transmission lines could have and take them

into account even from the earliest stages of the project. The proponent would then decide to include or refine major environmental impact mitigation measures in the transmission line design:

- during the initial design stage;
- during consultation with the local community, environmental experts and government agencies before and during the environment and planning approval processes; and
- very occasionally, as a result of explicit conditions that an environmental or planning approval body may impose.

Recent examples include the following.

As a result of its consideration of the sensitive environment in the Victorian Alps and potential impacts, TXU decided at the initial design stage to place its 46 km power line from Springs Saddle to Mt Hotham line underground. TXU developed a detailed Construction Environmental Management Plan that contained strategies and processes specifically developed for this project to minimise potential environmental impacts during and after construction. TXU's achievements on this project were recognised by its being awarded the national Australian and Energy Environmental Foundation Excellence Award for outstanding contribution to sustainable development.¹

After two years of community consultation on the Portland Wind Energy Project, Pacific Hydro decided to amend the design of its wind energy project to incorporate additional environmental impact mitigation measures, for example, to place power lines underground and adjacent to access road to minimise impact upon native vegetation. In her Assessment, the Victorian Minister for Planning acknowledged this undergrounding and rerouting.² In addition, the Minister specifically declined to issue a permit in relation to the seven wind turbines that Pacific Hydro planned to construct at the tip of Cape Bridgewater due to its impact on "valued landscapes".

Basslink Pty Ltd made major and costly changes to its project design during its environmental assessment to reduce environmental impact. Again, in her Assessment, the Minister for Planning acknowledged some of the changes that were proposed by the proponent in its revised design.³ The changes acknowledged by the Minister included the addition of a metallic return for the undersea cable across Bass Strait, the resiting of a converter station, the use of poles rather than towers, and horizontal direct drilling across the shoreline. Further, the Minister accepted the Basslink Joint Advisory Panel's recommendation to require specifically additional changes for the project to proceed, in particular, 6.5 km of additional undergrounding through the West Giffard coastal plan along a different line route, even though these additional changes had been resisted by the proponent.

¹ TXU Australia, *Environmental Report 2001*.

² Minister for Planning, *Assessment: Portland Wind Energy Project*, August 2002.

Murraylink includes a transmission line that has been placed underground for its entire length. However, if another proponent developed Murraylink's hypothetical replacement, this proponent may propose a different technology, route or other major environmental impact mitigation measures to those employed by MTC to enable it to gain its environmental approvals.

While legislation describing the environmental, planning and assessment processes is extensive and there are several guidelines and policies that need to be taken into account when these processes are conducted, there is no government policy or legislation in any of the relevant jurisdictions that requires specifically any particular environmental mitigation method to be incorporated into a transmission line project. Each project is considered on its merits based on criteria and assessment process set down in legislation and guidelines with regard to local conditions and community concerns.

Predicting conclusively the precise outcome of proponent's design judgements and a long and extensive environment and planning consultation and assessment process with any reasonable level of confidence is impossible. That is, there is a significant amount of uncertainty associated with the question: *What configuration (route, technology, and overhead or underground lines) would a proponent of Murraylink's hypothetical replacement include in its project to obtain its environmental and planning approvals?* Without conducting the full environment and planning consultation and assessment process, this question can only be answered in terms of a set of likely outcomes and probabilities.

³ Minister for Planning, *Assessment: Basslink Electricity Interconnector*, September 2002.

3 METHODOLOGY

To develop an appropriate set of likely outcomes for the configurations of Alternatives 1, 2 and 3, to soundly estimate their probabilities and to determine their ultimate cost impacts, Worley and BRW conducted an independent probabilistic assessment.

Worley's methodology involved:

- Preparing a document that described the proposed two routes of the alternative projects (the "preferred route" being that for Alternatives 2 and 3, and the "alternative route" being that for Alternative 1);
- Providing that document to a range of relevant and experienced community representatives, government officials, consultants and industry experts;
- On Monday 23rd June 2003, bringing those community representatives, government officials, consultants and industry experts together in a workshop to seek from them their collective and individual views about each section of the hypothetical transmission lines, and issues of environmental sensitivity, planning limitations and impact mitigation measures, and to agree on the range of possible environmental impact mitigation outcomes;
- Facilitating agreement among the community representatives, consultants and industry experts at the workshop as to the probabilities associated with each environmental impact mitigation possible outcome⁴; and
- Analysing the outcomes of the workshop and preparing quantitative inputs that describe the possible outcomes for major environmental impact mitigation measures for BRW to include in its project costing model.

BRW applied Worley's quantitative inputs and recosted the alternative projects to account for workshop outcomes.

4 THE WORKSHOP

4.1 Preparatory Documentation

In conjunction with BRW, Freehills and KBR, Worley prepared preparatory documentation setting out:

- purpose of the workshop;
- assumptions for the workshop;
- methodology to be employed;
- detailed maps showing the constraints that would be experienced by the alternative projects in terms of land use, agricultural, and protected areas;
- anticipated environmental assessment and planning approval processes;

- typical 220 kV transmission line construction including photographs of similar lines in the area; and
- proposed segmentation of the preferred route and alternative routes for the workshop's analysis purposes.

The attachments to the preparatory documentation have been reproduced in the report for completeness and consistency.

Worley provided this preparatory documentation to workshop participants four days prior to the workshop.

4.2 Workshop Agenda

The agenda for the workshop has been included as Attachment 1. Broadly the workshop fell into two stages.

The first stage of "setting the scene" involved briefing participants on the background to the workshop, assumptions, details of the preferred and alternative routes, a likely planning and approvals process and the methodology to be used in the analysis of the outcomes.

The second stage involved an assessment of the route on a segment-by-segment basis to identify the likely need for and extent of major environmental impact mitigation measures.

4.3 Workshop Participants

Invitations were issued to representatives of relevant government agencies, assessment advisers, community advocates and the electricity industry. Worley sought the involvement of agencies, organisations or individuals who had recent relevant experience in similar projects and processes, such as the Basslink inquiry, as well as those with knowledge of local sensitivities and issues.

Chairman

- Rod Touzel – General Manager Consulting, Burns and Roe Worley

Rod Touzel is the General Manager Consulting of Burns and Roe Worley (BRW) and in this capacity he is responsible for the company's consulting activities in the power and water industries throughout Australia. He has over 37 years experience in the power industry covering power generation, transmission and distribution within Australia and Asia/South East Asia. Mr Touzel was formerly Managing Director of SECV International prior to its acquisition by BRW in 1995. Within the former State Electricity Commission of Victoria, he held senior management positions responsible for power station design and project planning. In his role of Manager Project Development for the Commission, he was

⁴ While representatives of government agencies participated actively in the workshop, they indicated that they were not in a position to provide explicit advice on the probabilities associated with possible outcomes.

responsible for the planning and environmental approval phases of all new generation and related mining projects.

Facilitator

- Dr Patrick Tuohey – Executive Director Risk Management, Worley

Dr. Patrick Tuohey is the Executive Director of Worley responsible for Risk Management. A Chemical Engineer, he has over 20 years' experience in engineering consulting in Australia and South East Asia, with a particular focus on commercial and business risk management for major resource industry projects. Dr Tuohey is the sponsor behind Worley's Risk Management Process, which has been used to good effect on a number of significant projects. Dr. Tuohey provides risk management consultancy services extensively to internal and external customers of Worley, both within Australia and overseas.

Analyst and Modeller

- Andrew Jameson – Principal, Risk Management, Worley

Andrew Jameson is Principal of the Risk Management Group at Worley. His group provides project risk management services to Worley projects and directly to Worley's clients. He specializes in project risk management, decision analysis, risk allocation and risk financing, and the quantitative risk assessment of cost and schedule risk. Mr Jameson holds an honours degree in chemical engineering and a Masters degree in finance from the University of Melbourne. He is a chartered chemical engineer and State Chairman of the Institution of Chemical Engineers; a chartered finance and treasury professional; and holds the Enterprise Risk portfolio on the Finance and Treasury Association's technical committee. He was previously Principal of Aon's risk management consulting practice in Melbourne.

Assessment advisors and community advocates

- Alistair Sharp-Paul – Director, NSR Environmental Consultants

Alastair Sharp-Paul has been a director of the Melbourne-based international consultancy firm NSR since 1974. He is the author of 25 environmental impact statements for resource and infrastructure projects in Australia and overseas and has led environmental teams in five commissions of inquiry, two panel hearings, one private land use inquiry, litigation and negotiations over terms of reference, conditions of approval and offsets. He is a graduate of Cambridge University, a fellow of the Environment Institute of Australia and New Zealand and a member of the Australasian Institute of Mining and Metallurgy. Mr Sharp-Paul was engaged by National Grid as its Project Director for the environmental assessment of Basslink.

- John Ashe – Consultant

John Ashe is formerly Assistant Secretary with the Commonwealth Department of the Environment, Sport & Territories, Environment Assessment Branch and was appointed to the Basslink Joint Advisory Panel by the Commonwealth Government. He is an environmental consultant with skills and experience in advising and assisting clients in the private and public sectors on environmental

legislation and government approval processes. Mr Ashe has a thorough knowledge of environmental impact assessment and government approval processes acquired as a senior executive in the federal Environment Department and through subsequent statutory appointments and consultancy assignments. He has an excellent practical understanding of environmental protection in Australia and extensive experience in advising governments and working cooperatively and effectively with State and Territory governments in relation to environmental assessments and approvals. Also, Mr Ashe has trained as an environmental management systems auditor.

- **Leonie Burrows – Consultant**
Leonie Burrows was Chief Executive Officer of the Mildura Rural City Council until March 2003 and is currently Principal Consultant and Director of a consulting service which specialises in management consulting. She has 23 years senior management experience in Local Government in Victoria. Her interests include: regional development, community development / consultation, economic development, governance, community services, and organisational development. Prior to the workshop, Leonie consulted the current Chief Executive Officer of the Mildura Rural City Council and brought forward Council's views
- **Jenny Barnett – Research Officer, Victorian National Parks Association**
Jenny Barnett is the Research Officer for the National Parks Association, a position she has held for fifteen years. She investigates and responds to land-use issues that impact on flora and fauna such as land clearing, mining, grazing forestry fire management and development proposals etc., both inside and outside of Parks. Jenny has a Master of Science in Zoology from Monash University and has also worked in a range of university biological and medical departments. Ms Barnett played an active role in community consultation process conducted the environmental assessment of Basslink and TXU's line through the Alpine National Park.
- **Jackie Boyer – Manager, Environment & Water Resources, KBR**
Ms Boyer has 18 years' experience in environmental impact assessment, environmental planning, environmental management, and environmental policy matters. Her experience has been gained working with a wide range of interests—from State and local government, industry and academic institutions to landowners, community groups and the general public. She has worked on the environmental assessment and management of a range of development projects in Victoria and Western Australia; and has managed multidisciplinary teams in the conduct of studies which have resulted in the granting of environmental and planning approvals. She has also managed and undertaken Environmental monitoring, audits and site assessments. Ms Boyer advised the Victorian Government on the environmental assessment of Basslink and has detailed knowledge of the local ecological, social and heritage values in the Sunraysia and Riverland areas as she was the environmental consultant for the development of Murraylink.
- **Tim Power – Partner, Freehills**

Tim Power is a Partner of Freehills and holds a Master of Laws Degree from the Australian Centre for Environmental Law, University of Adelaide. He specialises in environmental, planning and native title law and has advised and assisted clients on the environmental assessment of a number of complex projects in Victoria. These include acting for the proponents of the Basslink and Murraylink electricity interconnectors, the Portland Wind Energy Project, the Patricia Baleen gasfield and pipeline project in eastern Victoria, the gas underground storage project in western Victoria, a proposed hydro-electric power station in Alpine national park, and the Port Phillip channel dredging project. He also has significant experience working in other jurisdictions. He advised Santos on environmental issues associated with its Cooper Basin development, the proponent of a nickel mine in Indonesia on environmental impact assessment and tailings management issues, and the financier and sponsor of a power station and gas pipeline in Western Australia. Tim is a former executive member of the National Environmental Law Association and the Sustainability Committee of the Property Council of Australia, and is also a member of the Victorian Planning and Environmental Law Association

Commonwealth and State Government Agencies

- Trevor Blake - Manager, Environmental Assessment Projects, Department of Environment and Sustainability, Victoria

Trevor Blake has been Manager Environmental Assessment Projects for six years and has been responsible for the assessment of many major projects in Victoria during that period including Basslink, and the Portland and the Nirranda Wind Energy Projects. He is currently leading the review of environment assessment procedures in Victoria. Trevor previously worked on environment protection policy with the Victorian Environment Protection Authority, as a lecturer at Monash and Deakin Universities, and as an environmental planner and consultant. He holds a First Class Honours degree in Science and a Master of Environmental Studies from the University of Melbourne.

- Dr John Cooke – Manager Sunraysia, Department of Sustainability and Environment, Victoria

As Manager Sunraysia Dr Cooke manages the Department's relationships with key organisations, in particular, local Government, and water authorities and catchment management authorities at Mildura, in north west Victoria. He is responsible for coordinating the Department's response to planning applications for infrastructure work in that area. Dr Cooke specialises in land and water management and has published a number of papers relevant to efficient use of natural resources. He represents Victoria on a number of advisory and planning committees relevant to salt and water management. He also advises on infrastructure development projects initiated by the Murray Darling Basin Commission.

- Michael Hodder – Department of Water, Land and Biodiversity Conservation South Australia. (Participated by telephone conferencing during consideration of South Australian segments of alternative project routes).

Lee Webb, Senior Environmental Officer of Planning SA had accepted an invitation to participate in the workshop but was unable to attend due to illness. The workshop took into account Lee Webb's letter to the Commission of 3 April 2003.

Two other government officials were unable to attend and provided advice by e-mail that the workshop considered - Attachment 10. These officials were:

- Gary Niewand - Senior Policy Officer, Public Land Management - Parks, Vic. Department of Sustainability and Environment; and
- Fiona Donohue – Department of Water, Land and Biodiversity Conservation South Australia.

Electricity industry representatives

- Andrew Randall - Investment Planning Manager, TXU Networks

Andrew Randall is Investment Planning and Risk Manager for TXU Networks. He has been in this role for two years after spending seven years with KPMG in their auditing and assurance division. In Andrew's current role he is responsible for balancing the cost, performance and risk of running TXU's gas and electricity networks. He holds an honours degree in Electrical & Electronic Engineering and is a member of the Institute of Chartered Accountants in England and Wales.

- Dr Harry Schaap – Assistant Director, Environment and Sustainable Energy Electricity, Supply Association of Australia

Dr Schaap has more than 30 years experience in the electricity supply industry in the areas of research and development, strategic planning, environmental management and sustainable energy development, including greenhouse issues management. He is a Board member of the Sustainable Energy Authority of Victoria and a member of three International Energy Agency committees

- Mike Farr – Project Director, TransÉnergie Australia

Mike Farr is Project Director for all of TransÉnergie's projects within Australia. Mike has more than 25 years experience in the Australian transmission and distribution industry and has been actively involved in many aspects of industry reform. He has extensive experience in both demand and supply side planning. Mike gained first hand experience in both the public and private sectors and has consulted in the competitive electricity market and other aspects of the deregulated electricity industry. In this capacity, he worked with regulators, distribution and transmission network service providers, retailers and end use customers in most Australian states. As Project Director for Murraylink, Mr Farr oversaw all aspects of project development; from inception, through the permit and community consultation phase, to EPC contract negotiations and project construction and commissioning.

Observers

- Stéphane Mailhot - CEO, Murraylink Transmission Company
- David Downie – Managing Director, DGJ Projects
- Marjorie Cutting - Senior Environmental Planner, KBR
- Sandra Gamble – Senior Associate, The Allen Consulting Group
- Sowmya Rao – Engineer, BRW

Richard Matton of the Commonwealth Department of Industry, Tourism and Resources had accepted an invitation to participate but was unable to attend because of the closure of Canberra Airport on the day due to fog.

4.4 Assumptions

The workshop was asked to consider the matters that would usually be considered in environmental assessment and planning approval processes. However, these processes can be very complex. Worley set down a number of simplifying assumptions to enable the workshop to focus its discussion upon the significant matters that would have a material impact upon the two projects that had been designated for analysis.

4.4.1 Need for a Transmission Line

Environmental assessment and planning approvals processes for transmission lines often include the consideration of the need for the line. Rod Touzel of BRW asked the workshop to make the assumption that an AC transmission line is required and that the “preferred route” (generally along the route of Alternatives 2 and 3 of the alternative projects identified by BRW) and the “alternative route” (generally along the route of Alternative 1) are the only feasible options.

4.4.2 Route selection and potential environmental issues

Ms Jackie Boyer of KBR made a presentation that highlighted the manner in the preferred and alternative routes were selected. These routes are shown on the constraint maps included as Attachments 2, 3 and 4 showing land use, agriculture and protected areas. She identified the broad environmental and social issues that would be associated with an overhead transmission line development in this region as being:

- clearing of native vegetation and fauna habitats;
- fragmentation of remnant vegetation, habitats and reserves;
- direct impacts on fauna (e.g. birdstrike);
- EMF (electromagnetic fields) and its perceived health effects;
- visual impacts; and
- fragmentation of land tenure and effects on property management.

The potential sensitive environmental areas and social impacts along the preferred route identified were:

- community and landowner concerns regarding the potential impacts on horticultural and farming practices and loss of land (Loxton, Lyrup, Red Cliffs in particular, but also broad-acre areas);
- visual impacts from the tower structures and lines;
- the Murray River and associated reserves;
- Lyrup Flats - environmental (major fauna habitat) and heritage issues, Bookmark Biosphere);
- the Sunset National Park (values and specific approval requirements, size of the park);
- farmer opposition in broadacre areas based on previous experience with infrastructure projects;
- expanding irrigated horticulture in and around Red Cliffs;
- residential development in and around Red Cliffs; and
- public conservation and resource zones around Red Cliffs and near the Murray River.

For the alternative route, the potential sensitive environmental and social issues identified were:

- community and landowner concern re potential impacts on horticultural and farming practices and loss of land;
- visual impacts tower structures and lines;
- impacts on the Bookmark Biosphere Reserve, particularly in terms of fragmentation of the Reserve, perceptions of the development being incompatible with the objectives of the reserve, and direct impacts on environmental values such as Ramsar wetlands and listed threatened species and ecological communities and listed migratory species;
- Riverland community plays an active role in the management of the Biosphere Reserve and had a strong “ownership” of the reserve.
- Ramsar wetlands include the Chowilla Floodplain and Anabranch system known as the Riverland Wetlands; and
- Calpernum Station (Commonwealth land). This was purchased by the Commonwealth in partnership with the Chicago Zoological Society in 1993 and leased to the Director of National Parks. Impacts on this would be assessed under EPBC Act provisions.

In addressing the typical impacts as well as the community and landowner concerns associated with transmission line developments, Ms Boyer drew on the experience from her role as the environmental advisor for the Murraylink project, Ms Boyer described the strong negative community reactions and mistrust first experienced by the developers of Murraylink. These reactions stemmed from a perception that developers of past

infrastructure projects had not met undertakings made in the approvals process and a strong aversion to overhead powers lines across provable land. A copy of Ms Boyer's presentation is included in Attachment 6.

4.4.3 Environmental assessment and planning approvals process

As set out in the preparatory documentation, Tim Power of Freehills set out a number of assumptions in relation to the types of environmental assessment and planning approval process that would apply to the projects in each jurisdiction - Victoria, South Australia and New South Wales and the Commonwealth. This paper is included as Attachment 7 of this report and a presentation summarising this was made by Mr Tim Power of Freehills. It was noted that the proponent is not a public authority and that this would have implications for the form of process in New South Wales.

4.4.4 Proponent's Approach

The workshop participants agreed to assume that the proponent of the projects being considered would propose a low technical cost configuration, which it may change during a formal environmental assessment process in response the community concerns and may change ultimately due to conditions placed upon the environmental and planning approval.

4.5 Analysis Methodology

Mr Andrew Jameson of Worley provided an overview of the manner in which the workshop outcomes will be defined and used in the analysis:

- For each segment of the route, participants would be asked to consider the nature and extent of potential environmental impact measures that might be required within the segment;
- Complete agreement on the measure and extent of mitigation was not anticipated and differing views would be recorded and modelled. Probabilities would be sought where possible for alternative mitigation measures.
- Costing of the mitigation measures would be carried out by BRW following the workshop and after confirmation of the record by participants.
- The results from the workshop and potential cost impacts would be integrated into the Monte Carlo risk analysis for the costing of the alternative projects.

4.6 Cost of Mitigation Measures

As a simplified guide to assessing environmental impact mitigation measures within the workshop, BRW suggested that the following costs could be used as a "rule of thumb" comparison:

- Tower Lines \$0.2 M/km
- Pole Lines \$0.4 M/km

- Underground Cable \$2.0 M/km

Modelling of the cost impacts would use unit costs consistent with those in the existing cost estimates for the alternative projects.

4.7 Confirmation of Segments

As part of the preparatory documentation for the workshop, Worley provided participants a preliminary tabulated breakdown of the preferred and alternative route alignments indicating the land use, agricultural and protected areas, issues and constraints and segment length. This breakdown had been prepared by KBR and BRW and is included as Attachment 8. Table 1 of this attachment is an indicative, non-route specific breakdown into representative areas for discussion purposes and this was provided to workshop participants as an explanatory exercise in preparation for consideration of the two alignments.

Prior to detailed consideration of the individual routes, participants were asked to review each route and its breakdown and classification into segments.

4.7.1 Preferred Route

Consideration of the route segment-by-segment resulted in modifications to the preferred route detailed in Attachment 8, Table 3 as follows:

- The segment *Victorian border to Meringur Road* through the Sunset National Park was modified to *Victorian border to Morkalla Road* as this more precisely represents the sensitive area within the park road reserve. Meringur Road is east of the park boundary.
- The segment *Meringur Road to Calder Highway* was modified to *Morkalla Road to Meridian Road*.
- A new segment *Meridian Road to 1 km west of Calder Highway* was introduced
- The segment *Calder Highway to Red Cliffs* was modified to *1 km west of Calder Highway to Red Cliffs*.

In the case of the first modification, there was considerable discussion about the difficulty of traversing the Sunset National Park and the issues of being able to locate a line or underground cable within the existing Sturt Highway road reserve given the location of a gas pipeline and Telstra cable within this reserve. Difficulties with the location of the Murraylink cable within the road reserve were cited as evidence of the constraint. The issue of induction in the gas pipeline from a parallel AC connection was raised and it was noted that this had not been an issue for Murraylink with the DC bi-polar cable.

Suggestions were made that DC transmission could be an option or possibly conversion to DC in this segment. Rod Touzel indicated that an overhead DC connection in this alignment had been considered by BRW as one of the alternative projects submitted to the ACCC and that this had not been selected as the preferred project on economic

grounds. The purpose of the workshop was to consider the preferred project selected by the ACCC.

The reason for the latter three modifications was that the initial segmentation proposed considered that there was a general change in land utilisation east and west of the Calder Highway. The workshop identified that the Red Cliffs horticultural area (assumed to the east of the highway) extended to Meridian Road i.e. west of the highway. Furthermore, it was identified that there was a change in the type of allotment. The area to the east of the highway is characterised, by small land holdings, typical of the post World War 2 soldiers settlement blocks, and that this smaller allotment size now extended to approximately 1 km west of the highway. The allotments from around 1 km west of the highway through to Meridian Road are larger in nature.

These modifications were incorporated in the route tabulation used to record the results of the segment-by-segment consideration as indicated in section 4.8.1.

4.7.2 Alternative Route

No modifications were made to the alternative route.

4.8 Assessment of Routes

4.8.1 Preferred Route

The preferred route was considered segment-by-segment commencing at the Monash Substation.

The record of consideration was made directly into a tabulation displayed on an overhead screen for consideration by the participants. The confirmed record is provided in Attachment 11, Table 1.

In considering the segments between the Monash Substation and the Victorian border, Michael Hodder of the South Australian Department of Water, Land and Biodiversity Conservation (DWLBC), contributed to the decision by telephone conferencing. Participants also took into account input provided by Ms Fiona Donohoue of DWLBC in her email of 22 June 2003 distributed to participants (Attachment 10).

Similarly, in considering the segment from the Victorian border to Morkalla Road, participants considered the contribution provided by Mr Garry Niewand of the Victorian Department of Sustainability and Environment in his email of 19 June 2003 distributed to participants (Attachment 10). Mr Niewand's email indicated the need for any proposal to establish utilities infrastructure to be dealt with under Sections 27 and 27A of the *National Parks Act 1975 (Vic)* and this was also extended on by Mr John Cooke of the Department in the discussion. Mr Cooke also made reference to the new *Victoria's Native Vegetation Management – A Framework for Action* which requires a Net Gain⁵.

⁵ According to *Victoria's Native Vegetation Management – A Framework for Action*, "Net Gain" is the outcome for native vegetation and habitat where overall gains are greater than overall losses and where individual losses are avoided where possible.

In the final segment of the route from 1 kilometre west of the Calder Highway to the Red Cliffs Substation, workshop participants identified significant problems with the large number of small viticulturalists, irrigation layouts and congestion with existing services that would make it very difficult to locate a transmission line, particularly a tower line. As a solution to these issues would require further investigation of options, the constraints were noted for BRW to investigate a realistic solution for modelling purposes. BRW's subsequent investigation, including further consultation to provide local input on constraints, resulted in a 6 km cable section being proposed for modelling from the Red Cliffs substation to Boundary Road and then a pole line for 7 km along the road west to the edge of the segment 1 km east of the Calder Highway.

In summary, the scope of potential environmental impact mitigation measures resulting from the workshop assessment was a total of 27 km of undergrounding, up to 24 km of pole lines, up to 3 additional km of route length for deviations and the associated costs in strain towers. This compares to the sole allowance of 25 km of undergrounding for environmental impact mitigation in the 16 October 2002 report.

4.8.2 Alternative Route

The alternative route was considered segment-by-segment commencing at the Monash Substation.

As with the preferred route, Mr Michael Hodder participated by telephone in the consideration of the South Australian segment and note was taken of the emailed contribution of Ms Fiona Donohue (Attachment 10). It was also noted that the ACCC had taken account of the letter from Mr Lee Webb of Planning SA dated 3 April 2003, included as Appendix B of its Preliminary View, in accepting the concept of tactical undergrounding and its related costs in the South Australian segment of the alternative route. In section 2.2.5 of the Preliminary View, the ACCC indicated that based on this advice from Planning SA, *an overhead transmission line through the Bookmark Biosphere and Ramsar regions, similar to the route taken by Alternative 1, would be questionable from an environmental perspective.*

It was noted by participants that the level of documentation of vegetation and land use was not as detailed for the NSW segments in comparison to the Victorian segments for the preferred route, similarly, there was not the same degree of local knowledge and familiarity. The workshop was divided as to whether it was likely that, had greater detail been provided, the workshop would have agreed that there was an increased probability that additional environmental mitigation measures would be required for the NSW segments of the alternative route.

The record of the segment-by-segment consideration was made directly into a tabulation displayed on an overhead screen for consideration by the participants. The confirmed record is provided in Attachment 11, Table 2.

In summary, the potential scope of environmental impact mitigation measures resulting from the workshop assessment was 30 km of underground, up to 9 km of pole line, up to 10 km of additional route length to cover deviations as well as flyovers and vegetation

offset costs. This compared with the 30 km of undergrounding allowed as the sole environmental impact mitigation measure in the 16 October 2002 report.

4.9 Confirmation of Workshop Outcomes

4.9.1 Review at workshop

Prior to the close of the workshop, the tabulated records for the preferred route and alternative route were reviewed on the overhead screen and minor adjustments or enhancements agreed by the participants. Participants were provided with a hard copy of the tabulated record of the route assessments and were advised that a tidied-up electronic copy would be issued formally to participants on 24 June 2003 for confirmation of the record. It was also indicated that participants would be asked to confirm the accuracy of the record or advise any alterations by close of business on 25 June 2003 and that no comment would be assumed to be acceptance of the record.

4.9.2 Formal Confirmation

The tabulated workshop record was issued to all participants and observers as scheduled on 24 June 2003. A number of responses suggested minor wording changes or additions to cryptic comments that would enhance the understanding to non-participants. These minor additions are seen as enhancements that do not alter the meaning and they have been included in the record (Attachment 11, Table 1 and 2) and indicated accordingly. On the basis of the responses, these tables are presented as a confirmed record of the workshop outcomes.

5 ANALYSIS OF THE WORKSHOP RESULTS

The results of the workshop were analysed by Worley into a series of assumptions for the purposes of cost modelling. This involved the translation of the workshop results for each route segment into a series of assumptions for detailing of the cost impacts associated with the respective mitigation measures and for input to the cost model. This translation of the workshop result into specific modelling assumptions is described in Worley's analysis report included as Attachment 12.

6 IMPACT ON COSTING OF THE ALTERNATIVE PROJECTS

6.1 Incorporation of Workshop Results

The cost estimates included in BRW's report of 16 October 2002 were based on KBR's assessment as to the most likely extent of undergrounding for each of the alternative projects, i.e. 30 km for Alternative 1 and 25 km for Alternatives 2 and 3. This assessment was treated as a firm quantity or input in the cost models for the 16 October 2002 report with the risk factors being associated with variations in the costs of supply and installation rather than scope or quantity.

The modelling output resulting from the analysis and costing of the workshop results was integrated into the probabilistic risk model for the overall project as there is an interaction

from all of the risk factors considered and they cannot be treated in isolation. The total capital costs for the alternative projects incorporating the environmental impact mitigation measures identified in the workshop were determined at a P50 level using a Monte Carlo simulation. The resulting capital costs for the alternative projects are summarised in Table 1 together with the capital costs on the same basis for the alternative projects with the original levels of environmental impact mitigation, i.e. as presented in BRW's report dated 16 October 2002⁶. The costs have been assessed at May 2003 price levels and include IDC calculated at a real discount rate of 9.25% consistent with the methodology used for the costing of the alternative projects in BRW's report of 16 October 2002. When compared to the original costing, the table also indicates the equivalent incremental capital cost associated with the level of environmental impact mitigation assessed by the workshop above that allowed for in BRW's original report. As requested by MTC, total costs have also been indicated for a 9.0% real discount rate and at September 2003 price levels. The escalation of these costs was carried out at 4% per annum consistent with the rate BRW used for escalation of other costs in the alternative projects.

It should be noted that for completeness Table 1 also includes Alternative 2, a 140 kV DC overhead line in the same route alignment as Alternative 3, i.e. the preferred route. The environmental impact issues associated with overhead DC technology was not assessed specifically in the workshop and BRW has applied the same environmental impact mitigation measures to this alternative as assessed for Alternative 3. The difference in cost structures between the DC and AC alternatives has been taken into account in translating the costs associated with these measures into the probabilistic cost model.

⁶ The costing methodology used in this comparison is based on a common P50 level with an allowance for owner's risk.

Table 1 Estimated total capital costs of alternative projects with environmental impact mitigation

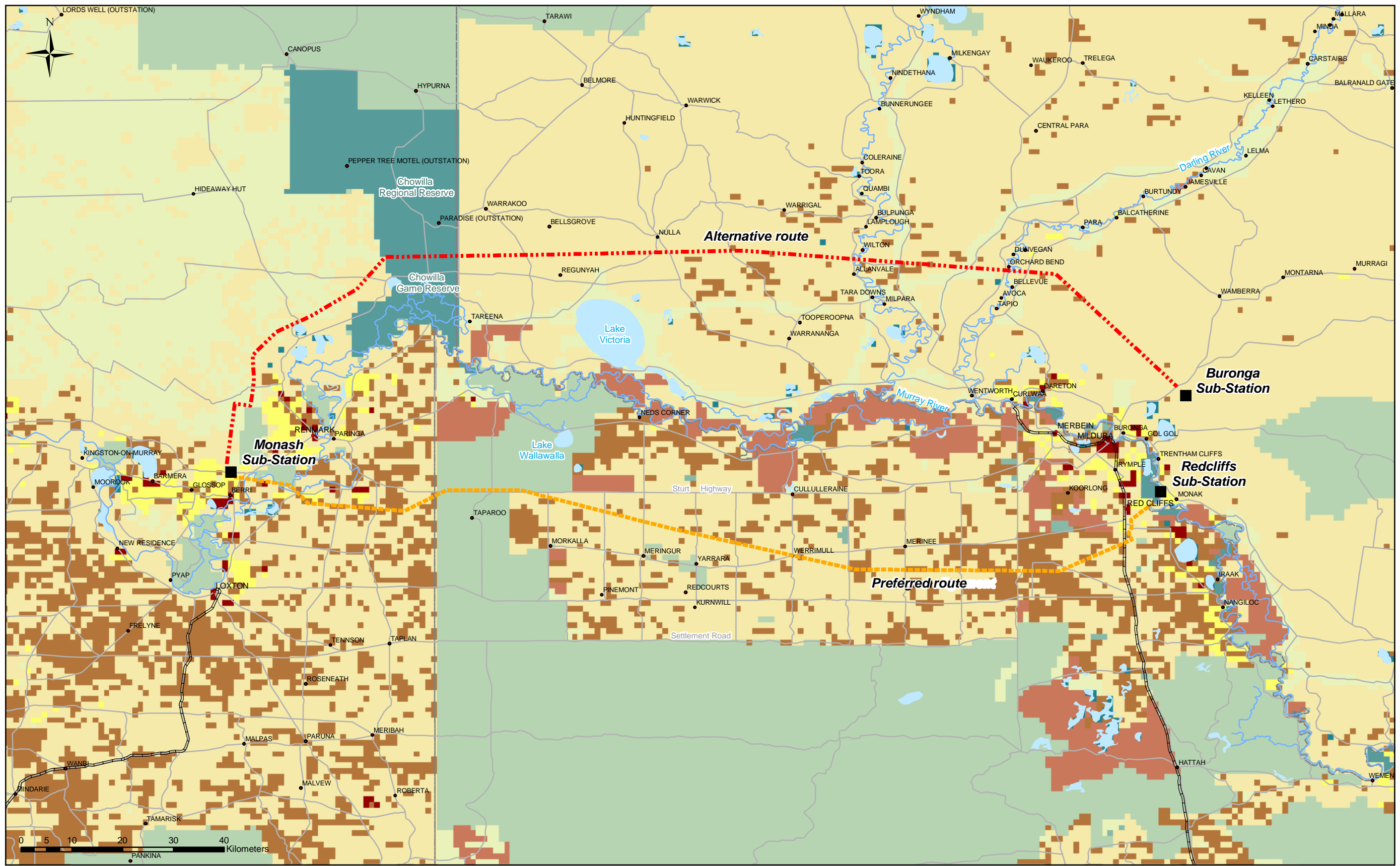
	Alternative 1 (Alternative Route)	Alternative 2 (Preferred Route)	Alternative 3 (Preferred Route)
Total Capital Cost (P50) revised to take account of workshop and with inclusion of Owner's Risks (May 2003, 9.25% disc. rate)	\$261,048,591	\$215,696,722	\$214,645,131
Original (P50) Capital Cost inclusive of Owner's Risk	\$245,594,624	\$203,033,360	\$201,450,072
Equivalent Cost of Additional Environmental Mitigation	\$15,453,967	\$12,663,362	\$13,195,059
Total Capital Cost (P50) revised to take account of workshop and with inclusion of Owner's Risks (Sep 2003, 9.00% disc. rate)	\$263,257,341	\$217,607,999	\$216,531,724

The likely increase in total capital costs resulting from the additional scope of environmental impact mitigation measures identified in the workshop ranges from \$12.7M to \$15.5M between the three alternative projects.

ATTACHMENT 1 – AGENDA

1. Welcome
Stéphane Mailhot (Murraylink Transmission Company)
2. Opening remarks
Chairman - Rod Touzel (BRW) and Facilitator - Patrick Tuohey (Worley)
3. Introductions
4. Assumptions
 - (i) Need for transmission line – Rod Touzel (BRW)
 - (ii) Routes and potential environmentally sensitive areas and constraints - Jackie Boyer (KBR)
 - (iii) Environmental and planning approvals processes – Tim Power (Freehills).
 - (iv) Project proponent's approach – Rod Touzel (BRW)
5. Analysis methodology – Andrew Jameson (Worley)
6. Review of route segments for - Patrick Tuohey (Worley)
7. Summary of workshop and next steps – Rod Touzel (BRW)

ATTACHMENT 2 – CONSTRAINT MAP – LAND USE



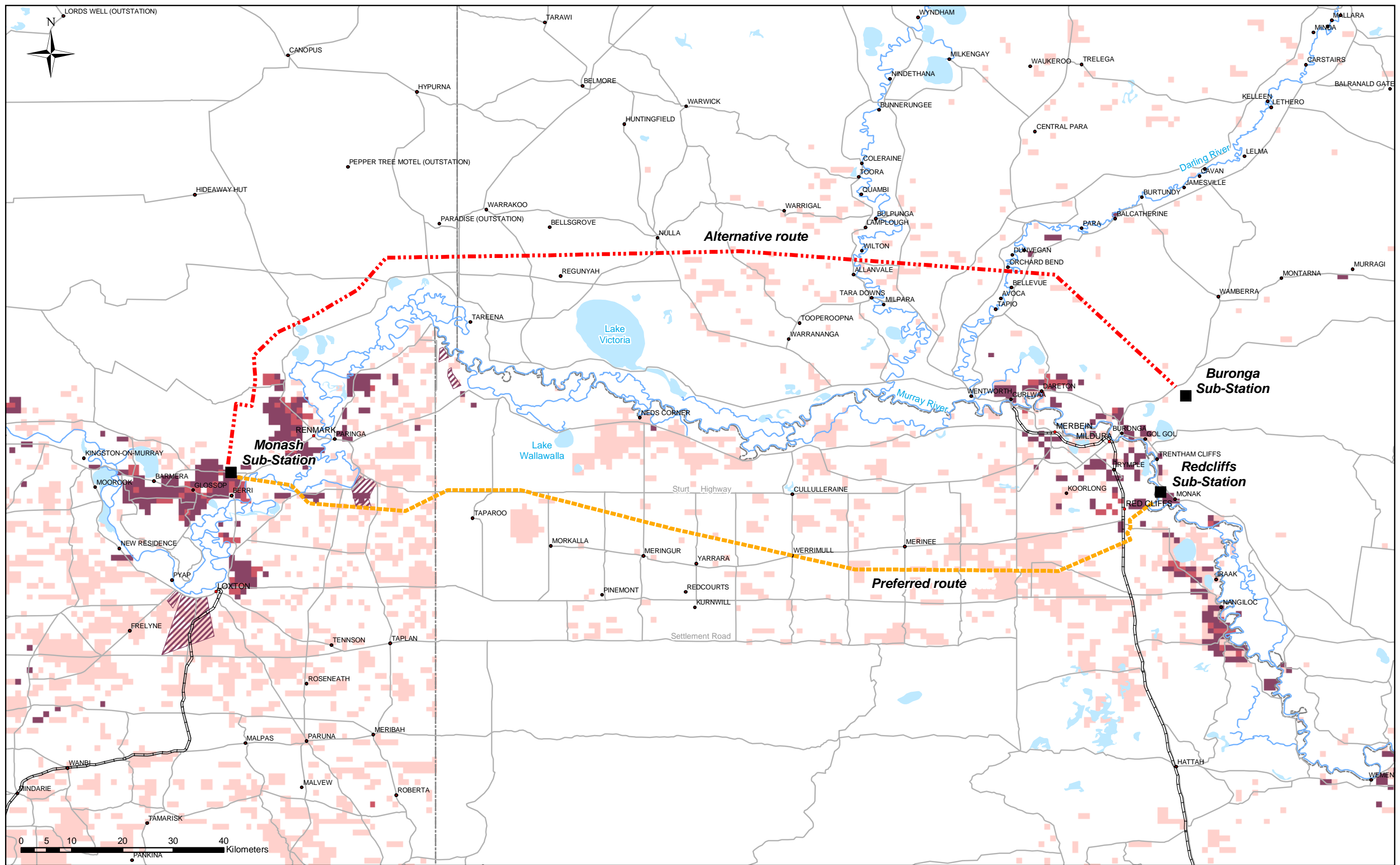
- Legend**
- towns
 - major towns
 - railway
 - rivers
 - roads
 - waterbodies
 - state border
 - Alternative 1
 - Alternatives 2 and 3
 - Built environment
 - Dryland agriculture
 - Forestry
 - Irrigated agriculture
 - Livestock grazing
 - Minimal use
 - Nature conservation
 - No Data
 - Other protected areas including indigenous uses
 - Waterbodies not elsewhere classified

Data Source
 1996/97 Land Use of Australia, Summary interpretation for the Australian Natural Resources Atlas,
 National Land and Water Resources Audit

Attachment 2
 Land use



ATTACHMENT 3 – CONSTRAINT MAP – AGRICULTURE

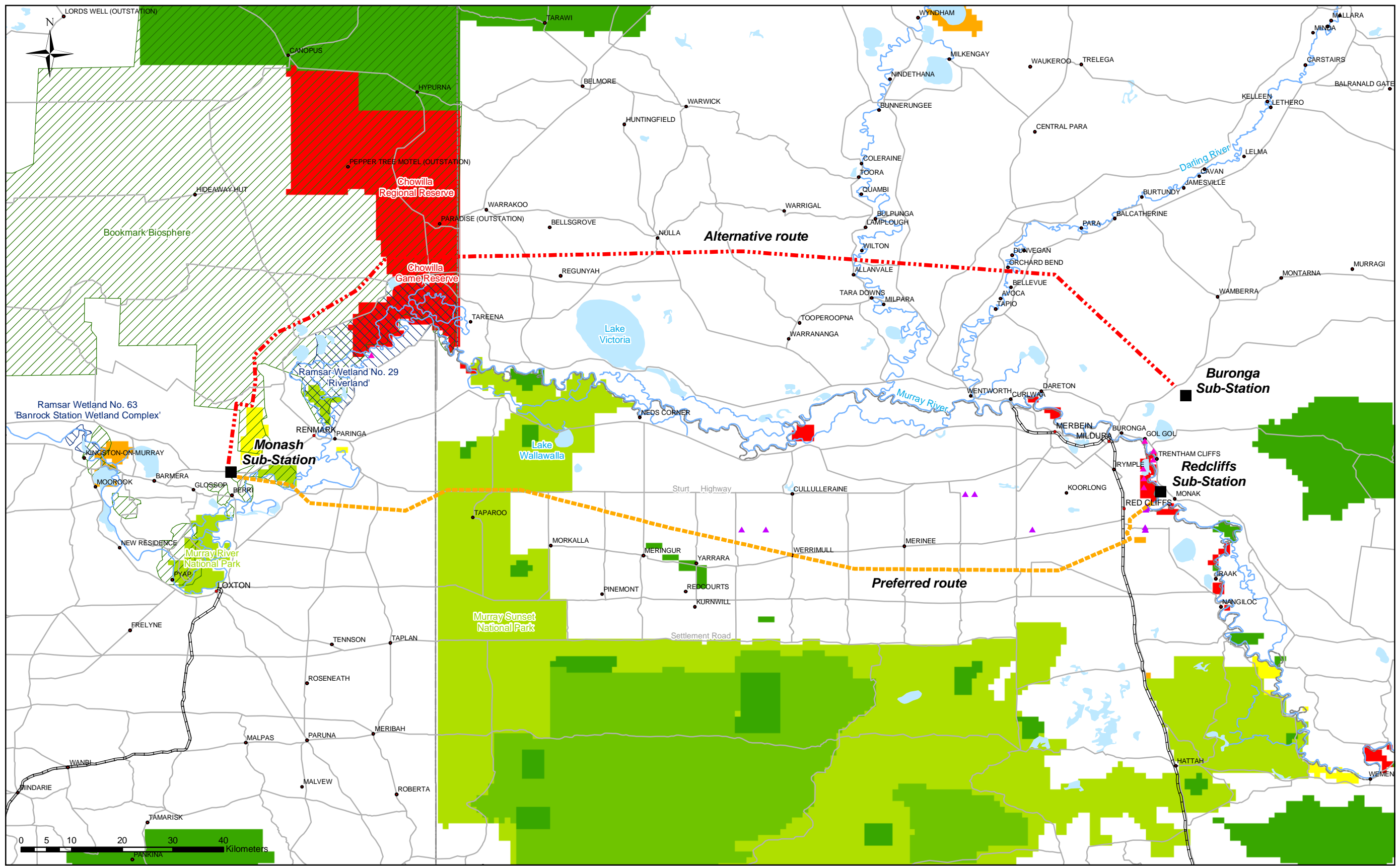


Legend

- towns
- major towns
- railway
- rivers
- roads
- waterbodies
- state border
- Alternative 1
- Alternatives 2 and 3
- Dryland cropping
- Horticulture
- Irrigated agriculture
- ▨ *additional irrigation areas

Data Source
 1996/97 Land Use of Australia, Summary interpretation for the Australian Natural Resources Atlas,
 National Land and Water Resources Audit
 NB: *additional irrigation areas identified in the 'Proposed SNI Interconnector EIS', Sinclair Knight Mertz, 2002

ATTACHMENT 4 – CONSTRAINT MAP – PROTECTED
AREAS



Legend

- towns
- major towns
- railway
- rivers
- roads
- waterbodies
- state border
- Alternative 1
- Alternatives 2 and 3
- Ia. Strict nature reserve
- Ib. Wilderness area
- II. National park
- III. Natural monument
- IV. Habitat/species management area
- V. Protected landscape/seascape
- VI. Managed resource protected area
- ▨ Bookmark biosphere
- ▨ Ramsar site
- ▲ *rare and vunerable vegetation
- ▲ **rare, endangered, threatened species

Data Source
 1996/97 Land Use of Australia, Summary interpretation for the Australian Natural Resources Atlas, National Land and Water Resources Audit
 NB: *rare and vunerable vegetation identified in the Murraylink Application report
 **rare, endangered, threatened veg. species identified in the SNI EIS report

Attachment 4
 Protected areas



ATTACHMENT 5 - NOTES TO CONSTRAINT MAPS

Information supplied on the maps is from the following sources:

Transgrid Proposed South Australia – New South Wales Interconnector (SNI) Environmental Impact Statement. Sinclair Knight Mertz June 2002.

- boundaries of the Bookmark Biosphere reserve; names of conservation areas, location of plant species considered rare, endangered and threatened near Alternative route 1.
- Location of irrigation areas including Chaffey Irrigation Area (where land is either used for irrigated horticulture (citrus and other orchards) or is yet to be developed for irrigation).

Environment Australia web site:

Search for features that would trigger the EPBC Act revealed the following:

- Two Ramsar wetlands (Riverlands and Banrock Station Wetland Complex)
- No World Heritage Properties
- One threatened ecological community – Buloke grassy woodlands (note the generalised map from the Environment Australia database is indicative only. The Murraylink vegetation assessment did not find this grassy woodland type during field survey nor did the SNI EIS).
- Thirteen threatened species (those found near Alternatives 1, 2 & 3 during the Murraylink project and the SNI EIS project have been mapped and for Alternative routes 2 & 3 discussed in the Murraylink application report. These species include Murray Hardyhead, Southern Bell frog, Mallee Fowl, Black-eared Miner, Regent Parrot. Note no threatened plant species listed under the EPBC were found along Alternative routes 2 and 3).
- Seven migratory species (White-bellied Sea Eagle, Mallee Fowl, Black-eared Miner known to be in general study area for Alternative routes 2 & 3).
- Five marine species (White-bellied Sea Eagle, Painted Snipe recorded in the study area for Alternative routes 2 and 3).

National Land and Water Resources Audit

Data sets derived from 1996/97 Land Use of Australia Version 2, Land Use Theme (both the source data sets and the alternative land use layer).

From this data set the following information was mapped:

- Protected area boundaries and descriptions (also mapped as the nature conservation land use)
- Built environment
- Dryland agriculture
- Forestry
- Irrigated agriculture

- Livestock grazing
- Waterbodies, etc

Note that the irrigated agriculture areas include irrigated modified pastures, cropping, perennial horticulture, and seasonal horticulture. The database did not allow for further separation of the individual agricultural types.

MurrayLink Underground Electricity Transmission System Application Report, by TransEnergie Australia Pty Ltd & Kinhill, February 2000.

Records of threatened flora and fauna species found along the route and in the general study area of routes 2 and 3. These species include those listed under EPBC and under relevant state legislation. A full copy of this Application Report will be available at the workshop.

ATTACHMENT 6

- ROUTES DESCRIPTIONS, KEY ENVIRONMENTAL AND SOCIAL ISSUES



Murraylink Alternative Project

Environmental Impact
Mitigation Workshop
Route descriptions

June 23, 2003

Murraylink Alternative Project

Overview of environmental and social issues

- Clearing of native vegetation and fauna habitats
- Fragmentation of remnant vegetation, habitats and reserves
- Direct impacts on fauna (e.g. birdstrike)
- EMR
- Visual impacts
- Fragmentation of land tenure and effects on property management

KBR

Murraylink Alternative Project

Overview of key management measures available to address impacts

- Route selection
- Use of poles instead of towers
- undergrounding

KBR

Murraylink Alternative Project

Preferred alignment

- Commences in at the Monash substation near Berri SA, crosses the Murray River, travels in an easterly direction through irrigated horticulture areas around Lyrup, and then moves through dry land agriculture, cropping and grazing areas and Sunset National park, before again encountering irrigated horticulture and residential areas around Red Cliffs.

KBR

Murraylink Alternative Project

Issues/sensitive areas along this route include:

- Community and landowner concern re potential impacts on horticultural and farming practices and loss of land (Loxton, Lyrup, Red Cliffs in particular, but also broadacre areas)
- Visual impacts
- The Murray River and associated reserves

KBR

Murraylink Alternative Project

- Lyrup Flats (environmental (major fauna habitat) and heritage issues, Bookmark Biosphere)
- Sunset National Park (values and specific approval requirements, size of the park)
- Farmer opposition in broadacre areas based on previous experience with infrastructure projects
- Expanding irrigated horticulture in and around Red Cliffs

KBR

Murraylink Alternative Project

- Residential development in and around Red Cliffs
- Public Conservation and Resource Zones around Red Cliffs and near Murray River

KBR

Murraylink Alternative Project

Alternative alignment:

- Commences at the Monash Substation near Berri and travels north through some irrigated agriculture, Bookmark Biosphere Reserve, Calperum Station (Commonwealth), alongside RAMSAR wetlands, grazing land, dry land agriculture, across the Greater Darling Anabranch and the Darling River to the Buronga Substation

KBR

Murraylink Alternative Project

Issues/sensitive areas along this route include:

- Community and landowner concern re potential impacts on horticultural and farming practices and loss of land
- Visual impacts
- EMR (perceived health effects)

KBR

Murraylink Alternative Project

- Impacts on the Bookmark Biosphere Reserve particularly in terms of fragmentation of the Reserve, perceptions of the development being incompatible with the objectives of the reserve, and direct impacts on environmental values such as Ramsar wetlands and listed threatened species and ecological communities and listed migratory species.
- Riverland community plays an active role in the management of the Biosphere Reserve – strong ownership

KBR

Murraylink Alternative Project

- Ramsar wetlands include the Chowilla Floodplain and Anabranh system known as the Riverland Wetlands
- Calpernum Station (Commonwealth land). Purchased by the Commonwealth in partnership with the Chicago Zoological Society in 1993 and leased to the Director of National Parks. Impacts on this would be assessed under EPBC Act provisions.

KBR

ATTACHMENT 7- ENVIRONMENT ASSESSMENT &
PLANNING APPROVAL PROCESSES

Attachment 7

Environmental Assessment & Planning Approval Processes

1 Introduction and assumptions

- 1.1 This document provides a brief outline of the environmental assessment and planning approval processes for two hypothetical overhead electricity transmission line projects: a preferred alignment between Red Cliffs in Victoria and Berri in South Australia, and a non-preferred alignment between Buronga in New South Wales and Berri in South Australia. It is also a reference document for the purpose of the workshop being conducted on Monday 23 June 2003.
- 1.2 The environmental assessment and regulatory approval processes in Victoria, South Australia, New South Wales and at a Commonwealth level are complicated, and a range of possible scenarios could apply to the assessment and approval of the two hypothetical projects. Parts 2 and 3 describe the environmental impact assessment and approval processes for both hypothetical alignments. The description of the environmental planning and assessment process in Parts 2 and 3 are based upon the following assumptions:
- (a) It is assumed the Victorian Minister for Planning decides that an environment effects statement (**EES**) is required under the *Environment Effects Act 1978* (Vic) for the Victorian segment of the preferred alignment¹. It is further assumed that the preferred alignment is not prohibited by the Mildura planning scheme;
 - (b) It is assumed the South Australian Minister for Urban Development and Planning declares the South Australian segments of both alignments to be a development to which section 46 of the *Development Act 1993* (SA) applies. It is further assumed that the proponent is directed to prepare an environmental impact statement (**EIS**) for the two projects²;

¹ The *Guidelines for Environmental Impact Assessment* (April 1995) prepared under section 10 of this Act sets out some examples of proposals which may need an EES. These are a general guide as to whether the Minister would be likely to require an EES. These examples include “proposals which could effect areas of high conservation value” and “major engineering works, such as... transmission lines”. It is also noted that the Minister for Planning required an EES for the Basslink overhead transmission line project which was recently assessed and approved by the Minister. Having regard to the Guidelines and the recent precedent of Basslink, the assumption that an EES would be required for the Victorian segment of the preferred alignment is reasonable.

² Based upon a section 46 declaration, the Major Developments Panel could require a proponent to prepare either an Environmental Impact Statement, a Public Environmental Report or a Development Report. Whether or not the Panel would require the proponent of the South Australian segment of either alignments to prepare an EIS, PER or Development Report is unlikely to be material to the outcome of the workshop, but nevertheless an assumption is made that an EIS would be required. This assumption is reasonable, having regard to the recent requirement for an EIS under the *Development Act 1993* for the South Australian segment of the SNI project between Buronga in New South Wales and Monash in South Australia, and to the criteria for determining the level of assessment in Appendix C of the publication titled *Guide to the Assessment of Major Developments or Projects* (Planning SA, 3rd Edition, 2002).

- (c) It is assumed that the proponent of the New South Wales segment of the non-preferred alignment is a private entity, that the project requires a development consent under the relevant environmental planning instruments, and that the project requires environmental assessment and approval under Part IV of the *Environmental Planning and Assessment Act 1979* (NSW)³; and
- (d) It is assumed the Commonwealth Minister for Environment and Heritage has determined that both alignments are a *controlled action* under the *Environment Protection and Biodiversity Conservation Act 1999* (**EPBC Act**) by virtue of their potential impacts on listed threatened species and communities and declared Ramsar wetlands. It is also assumed that the non-preferred alignment requires a comprehensive environmental assessment to the extent the project traverses Commonwealth land (such as Calperum station).

- 1.3 It is assumed the three state environmental impact assessment processes have been accredited by the Commonwealth Minister for Environment and Heritage under the EPBC Act in respect of the preferred alignment. In respect of the non-preferred alignment, it is assumed the Commonwealth Minister for Environment and Heritage does not accredit the EIA process⁴.

2 Preferred Alignment

2.1 Trigger and EIS guidelines

- (a) For the Victorian segment of the project, the proponent submits a planning permit application for the change in use of land, the development of land and for the clearance of native vegetation with Mildura City Council.
- (b) The Victorian Minister for Planning advises the proponent that an EES is required for the project. The Minister appoints a consultative committee, comprised of members of the community, relevant statutory authorities and government departments and Mildura City Council, to guide and assist the proponent in preparing guidelines for the EES.
- (c) Draft EES guidelines are prepared, published, and submissions received on the draft guidelines before their finalisation (**Victorian Guidelines**).

³ It is assumed, for the purpose of the workshop, that a species impact statement is not required for the project after considering the matters set out in section 5A of the *Environmental Planning and Assessment Act 1995*. This is a conservative assumption. It is assumed the Minister does not declare the project to be a *State Significant Project* and that the consent authority is, therefore, a local council. It is also assumed that the Minister for Urban Affairs and Planning does not appoint a commission of inquiry into the project, and that the project is not a designated development.

⁴ This assumption is based upon the draft bilateral agreement between the Commonwealth and New South Wales, where the EIS processes under Part 4 (for designated development) and Part 5 of the *Environmental Planning and Assessment Act 1979* are accredited, but the process of obtaining development consent under Part 4 for non-designated development is not. Even under this scenario, it is possible the Commonwealth could accredit the South Australian process and not the New South Wales process, but for the sake of simplicity it is assumed that neither processes are accredited for the non-preferred alignment.

- (d) Guidelines are prepared and published for the preparation of an EIS for the South Australian segment of the project (**South Australian Guidelines**).
- (e) The proponent prepares an EES/EIS which complies with the Victorian Guidelines and the South Australian Guidelines.

2.2 Publication of EES/EIS

- (a) The EES/EIS and the planning permit applications are exhibited concurrently in accordance with relevant statutory requirements. Submissions are received on the EES/EIS from environmental groups, land holders, local councils, government agencies and departments and industry bodies in both states. Some of those submissions object to the project.

2.3 Permit call-in and Victorian panel

- (a) The Victorian Minister for Planning calls in the planning permit application, and appoints a panel to conduct a public inquiry into the project. The panel has status to report on the EES under the *Environment Effects Act 1978* and on the planning permit applications under the *Planning and Environment Act 1987*.
- (b) The panel conducts a public inquiry into the project, and subsequently prepares a report to the Minister for Planning recommending that the project be approved, subject to conditions. The Minister eventually makes the panel report public after the assessment report is complete.

2.4 Finalisation and approval

- (a) For the South Australian segment of the alignment, after the public exhibition process the proponent prepares a written response to any matters raised by submissions on the EIS. The written response is submitted to the Minister for Urban Development and Planning, the Minister then prepares an assessment report, and submits that report to the Governor-in-Council. The Governor-in-Council approves the South Australian segment of the project, subject to conditions.
- (b) The Victorian Minister for Planning issues the planning permits to authorise the project;
- (c) The Commonwealth Minister for Environment decides whether or not to approve the project under the *Environment Protection and Biodiversity Conservation Act 1999*, after having regard to the assessment report prepared by the South Australian Minister for Urban Development and Planning and the Victorian Minister for Planning.
- (d) The Victorian Minister for Sustainability and Environment negotiates and issues a consent to the proponent to construct and operate the project within the Sunset National Park under section 27A of the *National Parks Act 1975*.

3 Non-Preferred Alignment

3.1 Trigger and EIS Guidelines

- (a) Because the New South Wales segment of the project is not a designated development, the proponent is not required to prepare an environmental impact statement. However, the project requires development consent under the relevant environmental planning instruments in New South Wales. Accordingly, the proponent must lodge an application for development consent together with a Statement of Environmental Effects (SEE);
- (b) Guidelines are prepared and published for the preparation of an EIS for the South Australian segment of the project (**South Australian Guidelines**);
- (c) The Commonwealth Minister for Environment determines the project is a controlled action, and directs the proponent to prepare an EIS for the project. Guidelines for the EIS are prepared, exhibited and approved under the *Environment Protection and Biodiversity Conservation Act 1999* (**Commonwealth Guidelines**);
- (d) The proponent prepares an EIS that satisfies, and is in compliance with, the South Australian Guidelines, the Commonwealth Guidelines and the proponent prepares an SEE which is consistent with the requirements in the *Guide to the information you need to include with your development application* and the draft *Network Electricity Systems and Related Facilities EIS Guideline* dated February 2002.

3.2 Publication of EIS/SEE

- (a) The EIS/SEE, together with the New South Wales application for development consent, is published concurrently in both New South Wales and South Australia, and in accordance with the relevant state legislative requirements. It is presumed that submissions are received from environmental groups, land holders, industry groups, local government and relevant government agencies and departments on the project. Some of those submissions object to the project.

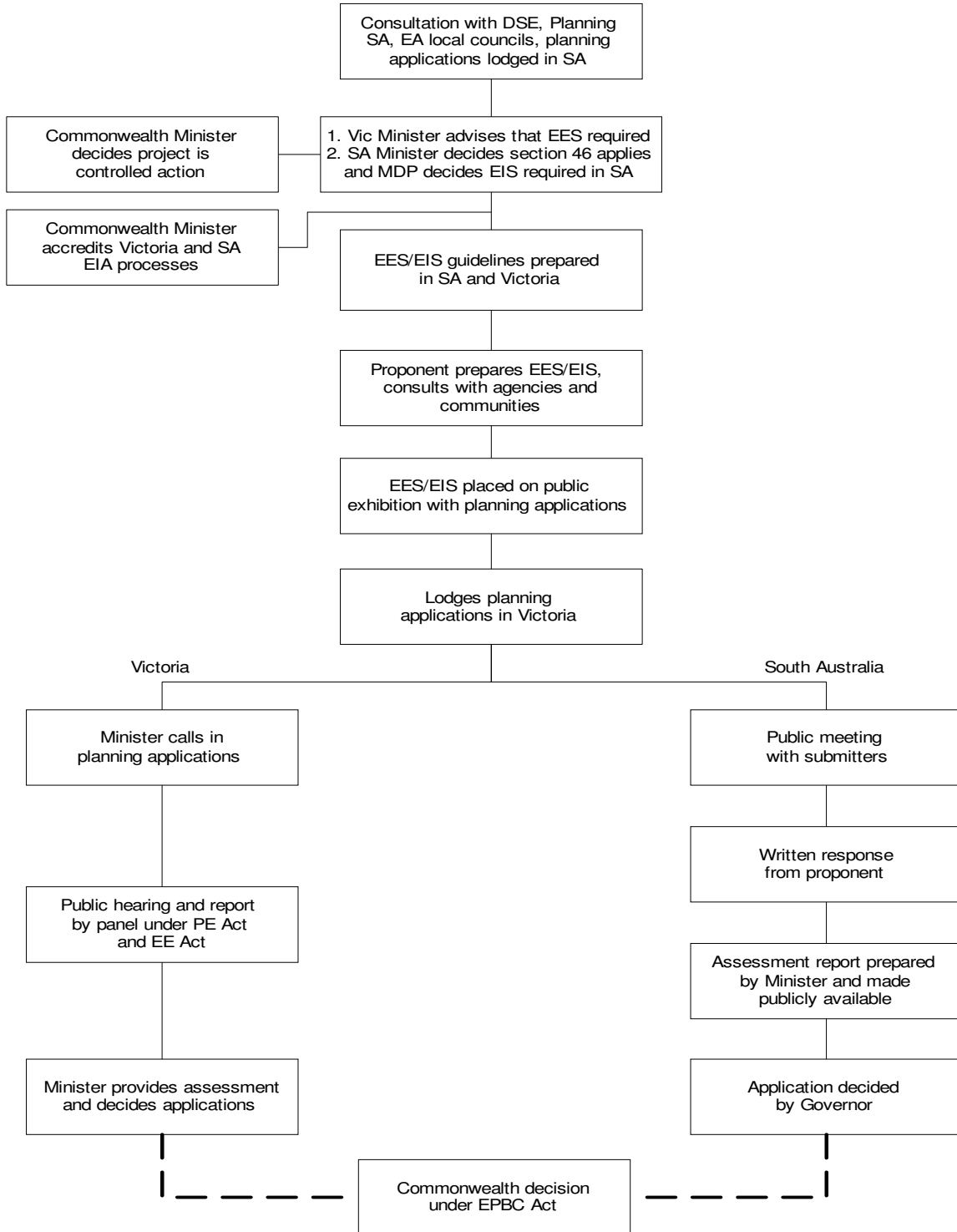
3.3 Finalisation and Approval

- (a) For the South Australian segment of the alignment, after the public exhibition process the proponent prepares a written response to any matters raised by submissions on the EIS. The written response is submitted to the Minister for Urban Development and Planning, the Minister then prepares an assessment report, and submits that report to the Governor-in-Council. The Governor-in-Council approves the South Australian segment of the project, subject to conditions;
- (b) After the application for development consent and SEE have been placed on public exhibition, the consent authority (which, assuming the project is not a *State Significant Project*, will be the relevant council) evaluates the merits of the application in accordance with section 79C of the *Environmental Planning and Assessment Act 1979*, and an assessment report is prepared based upon those requirements. The council then makes

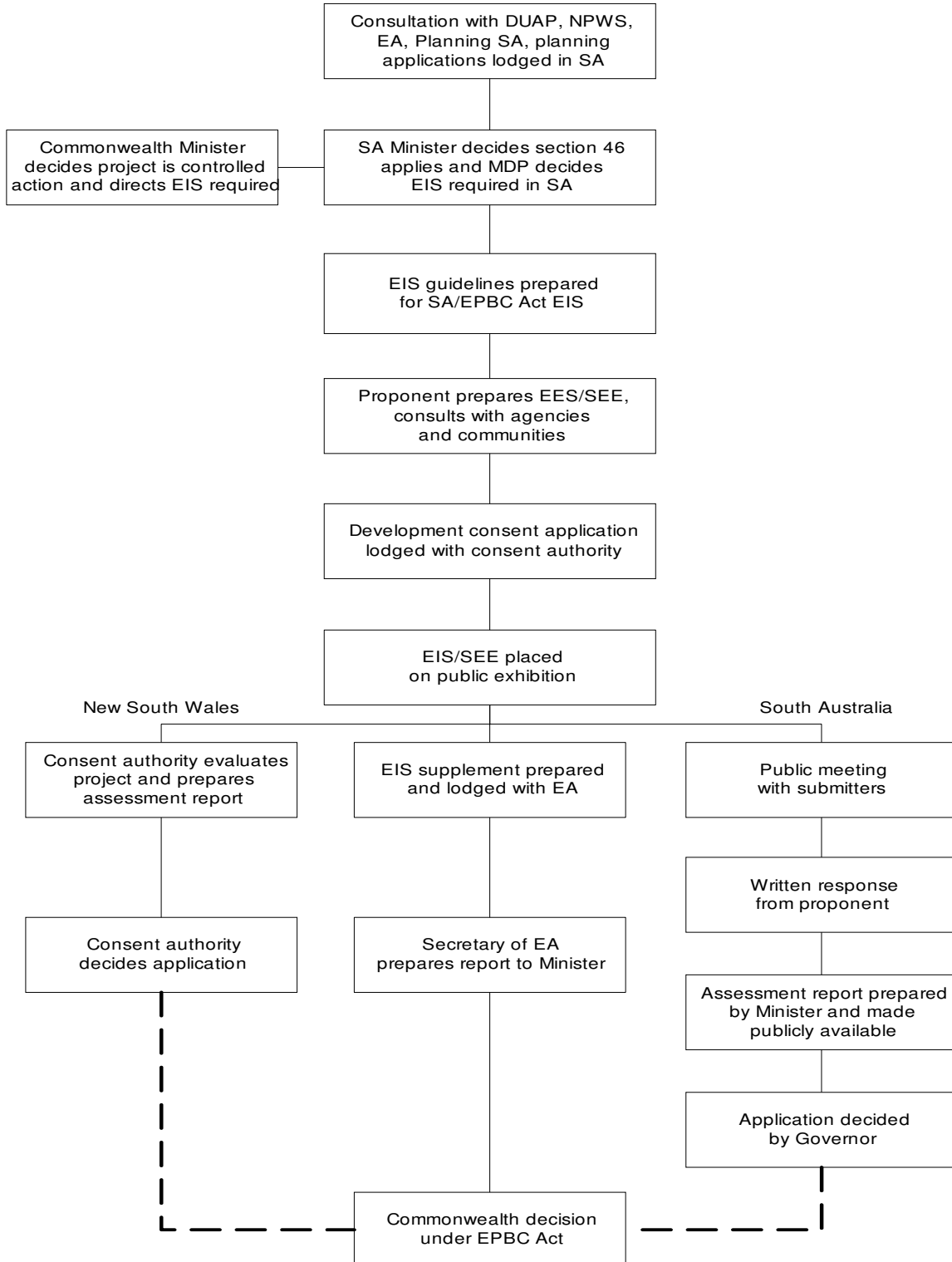
a decision on the application for development consent, which is subject to possible third party appeal rights to the Land and Environment Court;

- (c) The proponent prepares a supplement to the EIS which responds to submissions made on the EIS during the public exhibition process, submits that supplement to Environment Australia, the Secretary of Environment Australia prepares an Assessment Report and submits that report to the Commonwealth Minister for Environment and Heritage, and the Minister approves the project subject to conditions.

Attachment 1: Preferred Alignment



Attachment 2: Non-Preferred Alignment



ATTACHMENT 8 – ROUTE SEGMENTS FOR DISCUSSION

Attachment 8

Table 1 Breakdown by sensitive areas (representative examples)

Area	Primary land use	Description of land use and key features	Possible issues & constraints	Route length (km)	Mitigation Measures
Red Cliffs Township	Mixed land uses and zones (including residential, special use, public conservation, rural and road)	Residential dwellings, substation, roads, irrigated agriculture (viticulture and horticulture)	Noise, disruption and loss of amenity affecting residents Public conservation zone covers the edge of the River Murray - avoid vegetation clearance Irrigated viticulture is an intensive agricultural land use with a high capital cost in infrastructure and long period before returns in investment are made – landowners are likely to be concerned about disturbance or loss of land	13.2	
Irrigation Areas	Intensive agriculture and horticulture around Loxton, Lyrup and Berri	Primarily irrigated agriculture (viticulture and horticulture), rural living allotments. Mixture of private and Crown land	Irrigated viticulture is an intensive agricultural land use with a high capital cost in infrastructure and long period before returns in investment are made – landowners are likely to be concerned about disturbance or loss of land. Some low lying land susceptible to flooding	4.1	
Murray Sunset National Park	High nature conservation values	One of few remaining semi arid regions in the world where the environment is relatively untouched Number of threatened fauna	Significant impact on conservation and cultural values May trigger EPBC Act depending on route location Section 27, Approval to cross Sunset National	15.4	

Area	Primary land use	Description of land use and key features	Possible issues & constraints	Route length (km)	Mitigation Measures
		species (Paucident Planigale, Regent Parrot, Millewa Skink) Notable birdlife (Mallee Fowl, Pink Cockatoos, White-browed Tree creepers) More than seventy significant plant species	Park		
Dryland Cropping	Broad acre cereal cropping, livestock grazing	Seasonal cropping and animal husbandry	Disturbance and loss of current season's crops, or temporary loss of grazing land during construction works Increase in construction vehicles using roads Disruption of access to properties Noise Managing construction in presence of areas with accelerated soil erosion	33.4	
Murray River crossing (SA)	Waterbody	River and river banks used for recreation activities River used for navigation Significant landscape value Significant conservation values	Crown land approvals required Take off and landing points need to be located away from mooring points Possible native title claims Location of Aboriginal heritage sites in river banks Risk of flood event on infrastructure Loss of valued native vegetation on river bank Steep river banks / cliffs difficult for access and construction & maintenance	0.2	
Murray River Reserve SA (north and west side)	Bookmark Biosphere Murray River National Park Landscape Zone Flood plain	Significant landscape value Significant conservation values Chenopod Mallee vegetation community	Activities in Bookmark Biosphere would trigger the EPBC Act Avoid impacts on heritage sites Avoid damage/loss of native vegetation and fauna habitat	0.1	

Area	Primary land use	Description of land use and key features	Possible issues & constraints	Route length (km)	Mitigation Measures
			fauna habitat		
Murray River Reserve SA (south and east side)	Bookmark Biosphere Landscape Zone Flood plain	River Murray Riparian Zone vegetation community River Murray Flood Plain vegetation community Significant landscape value Significant conservation values	Activities in Bookmark Biosphere would trigger the EPBC Act Avoid impacts on heritage sites Avoid damage/loss of native vegetation and fauna habitat	1.0	

Table 2 Breakdown by Route Segments - Preferred Route

Route segment	Primary land use/features	Protected areas in segment	Possible issues & constraints	Route length (km)	Mitigation Measures
Monash Substation to River Murray (northern and western bank)	Irrigated agriculture immediately south of substation. Livestock grazing between substation and River. Rural living near Monash substation. Loxton Irrigation Area Landscape Zone	Bookmark Biosphere	Impact on land management (eg irrigation methods & infrastructure, machinery movement) Loss of cropping land Landscape, visual amenity and public health issues Avoid native vegetation clearance	2.0	
River Murray and Flood Plain	River and flood zone River and river banks used for recreation activities River used for navigation Significant landscape value Significant conservation values Indigenous heritage sites along Murray River	River Murray National Park Bookmark Biosphere	Avoid riverine remnant vegetation at Murray River crossing Avoid heritage sites Crown land approvals Visual impacts Risk of flood event on infrastructure Managing construction in presence of areas with accelerated soil erosion	10.3	
Lagoon Drive to SA Border	Livestock grazing Dryland agriculture and cropping Irrigated agriculture Rural living Low lying areas / water crossings	Bookmark Biosphere	EPBC triggered by Bookmark Biosphere Temporary loss of grazing and associated issues during construction Loss / disruption to cropping and associated issues Landscape, visual amenity and public health	25.3	

Route segment	Primary land use/features	Protected areas in segment	Possible issues & constraints	Route length (km)	Mitigation Measures
			<p>concerns</p> <p>Impact on land management (eg irrigation methods & infrastructure, machinery movement)</p> <p>Loss of land and plantings</p>		
Victorian Border to Meringur North Road	<p>Nature conservation</p> <p>Livestock grazing</p> <p>Dryland agriculture</p>	Murray Sunset National Park	<p>High conservation values (threatened fauna species, notable birdlife, many significant plant species) - avoid vegetation clearance in national park</p> <p>Section 27, Approval to Cross Sunset National Park</p> <p>Temporary loss of grazing and associated issues during construction</p> <p>Loss / disruption to cropping and associated issues</p>	17.7	
Meringur North Road to Calder Highway	<p>Livestock grazing</p> <p>Dryland agriculture</p> <p>Viticulture near Calder Highway</p>		<p>Disturbance and loss of current season's crop, or temporary loss of grazing land during construction works</p> <p>Increase in construction vehicles using roads</p> <p>Disruption of access to properties</p> <p>Noise</p> <p>Temporary loss of grazing land during construction works</p> <p>Loss / disruption to cropping and associated issues</p>	107.5	
Calder Highway to Red Cliffs	<p>Livestock grazing</p> <p>Irrigated agriculture</p> <p>Residential</p>	Managed resource protection area – zoned PCRZ including Kings Billabong directly north of substation	<p>Increase in construction vehicles using roads</p> <p>Disruption of access to properties</p> <p>Noise</p> <p>Impact on irrigated horticultural activities</p>	10.6	

Route segment	Primary land use/features	Protected areas in segment	Possible issues & constraints	Route length (km)	Mitigation Measures
			(including loss of land, plantings, infrastructure) Landscape, visual amenity and public health issues (community concern about EMF, noise) Avoid vegetation clearance in protected areas		

Table 3 Breakdown by Route Segments - Alternative Route*

Route segment	Primary land use/features	Protected areas in segment	Possible issues & constraints	Route length (km)	Mitigation Measures
Monash Substation to NSW/SA border	Some irrigated agriculture Livestock grazing Minimal use Chaffey Irrigation Area	Bookmark Biosphere (Calperum Station) Chowilla Regional Reserve Chowilla Game Reserve RAMSAR wetlands	Visual appearance Effect on landowners Heritage agreements (indigenous and non-indigenous sites) Native Title EPBC triggered by Bookmark Biosphere Native vegetation clearance Significant Mallee vegetation (avoid clearance) High habitat value (especially wetland areas)	78.8	
NSW/SA border to Greater Darling Anabranch	Livestock grazing (for most part) Dryland agriculture (cropping) Mainly open or cleared land		Greater Darling Anabranch (crossing) Areas of significant vegetation (avoid clearance) High habitat value (potential to support	70.9	

Route segment	Primary land use/features	Protected areas in segment	Possible issues & constraints	Route length (km)	Mitigation Measures
			<p>threatened flora and fauna)</p> <p>Undulating sandy and calcareous red earth plains</p> <p>Visual appearance from main roads</p> <p>Some perennial and intermittent water bodies</p> <p>Indigenous heritage sites</p>		
Greater Darling Anabranh to Darling River	<p>Livestock grazing (for most part)</p> <p>Dryland agriculture (cropping)</p> <p>Minimal use</p>		<p>Water courses (crossings) including Darling River</p> <p>Risk of flood event on infrastructure</p> <p>Irrigation areas to north</p> <p>Remnant vegetation (Mallee and chenopod)</p> <p>High habitat value</p> <p>Indigenous and non-indigenous heritage sites</p>	28.7	
Darling River to Buronga Substation	<p>Livestock grazing</p> <p>Dryland agriculture (cropping)</p>		<p>Water courses (crossings)</p> <p>Darling River floodplain</p> <p>Risk of flood event on infrastructure</p> <p>Areas of significant vegetation (significant stand of Mallee near existing Buronga to Broken Hill Transmission line)</p> <p>Indigenous and non-indigenous heritage sites</p> <p>Vegetation habitat sites</p> <p>Threatened fauna species (high habitat value)</p>	36.4	

* Some information for this table has been sourced from the 'Proposed SNI Interconnector EIS', Sinclair Knight Merz, 2002

ATTACHMENT 9 – 220KV OVERHEAD TRANSMISSION LINE ALTERNATIVE

1. DESCRIPTION OF CONSTRUCTION

The Murraylink alternative overhead, single circuit 220kV transmission line would consist of four major elements:

- Structures
- Conductors
- Insulators and attachment fittings
- Groundwires

The structures support the weight of the 220kV conductors, hold them safely clear of the ground and are designed to withstand the conductor forces due to their tension and the wind loads. The conductors carry the electrical current at the line voltage and three conductors are required to form the three phase electrical circuit. The insulators and fittings attach the high voltage conductors to the structures and the insulators prevent the passage of leakage current through the towers to the ground. The required spacing between the conductors is set by the line voltage. The groundwires are attached to the top of the tower and provide a protective screen against lightning strikes.

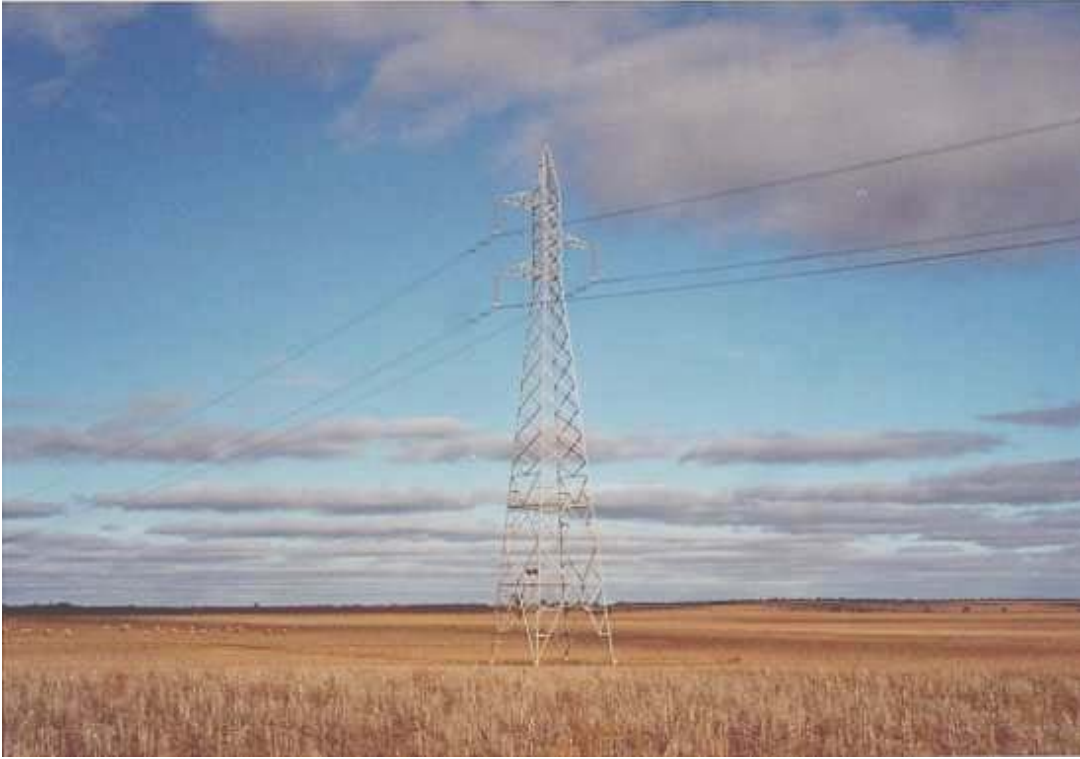
The Murraylink 220kV transmission line would consist of structures constructed using galvanized steel angles in a lattice braced arrangement with a square base and four legs attached to below ground foundations. The towers would be typically 40m in height and located about 400m apart along the easement. Most of the towers would be suspension types, which have a single insulator string for each conductor and only support the weight of the conductors. Tension towers at angles in the line and at each end are stronger and heavier in appearance, since they are also required to withstand the conductor tension loads. At least two tension insulator strings are used for each conductor on tension towers. Smaller towers could be used, but would increase the number of towers, since the spacing between towers along the easement would also be reduced to maintain the minimum safety clearance of the 220kV conductors above the ground.

The 220kV transmission line easement would be about 40m in width, as required to maintain the safety clearances used as the basis for the design, including allowances for the structure dimensions and the sideways swing of the 220kV conductors with

wind. Within this area buildings and similar structures would not be allowed and there would be controls on the heights and amounts of vegetation. Vehicle access is required to each tower and a clear area of 4-5m minimum width is generally required around each tower to allow access for maintenance. Restrictions would also apply to the heights of agricultural equipment and types of spray irrigators used on the easements.

Photographs of similar 220kV transmission lines in the Red Cliffs and Hattah-Kulkyne National Parks area are shown in the following section.

1. PHOTOGRAPHS



220kV, Single Circuit Suspension Tower

Primary Land Use/Features: Livestock Grazing

Dryland Agriculture

Mainly open or cleared land



220kV, Single Circuit Transmission Towers

Primary Land Use/Features: Steep Murray River Victorian bank

Note the level of modification to the vegetation around the tower.

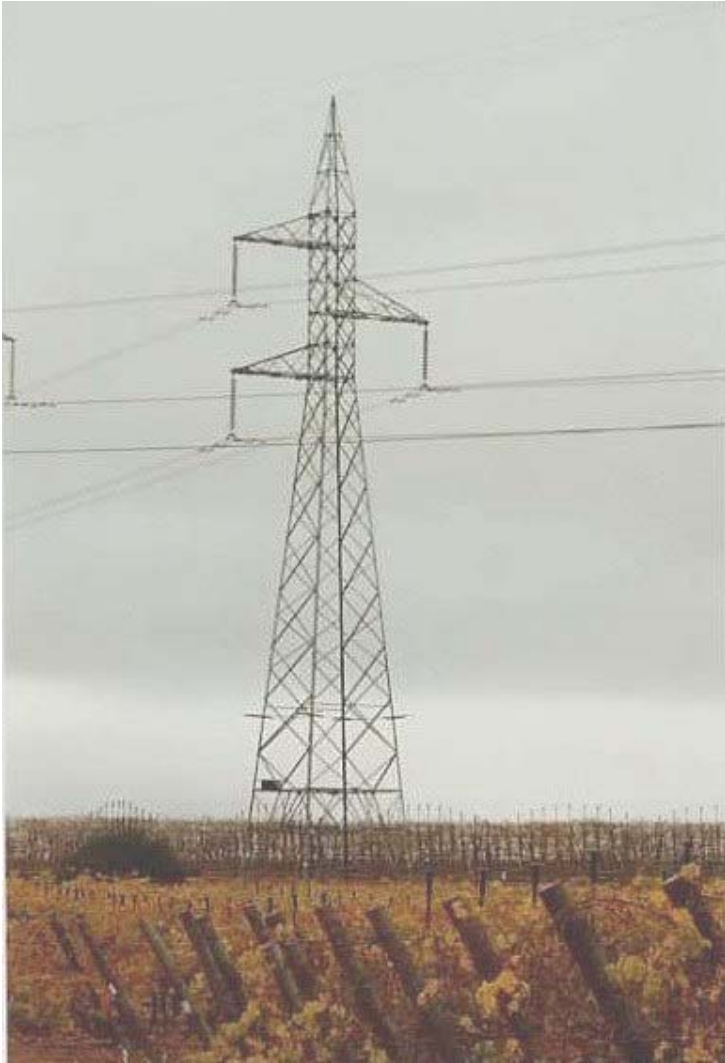


220kV, Single Circuit Strain Tower



220kV, Single Circuit Suspension Towers

Primary Land Use/Features: Red Cliffs scrubland near power station



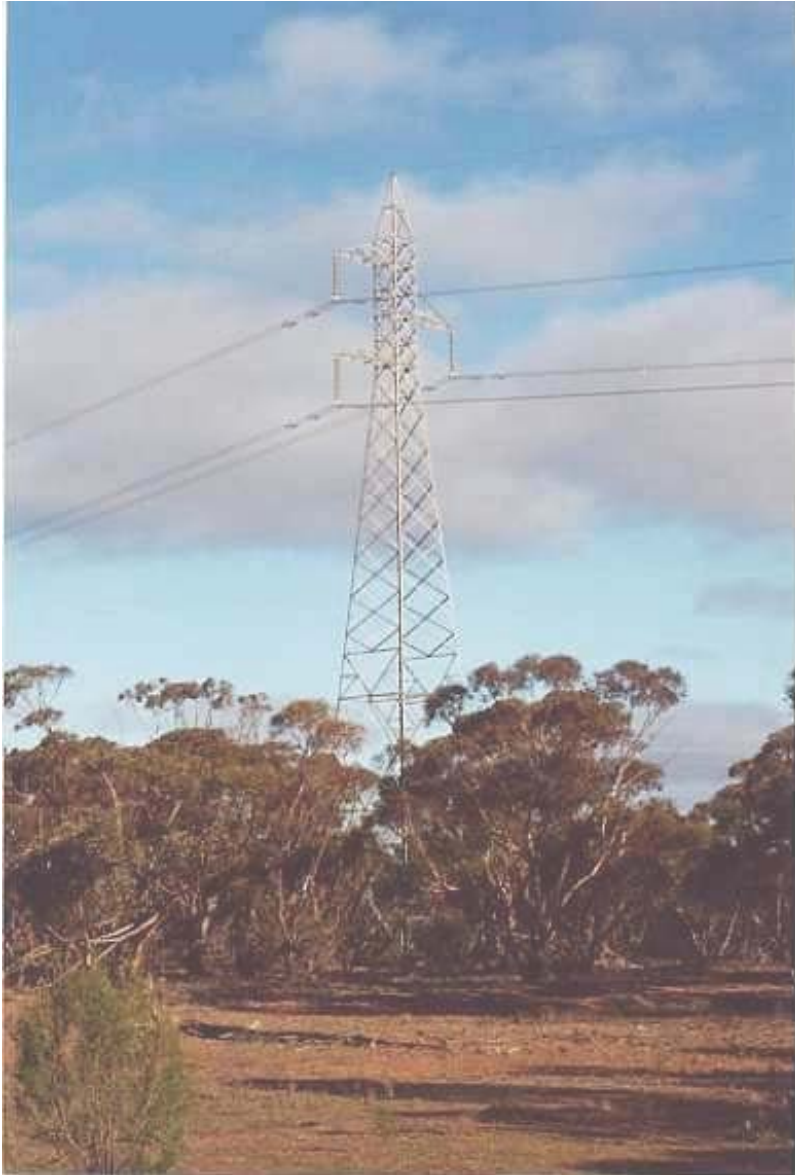
This Tower is part of a Double Circuit Transmission System so there are extra lines shown which connect to another

tower



220kV, Single Circuit Suspension Tower

Primary Land Use/Features: Irrigated Agriculture - Vineyards



220kV, Single Circuit Suspension Tower

Primary Land Use/Features: Mallee Woodland – Hattah -
Kulkyne National Park



220kV, Single Circuit Tower

Primary Land Use/Features: Murray River- River Red Gums, view into
NSW side
Low Lying Area / Water Crossing

ATTACHMENT 10

– CONTRIBUTIONS FROM MS FIONA DONOHOUE &
MR GARY NIEWAND

-----Original Message-----

From: Donohoue, Fiona (DWLBC) [mailto:Donohoue.Fiona@saugov.sa.gov.au]

Sent: Sunday, 22 June 2003 1:14 PM

To: mike.farr@transenergie.com.au

Cc: Hodder, Mike (DWLBC); sgamble@allenconsult.com.au

Subject: RE: Workshop Maps

Dear Michael,

Further to our phone conversation last Thursday, I've included some brief comments on the potential impact on native vegetation of a possible replacement for the Murraylink transmission line. Please note that these comments are not exhaustive due to the short time frame for response.

The maps and notes provided indicate two alternative routes for the hypothetical replacement for the Murraylink transmission line, a "preferred alignment" and an "alternative alignment". The "alternative alignment" north of the River (labelled 'Monash Substation to NSW/ SA border') passes through significant areas of native vegetation. In particular, it passes through extensive areas of intact native vegetation close to wetlands and through areas protected under the state's reserve system and Heritage Agreement areas. Clearance and ongoing works associated with the maintenance of the proposed alignment have the potential to substantially impact on area of native vegetation. They are also considered likely to be at variance with the principles of clearance contained in the Native Vegetation Act 1991.

Conversely, the "preferred alignment" (labelled 'River Murray and Floodplain' and 'Lagoon Drive to SA border') passes south of the river through cleared farming land. This route will minimise the need for vegetation clearance and associated habitat modification. It will also allow construction in cleared farming land for a greater percentage of the length. We would support the siting of a hypothetical replacement for the Murraylink transmission line along this alignment.

In areas of native vegetation that require clearance, we would suggest measures such as the use of underground cables to minimise damage to vegetation. Similarly, all clearance associated with the establishment of the transmission line should be rehabilitated using local native species.

I hope that these comments are useful.

Regards

Fiona Donohoue

Scientific Officer

Native Vegetation Program

Biodiversity Conservation Division

Department of Water, Land and Biodiversity Conservation

Ph: +61 8 8124 4764

Email: Donohoue.Fiona@saugov.sa.gov.au

-----Original Message-----

From: Gary.Niewand@dse.vic.gov.au [<mailto:Gary.Niewand@dse.vic.gov.au>]

Sent: Thursday, 19 June 2003 5:03 PM

To: mike.farr@transenergie.com.au

Cc: John.Cooke@dse.vic.gov.au; Joan.Phillips@dse.vic.gov.au;

John.Burley@dse.vic.gov.au; Sturmaine@parks.vic.gov.au;

pgoudy@parks.vic.gov.au; Dducket@parks.vic.gov.au

Subject: RE: Invitation to Workshop

Dear Mike/Sandra

I'm not sure that I can contribute enough to the Murraylink workshop on Monday to warrant my attendance. Therefore please accept the following in lieu of my attendance on the day.

As discussed yesterday morning, the establishment of utilities infrastructure in parks is dealt with under sections 27 and 27A of the National Parks Act 1975 (Vic.).

Section 27 relates to any applications for new infrastructure. Section 27(1) allows the Secretary to consent to works by a public authority (as defined in section 3(2) of the Act) provided that the Minister has first determined that there will not be a substantial effect on the park. Parks Victoria manages section 27 consents on behalf of the Secretary. Parks Victoria has a guideline on the consent process for infrastructure proponents wishing to consider accessing parks. Parks Victoria also has a standard consent document which is tailored to each particular case. Infrastructure in parks is generally incompatible with the objects of parks and parks management. Therefore any decisions in relation to the establishment of infrastructure in parks will not only be based on whether effects will be substantial but also within the broad context of a consideration of alternatives. The question as to whether an effect is likely to be determined to be substantial is difficult to define given the huge variations in both proposals and the natural and cultural values within specific parks. It is possible that a relatively minor proposal can have a major impact (especially where rare and threatened species are concerned). Cultural or social impacts are also considered - especially landscape impacts. Strict conditions will be applied to any consent to ensure that impacts are minimised. For example, in some cases proponents have only gained access to parks on the proviso that minimum impact installation technologies be used. In others very onerous rehabilitation standards have been set. While in still others, proponents have been required to significantly modify proposals or adopt less than optimal (in a fiscal or operational sense) alternatives.

In some cases consent may be given despite a substantial effect on the park if the Governor in Council determines that the benefits of the public authority activity outweigh the benefits derived from the park. This has only occurred once or twice - with one example being the installation of the Dunkeld town water storage in the Grampians National Park. The water storage area is 10 ha and there were not really any viable alternatives at the time of installation.

In regard to the hypothetical establishment of an overhead power line through Murray Sunset National Park: Any public authority or utilities provider is free to make application to establish the infrastructure; Every application would be considered on merit. Success of any application will be dependent on there not being a substantial affect on the park or viable 'outside park' alternatives.

The establishment of an overhead line through the park that includes a significant easement and requires on-going under-line vegetation management would almost definitely involve a substantial effect on the park. As the effect is likely to be determined by the Minister to be substantial, the proposal would have to be referred to the Governor in Council to determine if consent should be given. Given the availability of alternatives (routes and technologies) so far as the hypothetical case is concerned, it is difficult to envisage that the Governor in Council would determine that consent should be issued. Essentially, the outcome of all of this is that all proponents of utilities infrastructure wishing to access parks must prove that there will not be a substantial effect on the park before consent would be granted. In some cases there is obviously more than 'one way of skinning a cat'. However, it is difficult to envisage that the effects of an over-head proposition could be mitigated to the extent that it would not have a substantial effect on the park. Therefore such a proposition would not be considered to be one of the ways of 'skinning the cat'.

Section 27A allows the formalisation of existing infrastructure (e.g. that infrastructure that is in place at the time of a park's creation). That is, it may be used in cases where the use has been established. Section 27A has no bearing on the hypothetical case.

Parks Victoria contacts wrt this issue are Peter Goudy, Dennis Duckett and Steve Turmaine. All of these guys can be contacted via 13 1963. The National Parks Act 1975 can be accessed via the Victorian Govt website. I would be pleased to discuss further should you require it.

Regards

Gary Niewand

Senior Policy Officer

9637 8658

ATTACHMENT 11 - RECORDS OF ROUTE ASSESSMENT

Murraylink Alternative Project Environmental Impact Mitigation Workshop

23rd June 2003

Table 1: Record of Route Assessment – Preferred Route

Note: Comments in italics and underlined added after the Workshop to clarify the discussion. These do not alter the meanings of the points.

Route Segment	Primary Land Use/features	Protected Areas in Segment	Mitigation Measures
Monash Substation to River Murray (northern and western bank)	Irrigated agriculture immediately south of substation Livestock grazing between substation and River. Rural living near Monash substation. Loxton Irrigation Area Landscape Zone	Bookmark Biosphere	<ul style="list-style-type: none"> Murray crossing undergrounding because of impact on visual amenity, 350m bore would be required with directional drilling. could cross the river using Berri Bridge (at a cost) which would be same mitigation as undergrounding may be some native vegetation adjacent to road and adjacent to river, would want to minimise clearance (see Fiona Donouhoue email) and may require undergrounding if there is native vegetation Aboriginal heritage areas probably neutral on overheading vs undergrounding workshop agreed that to avoid vegetation clearing and aesthetics on crossing, it is highly probable (>80%) that this segment would be undergrounded to confirm length of undergrounding required, up to 5km
River Murray and Flood Plain	River and flood zone River and river banks used for recreation activities River used for navigation	River Murray National Park Bookmark Biosphere	<ul style="list-style-type: none"> small initial section (approx 1km) would continue undergrounding from first segment to cross river and transition workshop agreed it is highly probable that no further undergrounding would be required in this section additional development costs and time to address public consultation and community support

**Murraylink Alternative Project
Environmental Impact Mitigation Workshop**

Route Segment	Primary Land Use/features	Protected Areas in Segment	Mitigation Measures
	Significant landscape value Significant conservation values Indigenous heritage sites along Murray River		<ul style="list-style-type: none"> workshop considered towers would be viewed as acceptable in this area
Lagoon Drive to SA Border	Livestock grazing Dryland agriculture and cropping Irrigated agriculture Rural living Low lying areas / water crossings	Bookmark Biosphere	<ul style="list-style-type: none"> overhead with towers considered appropriate
Victorian Border to Morkalla Road	Nature conservation Livestock grazing Dryland agriculture	Murray Sunset National Park	<ul style="list-style-type: none"> To use the road reserve with undergrounding, would need to clear some native vegetation on the road reserve and address interaction between the power lines and the gas pipeline (but this is believed to be adequate) In a real proposal, DC may have to be examined in the context of avoiding clearing native vegetation VicRoads approval would be required, assuming this is granted Workshop believed undergrounding would be required along the road reserve to avoid the National Park the Workshop agreed going through the National Park was extremely unlikely to be permitted noted that 10 yrs ago Telstra forced to avoid National Park for telecoms cable State Planning Policy - net gain offsets for native vegetation loss allow for cost and address practicality of revegetation

**Murraylink Alternative Project
Environmental Impact Mitigation Workshop**

Route Segment	Primary Land Use/features	Protected Areas in Segment	Mitigation Measures
Morkalla Road to Meridian Road	Livestock grazing Dryland agriculture		<ul style="list-style-type: none"> many small landholders in this area, and strong VFF lobbying would need extensive community consultation with delays and additional development costs <u>workshop considered overhead with towers was appropriate, but</u> multiple minor realignments may occur to avoid native vegetation or paddock areas make an allowance for multiple minor realignments
Meridian Road to 1km west of Calder Highway	Large-scale horticulture and viticulture		<ul style="list-style-type: none"> west of highway has large horticulturists so easier consultation process towers would be acceptable make an allowance for realignment make a cost allowance for loss of productive land <u>and amenity value</u> (10-30% increase) use of poles may be required through irrigated horticulture to minimise footprint and loss of land (tower space is dead area) (probability 60%) and accommodate property owners modifications to towers to make taller and span longer may be an option at additional cost
1km west of Calder Highway to Red Cliffs	Livestock grazing Irrigated agriculture Residential Viticulture near Calder Highway	Managed resource protection area – zoned PCRZ including Kings Billabong directly north of substation	<ul style="list-style-type: none"> highway to substation has many small viticulturists who would require consultation couldn't use roadside, would have tower footing impacting on small viticulturists' irrigation layouts and other land use negotiation with large number of landowners would be time consuming and developments costs increased community view may be that undergrounding is required congestion constraints apparently rule out alternative routes need to explore (and rule out if applicable) use of other easements - double circuiting of towers may be possible - cost impact of coming out of underground and going additional distance may be more expensive than going underground direct

**Murraylink Environmental Impact Mitigation Workshop
23rd June 2003**

Table 2: Record of Route Assessment – Alternative Route

Note: Comments in italics and underlined added after the Workshop to clarify the discussion. These do not alter the meanings of the points.

Route Segment	Primary Land Use/features	Protected Areas in Segment	Mitigation Measures
Monash Substation to NSW/SA border	Some irrigated agriculture Livestock grazing Minimal use Chaffey Irrigation Area	Bookmark Biosphere (Calperum Station) Chowilla Regional Reserve Chowilla Game Reserve RAMSAR wetlands	<ul style="list-style-type: none"> • for overheading, native vegetation clearance would be required and opposed by National Vegetation Council, would advise against the Northern Route through EIS and could be refused • if undergrounding minimised clearance, would be supported • proximity of lines to RAMSAR wetlands is of concern • ecological and physical impact could require 30km undergrounding for impact on this area, this would cover RAMSAR and some of biosphere but not all • planning SA letter to ACCC questions environmental impact on RAMSAR ecological processes • range of views <u>on the need for undergrounding in RAMSAR areas</u>, given Planning SA views and possible public policy: zero, 30 and 60km <u>of undergrounding</u> depending on criteria: a strong view of a minimum of 30km, with the possibility of 60km on vegetation clearance grounds and a rare view of none at all (60%, 30% and 10%) • dependence on overall public policy view (playoff of various commercial interests etc) not incorporated due to lack of expertise • route alignment change further west and north to avoid sensitive areas resulting in longer route, and higher towers for vegetation overfly would be an alternative

**Murraylink Alternative Project
Environmental Impact Mitigation Workshop**

Route Segment	Primary Land Use/features	Protected Areas in Segment	Mitigation Measures
NSW/SA border to Greater Darling Anabranh	Livestock grazing (for most part) Dryland agriculture (cropping) Mainly open or cleared land		<ul style="list-style-type: none"> • will depend on degree of clearance of native vegetation, but generally believed to be low • overflying may be required to minimise clearance • will be a material vegetation offset cost • actual configuration will depend on environmental assessment • very strong likelihood of towers but with additional costs for offset and overflying • crossing on anabranh probable with towers with an allowance for rerouting • several km of poling required in horticultural areas around watercourses (2-3km) • are there areas of wilderness values that would require rerouting
Greater Darling Anabranh to Darling River	Livestock grazing (for most part) Dryland agriculture (cropping) Minimal use		<ul style="list-style-type: none"> • will depend on degree of clearance of native vegetation, but generally believed to be low • overflying may be required to minimise clearance • will be a material vegetation offset cost • actual configuration will depend on environmental assessment • very strong likelihood of towers but with additional costs for offset and overflying • several km of poling required in horticultural areas around watercourses (2-3km) • are there areas of wilderness values that would require rerouting

**Murraylink Alternative Project
Environmental Impact Mitigation Workshop**

Route Segment	Primary Land Use/features	Protected Areas in Segment	Mitigation Measures
Darling River to Buronga Substation	Livestock grazing Dryland agriculture (cropping) Horticulture each side of river		<ul style="list-style-type: none"> • will depend on degree of clearance of native vegetation, but generally believed to be low • overflying may be required to minimise clearance • will be a material vegetation offset cost • actual configuration will depend on environmental assessment • very strong likelihood of towers but with additional costs for offset and overflying • crossing on Darling River probable with towers with an allowance for rerouting • several km of piling required in horticultural areas around watercourses (2-3km) • are there areas of wilderness values that would require rerouting

ATTACHMENT 12 – ENVIRONMENTAL IMPACT
WORKSHOP ANALYSIS MODEL



Worley

BURNS AND ROE WORLEY

Environmental Impact Mitigation Workshop Analysis Model

455/00000/0

10 July 03

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SYNOPSIS

This report summarises the Environmental Impact Mitigation Workshop carried out in June 2003 in order to evaluate the likely degree of environmental mitigation required for the two Murtraylink alternatives evaluated in the workshop.

This report details:

1. the conclusions of the workshop
2. the translation of these findings into changes in the cost model
3. the new results of the cost model after these changes

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4			8		

455/00000/0 - ENVIRONMENTAL IMPACT MITIGATION WORKSHOP

REV	DESCRIPTION	ORIG	REVIEW	WORLEY APPROVAL	DATE	CLIENT APPROVAL	DATE
0	Issued to the Client	A Jameson	P Tuohey	R Touzel	10 Jul 03	N/A	



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1. INTRODUCTION

This report summarises the changes made to the Murraylink Alternatives' cost model on the basis of the Environmental Impact Mitigation Measures workshop carried out on Monday 23rd June 2003.

The changes made fall into several broad categories:

- Provision of poling for some or all of a segment, in order to reduce visual impact or physical footprint on existing land uses;
- Provision of undergrounding for some or all of a segment to reduce visual impact and/or avoid ecologically sensitive areas, including native vegetation;
- Provision of additional route length to account for the occurrence of minor realignments in a segment.

Where the workshop was uncertain as to the specific outcome of a situation, several scenarios were developed and a probability assigned to each scenario.

The workshop also redefined some segments to more accurately reflect changes in land-use. These changed segments were reviewed by the workshop and are provided in the minutes of the workshop meeting. BRW has recalculated segment lengths based on these changed segment definitions.

These changes were then implemented into the cost model.



2. PREFERRED ROUTE

2.1 Monash Substation to River Murray (northern and western bank)

2.1.1 Workshop conclusions

The workshop agreed that it is highly probable that this segment would be undergrounded in order to avoid clearance of native vegetation and to preserve the aesthetics of the Murray river crossing.

2.1.2 Modelling translation

Recommendation 1 (R1): BRW to confirm extent of undergrounding required (workshop estimated c. 5km) to incorporate this segment and the river crossing to an acceptable transition point

Recommendation 2 (R2): Capital cost model for this segment to be modified to a discrete probability distribution:

- 90% probability of undergrounding required of length in R1 in this segment
- 10% probability of poles in this segment

2.2 River Murray and Flood Plain

2.2.1 Workshop conclusions

The workshop agreed that it is highly probable that no undergrounding would be required in this section after the Murray River crossing (see 2.1.1). The workshop considered that additional development costs would be incurred in order to engage in a public consultation and community support exercise.

2.2.2 Modelling translation

Recommendation 3 (R3): Development costs to be reviewed to ensure adequate allowance for a public consultation and community support exercise has been made. If not, then the development cost to be increased to cover this exercise.

2.3 Lagoon Drive to SA Border

2.3.1 Workshop conclusions

The workshop agreed that no further environment impact mitigation would be required in this segment.



2.3.2 Modelling translation

No changes to existing model.

2.4 Victorian Border to Morkalla Road

2.4.1 Workshop conclusions

The workshop agreed that going through the National Park was extremely unlikely to be permitted, and noted that ten years ago Telstra was forced to avoid the park when laying optical cable.

The alternative route is to use the road reserve through the park. The reserve is not wide enough to permit overhead transmission. To use underground transmission and maintain the required support and separation between cables and the gas pipeline through the reserve, native vegetation would need to be cleared alongside the road. Net gain offsets will be incurred for this clearance.

The Minister could insist on the use of DC cables (which can be laid within the existing cleared road reserve area) but the workshop considered this very unlikely.

It is assumed that VicRoads permission would be granted for the use of the reserve.

2.4.2 Modelling translation

Recommendation 4 (R4): this segment of the route to be costed on the basis of undergrounding along the road reserve. BRW to modify route length if appropriate.

Recommendation 5 (R5): The remote chance that the Minister might insist on the use of a DC cable to avoid the clearance of native vegetation has not been incorporated into the cost model.

2.5 Morkalla Road to Meridian Road

2.5.1 Workshop conclusions

This area of the route encompasses many small landholders. The workshop considered that additional development costs would be incurred in order to engage in a public consultation and community support exercise, but that overhead transmission would be considered acceptable.

The workshop stated that multiple minor realignments would be required as a result of the consultation process or to avoid pockets of native vegetation or paddock areas.

2.5.2 Modelling translation

Recommendation 5 (R5): BRW to document and provide an appropriate allowance in the base estimate for multiple minor realignments

Recommendation 6 (R6): Development costs to be reviewed to ensure adequate allowance for a public consultation and community support exercise has been made. If not, then the development cost to be increased to cover this exercise.



2.6 Meridian Road to 1km west of Calder Highway

2.6.1 Workshop conclusions

The horticultural landowners in this area cover larger areas than those on the other side of the Calder Highway, and so the consultation process will be more straightforward. Towers would be acceptable subject to the consultation process: however, multiple minor realignments may be required to avoid irrigation systems. Land compensation costs will be higher in the area due to the loss of productive land and so poles may be proposed as a way of reducing the footprint. Alternatively, taller towers with a longer span between towers might be used.

2.6.2 Modelling translation

Recommendation 7 (R7): Capital cost model for this segment to be modified to a discrete probability distribution:

- a 60% probability that poles will be required for this segment
- a 40% probability that towers will be acceptable but with the costs increased by 10-30% (modelled by a triangular distribution with a mode of 20, minimum of 10 and maximum of 30)

The possibility of using taller towers with a longer span between towers has not been incorporated into the model.

2.7 1km west of Calder Highway to Red Cliffs

2.7.1 Workshop conclusions

This segment of the route has predominantly small viticulturists and other horticulturalists. The workshop considered that additional development costs would be incurred in order to engage in a public consultation and community support exercise.

The community may consider that overhead transmission would be considered acceptable. However, the workshop also expressed a view that, under certain circumstances, the community would not accept overheading and insist on undergrounding.

The workshop formed a view that there would be considerable opposition to a new overhead route. However, it may be possible to reroute to utilise existing towers with double circuiting.

2.7.2 Modelling translation

Recommendation 8 (R8): BRW to investigate feasibility of using existing infrastructure

Recommendation 9 (R9): if the existing infrastructure cannot be used then undergrounding will be required on this segment



3. ALTERNATIVE ROUTE

3.1 Monash Substation to NSW/SA border

3.1.1 Workshop conclusions

Substantial native vegetation clearance would be required on this section of the route. This would be opposed by the National Vegetation Council who would advise against this routing in the Environmental Approvals process. Undergrounding would be supported if it minimised clearance. The proximity of the lines to the RAMSAR wetlands, and the potential for impact on their ecological processes, was highlighted as a concern.

Three scenarios were postulated by the workshop:

- no undergrounding at all would be required – this was felt to be rare;
- the 30km section adjacent to the RAMSAR wetlands, but not all of the Bookmark Biosphere, would need to be undergrounded – this (as a minimum) was felt to be strongly likely;
- the full 60km would need to be undergrounded to protect not only the RAMSAR wetlands but also the Bookmark Biosphere – this was felt to be a possibility.

3.1.2 Modelling translation

Recommendation 10 (R10): the degree of undergrounding required in this segment to be represented by a discrete distribution of the following cases:

- A probability of 10% of no undergrounding;
- A probability of 60% of 30km of undergrounding; and
- A probability of 30% of 60km of undergrounding.

3.2 NSW/SA border to Greater Darling Anabran ch

3.2.1 Workshop conclusions

The degree of environmental impact mitigation will depend on the degree of native vegetation clearance required, but the workshop felt the degree of clearance would probably be low. There is a very strong likelihood that towers will be acceptable for this entire segment with the exception of 2-3km of poling through horticultural areas around the watercourses. The anabran ch crossing is considered appropriate with towers but there may need to be rerouting to an optimal crossing point. Similarly, some minor rerouting may be required to avoid pockets of vegetation as a result of the environmental assessment.

The workshop also discussed whether there were areas of wilderness value along the route, as these would require rerouting.



3.2.2 Modelling translation

Recommendation 11 (R11): BRW to provide an allowance for multiple minor realignments that will arise during the environmental impact process

Recommendation 12 (R12): BRW to provide an allowance for rerouting to a suitable crossing of the Anabranh

Recommendation 13 (R13): BRW to incorporate a cost allowance for the material vegetation offset cost

Recommendation 14 (R14): BRW to incorporate any additional costs for offset and overflying

Recommendation 15 (R15): It is assumed that there are no areas of wilderness value that will require rerouting to take place

Recommendation 15a (R15a): the degree of poling required in this segment to be represented by a uniform probability distribution between 2 and 3km

3.3 Greater Darling Anabranh to Darling River

3.3.1 Workshop conclusions

The workshop had similar discussions to those outlined in 3.2.1.

3.3.2 Modelling translation

Recommendation 16 (R16): BRW to provide an allowance for multiple minor realignments that will arise during the environmental impact process

Recommendation 17 (R17): BRW to incorporate a cost allowance for the material vegetation offset cost

Recommendation 18 (R18): BRW to incorporate any additional costs for offset and overflying

Recommendation 19 (R19): it is assumed that there are no areas of wilderness value that will require rerouting to take place

Recommendation 19a (R19a): the degree of poling required in this segment to be represented by a uniform probability distribution between 2 and 3km

3.4 Darling River to Buronga Substation

3.4.1 Workshop conclusions

The workshop had similar discussions to those outlined in 3.2.1

3.4.2 Modelling translation

Recommendation 20 (R20): BRW to provide an allowance for multiple minor realignments that will arise during the environmental impact process



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Recommendation 21 (R21): BRW to provide an allowance for rerouting to a suitable crossing of the Murray River

Recommendation 22 (R22): BRW to incorporate a cost allowance for the material vegetation offset cost

Recommendation 23 (R23): BRW to incorporate any additional costs for offset and overflying

Recommendation 24 (R24): it is assumed that there are no areas of wilderness value that will require rerouting to take place

Recommendation 24a (R24a): the degree of poling required in this segment to be represented by a uniform probability distribution between 2 and 3km



4. MODELLING IMPLEMENTATION

4.1 Use of trigger functions

Trigger functions were used to probabilistically model the occurrence of a discrete scenario with two possible outcomes. If the trigger function is true, then the parameters associated with that case are put into the model. This occurs under some scenarios, where additional costs are incurred with poling for realignment, for example.

Discrete parametric distributions were used where only one variable was under uncertainty. An example is undergrounding alone with no other changed costs.

4.2 Degree of undergrounding

The base model had an input field for the degree of undergrounding. The new undergrounding length generated by the Monte Carlo engine using the process above was referenced into this field.

4.3 Degree of poling

The additional cost associated with poling was implemented as a line item in the summary cost model. This line item was the marginal cost of moving from towers to poling so that the base model did not have to be rebuilt. The additional cost was advised by BRW. The degree of poling was calculated using the method described above.

4.4 Additional costs

Additional costs incurred were also represented as a line item in the summary cost. This was calculated using the method described above. BRW's estimate of these costs, linked to the action items above, is detailed in Appendix 1 of this report.



5. REVISED RESULTS

5.1 Mean route impact measures

	Undergrounding	Poling	Towers	Re-routing Costs
Preferred route (Alternative 3)	27	24	121.4	\$1,120,000
Alternative route (Alternative1)	30	7.5	168.9	\$2,933,400

Note: the mean represents the average over all the simulations. However, the workshop results were implemented by the use of a discrete distribution. Such distributions do not necessarily have a scenario represented by the mean

5.2 Regression sensitivities

The regression sensitivities show the sensitivity of the price to the sources of uncertainty calculated in the model.

5.2.1 Preferred route

The two trigger functions, which determine the degree of undergrounding required for the first and last sections of line, are the main sources of uncertainty for this route, followed by the supply and installation costs of cable. This is in line with expectations based on analysis of the model architecture.

5.2.2 Alternative route

The dominant source of uncertainty for the alternative route is the degree of undergrounding. This is from the NSW Border – Monash Substation section, and reflects the wide separation of the three scenarios (0km, 30km and 60km). This is as expected.

The uncertainty in supply and installation costs of cable are the next two largest contributors.

5.3 Comments on model

5.3.1 Contingency figures

Contingency, in the definitions of a quantitative capital cost risk model laid down by the AACEI, is the additional cost provision required to take the base estimate to a P50 level. Under normal circumstances, uncertainty is applied (through a parametric simulation methodology) to a base estimate. This base estimate normally represents the deterministic 'best guess' of the estimating team. The concept of contingency starts to collapse, however, when there is no deterministic base



model – the analyst is faced with having to make a decision as to which of a number of permutations of scenarios represents the base models. This is a common pitfall with discontinuous distributions.

Under such circumstances, the capital cost at a given percentile is a more appropriate input to decision making than breaking this into an arbitrary base cost and contingency. In the above results, I have therefore not presented a contingency figure.

However, it should be highlighted that this is only one layer of contingency as a project proponent or contractor would apply. A more appropriate description of the contingency generated by these models would be *cost uncertainty contingency*. Other sources of contingency would normally encompass event risk and commercial risk. These are not evaluated in the models described and analysed above. Therefore, although such models may provide an input to contingency analysis, they do not price all risks and cannot be used as an indication of the likely market price of a project.



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APPENDIX I BRW CLOSEOUT OF EIWM ACTIONS



Murraylink Alternative Project Environmental Impact Analysis Modelling

Preferred Route

Route Segment	Modelling Translation	Results	Route Length (km)
2.1 Monash Substation to River Murray (northern and western bank)	<p>R1: Confirm extent of undergrounding required to incorporate segment and river crossing to an acceptable transition point, workshop estimated ~5km (BRW)</p> <p>R2: Capital cost model for this segment to be modified to a discrete probability distribution:</p> <ul style="list-style-type: none"> 90% undergrounding of length in R1 of this segment 10% poles in this segment 	<p>R1: Use 8km length of underground cabling (to be confirmed)</p> <p>R2:</p> <ul style="list-style-type: none"> Undergrounding is \$2M/km Poles is \$0.32M/km 	8
2.2 River Murray and Flood Plain	<p>R3: Review development costs to ensure adequate allowance for public consultation and community support exercise. Increase development cost if no allowance has been considered for this exercise</p>		10
2.3 Lagoon Drive to SA Border	No changes to existing model		25.4
2.4 Victorian Border to Morkalla Road	<p>R4: Segment to be costed on undergrounding along the road reserve. Modify route length if appropriate</p> <p>R5: Use of DC cable has not been included in cost model if required to avoid clearance of native vegetation</p>	<p>R4: Use 13km length of underground cabling (\$2M/km)</p>	20



Route Segment	Modelling Translation	Results	Route Length (km)
2.5 Morkalla Road to Meridian Road	<p>R5: Provide an appropriate allowance in the base estimate for multiple minor realignments (BRW)</p> <p>R6: Review development costs to ensure adequate allowance for public consultation and community support exercise. Increase development cost if no allowance has been considered for this exercise</p>	<p>R5:</p> <ul style="list-style-type: none"> Add 2kms extra route length for multiple minor realignments (\$0.16M/km) Add additional \$160,000 to allow for deviations in route (allowing for 4 deviations in the route @ \$40,000/deviation) 	79
2.6 Meridian Road to 1km west of Calder Highway	<p>R7: Capital cost model for this segment to be modified to a discrete probability distribution:</p> <ul style="list-style-type: none"> 60% for poles needed for this segment 40% towers in this segment with increased costs of 10-30% 	<ul style="list-style-type: none"> Pole cost is \$0.32M/km. Add 2kms in extra route length Tower cost is \$0.16M/km. Add 1km in extra route length. Add \$80,000 to allow for deviations in route (allowing for 2 deviations in the route @ \$40,000/deviation) 	17
2.7 1km west of Calder Highway to Red Cliffs	<p>R8: Investigate feasibility of using existing infrastructure (BRW)</p> <p>R9: If not using existing infrastructure then undergrounding required in this segment</p>	<p>R8: Using existing infrastructure does not appear viable</p> <p>R9: Option 1 (60% probability) - 6kms of underground cabling from substation to south of Red Cliffs (\$2M/km) and 7km of poles for remaining section to west of Calder Hwy (\$0.32M/km) – to be confirmed</p> <p>Option 2 (40% probability) – 13kms of underground cabling for entire route (\$2M/km)</p>	13



Murraylink Environmental Impact Analysis Modelling Alternative Route

Route Segment	Modelling Translation	Results	Route Length (km)
3.1 Monash Substation to NSW/SA border	<p>R10: Degree of undergrounding in segment to be represented by discrete distribution:</p> <ul style="list-style-type: none"> 10% no undergrounding 60% of 30km undergrounding 30% of 60km undergrounding 		70
3.2 NSW/SA border to Greater Darling Anabranh	<p>R11: Provide allowance for multiple minor realignments arising during environmental impact process (BRW)</p> <p>R12: Provide allowance for re-routing to a suitable crossing of the Anabranh (BRW)</p> <p>R13: Incorporate cost allowance for vegetation offset cost (BRW)</p> <p>R14: Incorporate cost allowance for offset and overflying (BRW)</p> <p>R15: Assumed there are no areas of vegetation value requiring re-routing</p>	<p>R11: Add 3kms extra route length (\$0.16M/km)</p> <p>R12: Add 3kms extra route length (\$0.16M/km)</p> <p>R13: Allow \$1000/km</p> <p>R14: Allow \$5000/km for the entire route length (based on that half of the length may require overflying at \$10,000/km)</p>	70.9

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11 July 2003

REF: 024/45003

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Attention: Stéphane Mailhot
Chief Executive

MURRAYLINK PROJECT

BRW RESPONSE TO PB ASSOCIATES REPORT

Dear Stéphane

Murraylink Transmission Company (MTC) has requested that BRW provide its advice on issues raised in the PB Associates report *Murraylink Review of Expenditure* to the Australian Competition and Consumer Commission dated 3 July 2003. Advice is provided on two issues that have not already been addressed through comments on the Commission's *Preliminary View*.

Phase Shifting Transformer Costs

In section 5.3 of its report, PB Associates indicates that it considers the cost of the phase shifting transformers should be lower by approximately 25%, or nearly \$5 million.

BRW's cost estimate for the phase shifting transformers was derived from budget prices obtained from a supplier for a similar phase shifting transformer and other pricing for large transformers purchased. The pricing was subsequently checked with a budget price from a supplier against a specification for the requirements of the alternative projects; this check confirmed the cost estimate and details can be provided to the Commission on request. On this basis, BRW does not accept the comment made that the costs should be lower by nearly \$5 million as indicated in the PB Associates' report. The potential variability in the phase-shifting transformers has been factored into BRW's quantitative risk analysis with a material cost variation of -15% / +25%.

Total Capital Costs

PB Associates has also indicated in Section 5.3 of its report that the total costs estimated by BRW in Appendix 5 of its report dated 16 October 2002 do not reconcile with the activities listed. The former indicates that it appears that the total cost of Alternative 3 is overstated by \$13.3 million and PB Associates recommends that the Commission should review the BRW input information. BRW has reviewed this comment and the example quoted by PB Associates (Table 2 of the report dated 9 May 2003). PB Associates has not allowed for the 10% profit and overheads applied to the total transmission line and switchyard costs of \$133.2 million and this oversight accounts for the \$13.3 million not included in its reconciliation of the costs. A correction to PB Associates Table 2 is provided below.

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Activity	Estimate
Development Cost	\$13,569k
<ul style="list-style-type: none"> • Transmission Line Cost • Switchyard Cost • 10% Contractor Profit and Overhead 	<ul style="list-style-type: none"> \$74,647k \$58,572k \$13,322k
Total EPC Project Cost	\$146,541k
Interest During Construction	\$29,247k
Total Project Cost	\$189,357k

Yours sincerely
Burns and Roe Worley



R McD Touzel
General Manager, Consulting