

**TELSTRA'S SUBMISSION IN SUPPORT OF THE ULLS
MONTHLY CHARGES UNDERTAKINGS DATED DECEMBER
2005**

**ANNEXURE E
NETWORK COSTS**

INTRODUCTION

- 1 On 10 August 2005 the Commission released a draft decision to reject Telstra's ULLS and SSS Undertakings dated 13 December 2004 ("**Draft Decision**").¹
- 2 Telstra responded to the Draft Decision in September 2005. The response included a review of the Commission's comments in the Draft Decision regarding the PIE II model. That review is reproduced below.

**TELSTRA'S RESPONSE TO THE COMMISSION'S CRITICISMS OF PIE II IN
THE DRAFT DECISION**

- 3 In the Draft Decision, the Commission identifies certain concerns with Telstra's model for estimating network costs - the PIE II model.² In particular, the Commission says that:

*[it] continues to believe that the PIE II model and its underlying assumptions are unlikely to produce estimates which can be considered reasonable under the statutory criteria. Further, the ACCC believes that Telstra has not provided sufficient justification for the existing model structure in response to previously expressed concerns, nor has it made any adjustments to the model and its underlying assumptions.*³

- 4 For these reasons, the Commission says that it cannot accept Telstra's estimates of network costs produced by the PIE II model as being reasonable.

¹ ACCC, 2005, Assessment of Telstra's ULLS and LSS Monthly Charge Undertakings, Draft Decision, August. Telstra notes that the Commission issued its Final Decision – Assessment of Telstra's ULLS and LSS Monthly Charge Undertakings on 21 December 2005 ("**Final Decision**"). For the purpose of these Undertakings, Telstra will deal with any relevant issues stemming from the Final Decision in a supplementary submission in due course.

² Draft Decision, section 6.4 and Appendix E.

³ Draft Decision, page 31.

- 5 Telstra submits that the Commission has provided no reasons that would justify it reaching a conclusion that the PIE II model input parameters or model outputs are not reasonable as defined by the TPA, nor that they are inconsistent with international practice of TSLRIC modelling.
- 6 Telstra maintains that, as set out in its ULLS Monthly Charges and LSS Monthly Charges Undertakings and its submissions in support of them, the PIE II model estimates of network and associated costs are conservative and reasonable. Telstra has designed its PIE II model to reflect a forward looking network structure and has provided the Commission with submissions and expert reports to support the modelling assumptions and parameters used by it.⁴
- 7 In this Annexure, Telstra responds again to the concerns relied upon by the Commission in its Draft Decision.

CONFIDENTIALITY

- 8 This Annexure has all of the confidential information deleted and thus may be disclosed publicly. Telstra will provide the confidential version of this Annexure and the confidential information contained in it to interested parties upon those parties signing appropriate confidentiality undertakings. The confidentiality undertakings do not limit the extent to which interested parties, including the Commission, can analyse and comment on the content of this Annexure. Rather they are intended to prevent the distribution and use of the confidential material contained in this Annexure for purposes other than participating in the Commission's public inquiry in relation to the ULLS Undertakings lodged 23 December 2005.

REASONABLE REQUIREMENTS FOR MODELLING

⁴ These include *Telstra's Submission in relation to the Methodology used for Deriving Prices Proposed in its Undertakings dated 9 January 2003*, 13 February 2003 ("**Methodology Submission**"); Bridger Mitchell, *Appropriateness of Telstra's cost modelling methodology*, 28 May 2003 (Annexure B to *Telstra's detailed submission in support of its undertakings dated 9 January 2003*, 31 July 2003) ("**Mitchell report 2003**"); *Telstra's Submission Relating to PSTN, OTA and LCS in Response to the Draft Decision on Telstra's Undertaking for PSTN, ULLS and LCS Dated October 2004*, November 2004 (section F and Annexure D); *Telstra's submission in support of the ULLS monthly charges undertaking dated 13 December 2004*, March 2005, Annexure B ("**March Submissions, Annexure B**"); and Mark Kennet and Bridger Mitchell, *Confidential Commentary on PIE II Model Assumptions*, May 2005 ("**Kennet and Mitchell report 2005**").

- 9 In Appendix E of the Draft Decision, the Commission refers to certain concerns it has with Telstra’s PIE II model, and says that because of these concerns it continues to believe that it cannot accept it.

Simplicity and transparency

- 10 The Commission states that it is incumbent on Telstra to make the model sufficiently transparent to enable both the Commission and access seekers to make a well informed decision about the operation and content of the model.⁵ The Commission notes that:

“[i]t is open to Telstra to either produce a simpler model or provide sufficient documentation and justification that other parties are able to inform themselves regarding the model.”⁶

- 11 Telstra accepts that the PIE II model is complex, but this is no reason to reject it. Any acceptable model that seeks to reflect a telecommunications network (such as Telstra’s) accurately must necessarily be complex.
- 12 In regard to the allegation that the PIE II model should be “simpler”, the Commission has advanced no suggestions as to how the PIE II model could be simplified and how this would result in either more accurate outputs or more reasonable network cost estimates. In fact, in a number of instances, the Commission calls for increased complexity, which is inconsistent with the Commission’s requirement for the model to be simple.
- 13 Telstra does not agree that a model has to sacrifice complexity and accuracy for cost, malleability and transparency in order for it to be accepted as being reasonable. This “trade off” referred to by the Commission is not something which is relevant to the statutory criteria or to whether or not a model produces reasonable estimates.
- 14 The Commission criticises the PIE II model on the basis that considerable time and expense is required in order to understand and manipulate the PIE II model. Telstra considers this to be unjustified and an irrelevant criticism of the PIE II model. The Commission cannot require a cost model to be flexible or to address

⁵ Draft Decision, page 91.

⁶ Draft Decision, page 91.

the issues raised by the Commission in terms of flexibility and malleability, while at the same time demand that the model be simple to use. The issues being considered and the services being costed are complex and require sophistication and investment in appropriate resources. Simply because some access seekers are unwilling to make such an investment has no bearing on the reasonableness of the costs estimated by the PIE II model. Further, Telstra has expended substantial resources on building the PIE II model so as to ensure that its outputs are reasonable, something that the Commission does not appear to have taken into consideration.

- 15 Telstra notes that a number of parties who complained about the complexity of the model (for example, Gibson Quai, Access Economics) did not avail themselves of Telstra's offer to assist and answer questions throughout the industry consultation process. For these reasons, Telstra believes that any complaints about the complexity of the PIE II model raised by access seekers are disingenuous.
- 16 In Telstra's view, it is also unreasonable for the Commission to continue to question the validity of the PIE II model when it has not been prepared to invest in an updated model of its own and it continues to make reference to outputs of the NERA model developed in 1998, which is outdated and significantly less sophisticated than the PIE II model in a number of respects.
- 17 As regards the Commission's complaints about lack of transparency, Telstra went to considerable lengths throughout the Undertaking process to make the PIE II model available and to explain the PIE II model to the Commission and to the rest of the industry. For example, Telstra provided a soft copy of the PIE II model to all parties who requested it. Telstra assisted with hardware and software problems encountered by parties by making the model available to them at Telstra's premises on Telstra's computers. Telstra was also available to answer questions and to provide guidance in the event that any difficulties were experienced.
- 18 It is of some significance in this regard to compare Telstra's actions with the Commission's treatment of the NERA model that has been used by the Commission to set PSTN prices in the past. For example, for the purposes of the Telstra's PSTN undertakings in October 1999, the Commission only allowed

Telstra access to the NERA model for a short period (of a few hours) and only in the Commission's offices. The Commission did not allow the NERA model to be taken outside the Commission premises, nor did it allow Telstra to amend the NERA model's underlying architecture. However, Telstra notes that this did not prevent the Commission from relying on the NERA model in assessing the reasonableness of the terms of the PSTN undertakings.

Manipulation of the model

19 The Commission states that:

“Telstra continues to require all analysts using the model to sign an agreement stating that they would not ‘manipulate’ the model. This proscription, of itself, precludes the ACCC’s acceptance of PIE II.”⁷

20 Telstra asked those who were given access to the PIE II model not to manipulate the model's underlying architecture. Telstra did this in order to protect the model's design integrity. As the Commission will appreciate, with highly complex, inter-related models such as PIE II, there is a very real risk that uninformed and selective changes to the code or structure may have unintended or undetected consequences, and may generate highly speculative and non-comparable outputs.

21 If manipulation of the underlying structure were permitted, both Telstra and the Commission would need to be provided with a copy of the altered model for assessment. This is likely to considerably lengthen and complicate the process of assessing the Undertakings. It is also unclear how these manipulated models would necessarily assist the Commission given that its role is to assess the reasonableness of Telstra's approach rather than find the most reasonable approach.

22 Telstra submits that lack of manipulation of the PIE II model does not mean that the reasonableness of the PIE II model cannot be assessed. Both the Commission and industry participants are able to see the architecture used and comment on its appropriateness. This ability is evidenced by the scope and depth of a number of the submissions to the Commission on the range of parameters and assumptions

⁷ Draft Decision, page 91.

within the PIE II model. Allowing manipulation of the PIE II model would also impact on any intellectual property rights which Telstra has in the PIE II model.

- 23 Further, any network model will always have a mixture of fixed and variable assumptions. By their very nature, “variable” assumptions can be changed by users. Throughout the Undertaking process, Telstra did not prevent the Commission or industry participants from changing or “manipulating” these variables. In fact, the Commission itself has changed a number of assumptions to arrive at its estimate of ULLS network costs. However, there is a range of “fixed” assumptions in any model that cannot be varied. For example, the PIE II model cannot switch between a scorched node model to a scorched earth model. In supplying the Commission and industry with copies of the model, Telstra required that these underlying “fixed” assumptions not be changed. As noted in the paragraphs above, Telstra believes there are valid and sound reasons for this requirement.

Changing parameters in isolation

- 24 In the Draft Decision, the Commission has referred to Telstra’s argument that individual parameters cannot be altered in isolation, and has then claimed that:

“[i]f this is the case, it is hard to see how access seekers can constructively comment on the model. Specifically, Telstra is implicitly stating that any change in the model requires the model to be fully rebuilt.”⁸

- 25 As noted above, there are a range of assumptions in the PIE II model which can be altered freely without changing other assumptions. For example, in relation to the WACC, this variable can be changed within the model without adjusting other variables. However, what Telstra has consistently stated in its previous submissions is that individual parameters cannot be updated or altered in isolation.⁹

⁸ Draft Decision, page 92.

⁹ See, for example, March Submissions, Annexure B, Telstra’s *Submission Relating to PSTN OTA and LCS in Reponses to the Draft Decision on Telstra’s Undertaking for PSTN, ULLS and LCS Dated October*, November 2004 (section F and Annexure D - Letter dated 24 August 2004 from Telstra to the Commission).

- 26 The PIE II model was built in June 2000. Since then, and throughout the Undertaking process, it has been possible for Telstra to update the vast majority of ‘forecast’ variables and to replace them with ‘actual’ data. However, Telstra submits that if this is to occur and be considered robust, the process must be comprehensive and not selective. In particular, Telstra believes that:
- (a) forecasts used in an Undertaking should not be updated after an Undertaking has been lodged. An Undertaking is lodged for a defined period of time. Accordingly, if the costs (and therefore prices) are updated constantly because of new information that subsequently becomes available, no Undertaking could ever be accepted by the Commission because, with the passage of time, inputs invariably change; and
 - (b) nearly every variable in the PIE II model has potentially differed as time has passed. Given the nature of the Undertaking consultation process, the industry will invariably highlight those parameters that they believe produce a lower result in terms of estimated costs, and will remain silent on those variables that produce higher results.
- 27 The Commission also asserts that the PIE II model is opaque and difficult to adjust.¹⁰ The Commission provides little evidence for this claim, other than citing ‘future demand’ by way of example of a variable that it sought to change (and presumably failed). Telstra submits that (as noted above) certain variables can be adjusted (including the variable highlighted by the Commission) and that the PIE II model is no more difficult to adjust than other models.

TELRIC Modelling

- 28 The Commission contrasts TELRIC and TSLRIC models, and states that TELRIC models will tend to allocate all costs to the set of services that are modelled. In this respect, the Commission cites the use of CMUX technology within the CAN and notes that some of the costs of the CMUX must be allocated strictly to ADSL. Telstra does not agree that this is a point of difference between TSLRIC and TELRIC models, and does not agree that TELRIC models tend to allocate costs only to services that are being modelled. Properly constructed, each model

¹⁰ Draft Decision, page 92.

is able to cost the range of services that use the PSTN and allocate costs appropriately. Telstra took the approach in the PIE II model of sharing network costs with those services that use the PSTN and that were included in the PIE II model. As such, the cost of the CMUX is shared amongst all services included in the model. At the time the PIE II model was constructed, given that the take-up of ADSL was insignificant and given the amount of PSTN network elements that ADSL use, ADSL was not included in the PIE II model. Telstra has dealt with the use of CMUX/IRIM equipment, and the treatment of ADSL costs in more detail in a number of previous submissions to the Commission.¹¹

APPROPRIATENESS OF MODELLING ASSUMPTIONS

- 29 The Commission notes that while the PIE II model and its assumptions have previously been provided to and scrutinised by the Commission and industry participants, Telstra has been silent on the implications of this scrutiny of any changes it could have made as a result. Further, because of a perceived lack of transparency and manipulability of the model, the Commission notes its belief that an appropriate level of scrutiny has not taken place.¹² Telstra has responded to the Commission's concerns about transparency and the ability of the Commission and industry participants to manipulate the model above.
- 30 The Commission has also expressed disappointment that Telstra has not adjusted the PIE II model in response to criticisms made of the model by the Commission and other industry participants.¹³ This is irrelevant to the consideration as to whether Telstra's estimates of network costs using the PIE II model are reasonable. Telstra has not made these changes because it does not agree with them. It remains open to the Commission to adjust parameters in the PIE II model and to put forward the results as their view of the appropriate network costs. Throughout the Undertakings process, the Commission appears to be reluctant to specify the exact adjustments it would and would not make to each of the parameters in the model.

Network provisioning

¹¹ See, for example, Mitchell report 2003, and July Detailed Submissions.

¹² Draft Decision, page 94.

¹³ Draft Decision, page 94.

- 31 As a general matter, the Commission appears to misunderstand the reasons for dimensioning the network in particular ways, and attributes the need for ‘spare capacity’ solely to take account of possible increases in demand. Telstra has explained previously to the Commission the need for provisioning of telecommunications networks to include provisioning for spare capacity.¹⁴ In assessing whether Telstra’s reliance on the PIE II model (and, in particular, network provisioning as an input) is reasonable, the Commission has failed to take into account Telstra’s previous explanations and submissions.
- 32 One reason that networks are not dimensioned to 100% of capacity is that traffic is not uniform throughout the day or year, but experiences peaks and troughs over a period of time. At any point in time, if there is insufficient capacity in a particular element, significant additional cost would need to be expended to install additional capacity. The level of spare capacity allowed for is even influenced by such diverse things as the forecast “predictability” or the probability that the forecast traffic over a network element will be exceeded. That is, forecasts of network traffic are merely an assessment of the most probable traffic, and consequently the actual traffic over the network element will almost certainly show some deviation from the forecast. In order to achieve an economic and flexible network, spare capacity is required in order to take account of this.
- 33 Another reason for the need to provision networks to greater than 100% capacity is in order for the network to be maintained and for faults to be repaired. If a network is always provisioned to 100% capacity, it would be impossible for any network element to be removed from the network for maintenance or repair without impacting the performance of the network.¹⁵
- 34 Provisioning the network to near capacity as appears to be suggested by the Commission ignores these factors, and provides no margin for error should, for whatever reasons, additional network capacity be required.
- 35 The Commission also states that the costs of provisioning for future demand should be recovered from that demand once it eventuates. The Commission asserts that Telstra’s PIE II model (including the annualised costs of spare

¹⁴ For example, see Mitchell report 2003, pages 17-18; Kennet and Mitchell report 2005, section 4; and March Submissions, Annexure B.

¹⁵ See also Mitchell report 2003, section 6.1.

capacity in current year prices) “perpetually over recover[s]” costs and alleges that Telstra has failed to justify its position with supporting evidence.

36 Telstra notes that it has addressed the Commission’s concern about over recovery, including with expert reports.¹⁶ In particular, Telstra has explained that if the costs of efficiently provisioning for future demand are to be recovered in a future period (rather than when the costs are incurred) and only if that demand eventuates, then:

- (a) Telstra must be compensated for the risk of non- or incomplete recovery of efficiently-incurred costs, a risk that is not present when costs are recovered at the time of investment in spare capacity. This would, for example, require an adjustment to the WACC; and
- (b) efficient TSLRIC prices that would recover the costs of today’s demand would need to be increased to account for the cost of capital of the investment in spare capacity incurred in the past but not yet recovered.

37 The Commission is silent on acknowledging the need for these adjustments to its preferred TSLRIC approach. Telstra submits that the Commission’s approach fails to recognise the risk of non-recovery of the provisioning costs. An efficient operator would not invest in infrastructure where there was such a risk of non-recovery. For the reasons previously set out before the Commission, Telstra submits that its inclusion of network provisioning as an input to the PIE II model is reasonable and consistent with the statutory criteria.

38 Telstra considers the Commission’s claim that PIE II “perpetually over recovers costs” is misplaced. If demand is growing constantly, for a network to be efficient it must be built bearing in mind the future demand. Consumers pay for the costs of efficiently serving the demand plus a proportion of the costs of efficiently preparing to serve future demand. Total costs (including the access provider’s WACC) are just recovered - not over recovered. It is merely the time profile over which those costs are recovered that varies according to whether costs are recovered by a “forward looking” pricing policy or a “backward

¹⁶Mitchell report 2003, page 18; Kennet and Mitchell report 2005, section 4.1.2; and March submissions, Annexure B.

looking” policy. Telstra has previously submitted an expert report analysing the effect on the current pricing of a backward looking approach.¹⁷

- 39 The Commission says that the level of provisioning claimed by Telstra to be required to meet future demand is excessive.¹⁸ The Commission claims:

*“[It] has previously stated that it does not agree that there is necessarily increasing demand for fixed line services. The ACCC further noted that the issue is complicated and requires further analysis and justification.”*¹⁹

- 40 Telstra has previously presented expert reports that provisioning need not necessarily be driven by increasing demand and that demand uncertainty and heterogeneity can be drivers of the need for providing for spare network capacity.²⁰
- 41 However, and in any event, Telstra considers that the Commission has erred in its conclusion. In particular, it is not appropriate to refer to the demand for **all** fixed line services when assessing the reasonableness of the provisioning assumptions underlying Telstra’s estimate of ULLS network costs.²¹ Instead, the Commission should have regard to the future demand for CAN services. The future demand for other fixed line services is irrelevant except to the extent that demand for these services affects demand for CAN services.
- 42 Furthermore, it is wrong to assert that there is not likely to be increasing demand for CAN services over the relevant period. It is important to note that demand should be assessed over the period within which decisions to efficiently provision the CAN network are made.²²
- 43 Telstra submits the following matters that suggest the demand for CAN services is likely to grow over the relevant time frame.

¹⁷ In the Mitchell report 2003, B Mitchell analyses the likely effect of a backward-looking approach to pricing and concludes that backward-looking pricing would likely result in higher charges in the current period than would forward-looking pricing principles (see Mitchell report 2003, paragraph 61 and Annexure F).

¹⁸ Draft Decision, pages 31 and 94-95.

¹⁹ Draft Decision, page 94.

²⁰ See Mitchell report 2003 pages 15-17; Kennet and Mitchell report 2005..

²¹ The Commission might need to consider provisioning in the IEN when assessing the ULLS contribution to IEN costs.

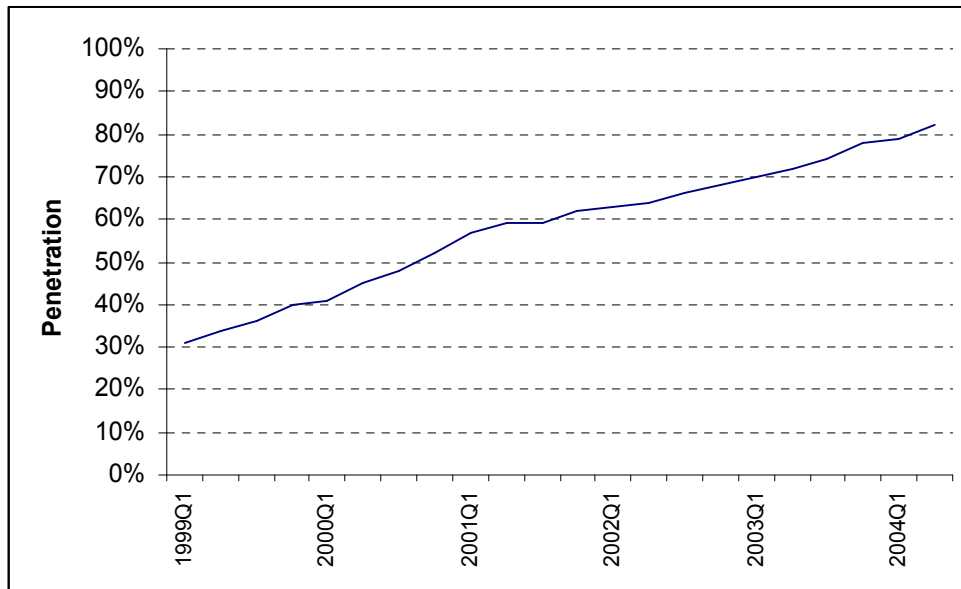
²² Note the Commission estimates asset lives for copper cable at 22 years and for fibre cable at 24 years: Commission, *A report on the assessment of Telstra’s undertaking for the Domestic PSTN Originating and Terminating Access services*, July 2000, table A5.1.

- 44 First, the number of households in Australia is increasing – currently this is at around 2.0% p.a.²³ If each of these households requires a CAN service from Telstra or an access seeker then, all other things the same, demand for CAN services could be expected to grow 10.4% in five years, 21.9% in 10 years and 48.6% in twenty years.²⁴
- 45 Second, the recent drop-off in fixed-line demand over the last few years does not necessarily suggest that there will be an overall decrease in demand over the longer term, say over 10 to 20 years. There are several reasons for this:
- (a) Although Telstra's basic access lines fell from 10.54 million in mid-2002 to 10.37 million in mid-2004, the 2004 figure was still 720,000 basic access lines above that in mid-1997.²⁵
 - (b) One potential cause for the recent drop in CAN demand is mobile access substitution. However, as the saturation of the mobile market occurs in Australia (see Figure 1), the impetus for fixed lines to be abandoned can be expected to slow. That is, those who are going to switch from fixed to mobile access services, are likely to have done so already.

²³ ABS data indicates that the number of households grew by 15% over the period 1995-96 to 2002-03, representing an annualised compound growth rate of 2.0%. ABS, Cat no. 4130.0.55.001 *Housing Occupancy and Costs Australia*, [<http://www.abs.gov.au/Ausstats/abs@.nsf/Lookup/99E1DB0D9F148DA0CA256E7C00805A11>].

²⁴ These growth rates are equal to $1.02\%^{[\# \text{ of Years}]} - 1$.

²⁵ Data from Telstra Annual Report 2004 and Telstra Annual Report 1998. These numbers include FaxStream access lines.

Figure 1: Australia mobile subscriber penetration

Source: Merrill Lynch (2004), *Global Wireless Matrix 2Q04*, 29 September 2004.

- (c) Another cause for the recent drop in for CAN services is a decline in the demand for second lines for a dial-up Internet connection, given the availability of ADSL. However, again customers that once had a second line for dial-up Internet are likely to have been the early adopters of ADSL and are also likely to have already disconnected their second line. This is because the price of ADSL is considerably cheaper than the price for a second phone line and a dial-up Internet plan.²⁶ Customers who previously had a second line for dial-up Internet are, therefore, likely to represent a large proportion of the decline in PSTN services over the last three years since ADSL has become available. However, since the majority of these customers are likely to have already disconnected their second lines, they will not contribute to a further decrease in the demand for CAN services in the future.

- 46 Third, when customers switch from Telstra's PSTN services to ULLS access seekers substitute services, this will have a neutral effect on the number of CAN services.

²⁶ For example, Primus offers a line rental and unlimited dial-up Internet bundle at \$53.45 (http://www.iprimus.com.au/plans_matrix.asp) and an unlimited ADSL plan at \$34.95 (<http://www.iprimus.com.au/broadband-pricing.asp?refcode=>).

- 47 Fourth, the increasing penetration of DSL serves as an impetus for households to retain a CAN service, if not for voice call services. It also mitigates the effect that mobile substitution might have on the demand for CAN services. The compound annual growth rate of DSL demand was 190% from July 2001 (28,000 services) to March 2005 (1,386,300 services).²⁷
- 48 Fifth, the emergence of VoIP is expected to significantly reduce the costs of fixed line call charges relative to mobile call charges and hence increase the attractiveness of retaining a CAN service.
- 49 In summary, it is not clear that the factors that have led to a recent decline in the demand for CAN services will continue and there are strong indications that other factors will drive CAN service demand higher in the future. Anticipated demand for ADSL and high speed Internet services (i.e., not just voice telephony) are also factors Telstra must take into account in provisioning for future demand for CAN services.²⁸

Operation and maintenance factors

- 50 The Commission has said that Telstra's method of calculation of operation and maintenance ("O&M") expenses is unlikely to reflect efficient O&M costs.²⁹
- 51 The Commission claims:

*"There is a significant onus on Telstra to verify that its claimed O&M percentages result in the estimation of O&M costs which could reasonably be expected to be incurred by an efficient operator. At this stage, Telstra has failed to do this, and accordingly the ACCC cannot accept the claimed O&M costs as being reasonable under the relevant statutory criteria."*³⁰

- 52 Further, the Commission claims that Telstra's explanation of its approach is insufficient and that further justification as to the manner in which all the proposed cost percentages are determined is required.

²⁷ Commission, Snapshot of broadband deployment as at March 2005.

²⁸ See also Telstra's previous submissions on the need to provision for future demand, including Telstra's *Submission Relating to PSTN OTA and LCS in Responses to the Draft Decision on Telstra's Undertaking for PSTN, ULLS and LCS Dated October*, November 2004 (Annexure E).

²⁹ Draft Decision, page 32.

³⁰ Draft Decision, page 96.

- 53 Telstra is frustrated by these comments. Telstra has on a number of occasions made detailed submissions to the Commission on why it considers its O&M percentages are a reasonable approximation of efficient costs.³¹
- 54 Telstra has provided extensive explanation of how Telstra has adjusted various direct O&M percentages to account for efficiency and how its approach to calculate O&M percentages accords with international practice in relation to TSLRIC modelling.³² This evidence appears to have been ignored by the Commission.
- 55 The Commission's main basis for doubting Telstra's approach to O&M factors relates to the way that the O&M percentages have been derived rather than the actual magnitude of the costs that result.
- 56 Telstra also notes that the approach taken in the PIE II model is broadly consistent with the approach adopted by the Commission in its final decision relating to an earlier Telstra undertaking.³³
- 57 The Commission claims (without justification) that when calculating the percentages for O&M, Telstra uses historical asset costs for some percentages and PIE II estimated costs for other percentages. The Commission states that this dichotomy is not justified.
- 58 In the PIE II model, the direct O&M costs allocated and attributed to asset types are expressed as a percentage of the historical cost of the relevant asset type extracted from Telstra's Asset Accounting System ("TAAS"). There is only one exception to this – the cable and trench assets. As noted previously, the historical cost of fully depreciated cables and trenches are not detailed in TAAS. As such, Telstra has used the capital cost calculated by the PIE II model for the relevant year as a surrogate for the historical cost. Telstra believes that this approach is principled and justified and does not give rise to uncertainty or doubt as to the accuracy of calculations.³⁴

³¹ For example see March Submissions, Annexure B paragraphs 12 to 14 and Mitchell report 2003, section 8.5.9.

³² See Mitchell report 2003, pages 36 to 40.

³³ See specifically, Commission, *A report on the assessment of Telstra's undertaking for the Domestic PSTN Originating and Terminating Access services*, July 2000.

³⁴ Mitchell report 2003, paragraphs 133 and 134.

- 59 The Commission's critique of the PIE II model procedures for O&M factors depends on the assertion that PIE II uses costs that include some degree of inefficiency because those estimates are derived from actual cost measures. The Commission claims that Telstra's approach of using actual costs without evidence that these costs are in fact efficient is a concern.
- 60 It is incorrect to claim that there is no account taken of efficiency in these calculations for the following reasons:
- (a) Where the PIE II model uses the ratio of actual operating costs to new asset costs estimated by the PIE II model, it does so for long-lived cable and trench assets. To use actual depreciated asset values for long-lived assets would result in higher O&M cost ratios and would overstate efficient O&M costs.³⁵
 - (b) To the extent that costs relate to legacy technology, Telstra has excluded these from the calculation of the O&M percentages and hence the O&M costs. That is, the percentages were derived using only costs incurred in respect of the most recently installed assets and exclude those associated with earlier technologies. For example, expense ratios for maintaining fibre optic systems are limited to SDH equipment, and not earlier generation PDH equipment. This arguably constitutes data most nearly resembling that of a forward looking cost calculation that can be derived from actual accounts.³⁶
 - (c) Further, as noted in paragraph 139 of the Mitchell report 2003, the O&M expenses used in the PIE II model are "*broadly consistent with TELRIC models in the US*" and the approach in the PIE II model is in fact a common and widely used technique for determining O&M costs.
- 61 In relation to paragraph (a) above, the Commission also comments that actual maintenance costs of network equipment that was incurred some time in the past is unlikely to reflect the costs of operating a new network in the initial years of operation. The Commission provides no evidence for this claim. The statement at least suggests that the Commission views O&M expenditure on a

³⁵ Mitchell report 2003, paragraph 139.

³⁶ Mitchell report 2003, paragraph 133.

telecommunications network as being solely related to the age of the network. While it is true that wear and tear plus ageing have a detrimental effect on copper cables and other network elements, maintenance is also related to the early stages of installation and the various teething problems that arise and must be addressed. With the installation of any new technologies, there will always be a time period to “iron out” problems and test for installation issues.

- 62 For example, even when Telstra upgrades exchanges to newer technologies, there is always a period post cutover where teething problems arise and where O&M expenditure is higher than when the network equipment has been in place for some time. Telstra is of the view that O&M costs are higher in the very early stages of network rollout than in latter years when the network becomes stable and less subject to disturbance. Telstra notes that by taking the O&M costs associated with a network that has been in-place for a period of time (as the PIE II model does) these additional O&M costs are not captured. In arguing the case for lower O&M because the network is “new build”, the Commission appears to have taken some factors into account (newer technology) but ignored other factors that counterbalance or outweigh those impacts.
- 63 Telstra submits that indirect O&M costs are incurred by Telstra to serve facilities and subscribers in new estates as well as subscribers in the rest of Telstra’s network. In the PIE II model, the factor used for indirect O&M costs is obtained from the historical ratio of O&M costs to network capital costs. The exclusion of new estate trench costs from TSLRIC capital costs introduces underestimation of the total network indirect O&M costs (because network capital costs have not increased, but O&M costs have). The indirect O&M cost factor is calculated for an historic network with a lower proportion of new estates.
- 64 Further, as explained to the Commission previously, indirect cost percentages (for indirect O&M and capital costs) are calculated by dividing an accounting measure of indirect costs by an accounting measure of direct costs.³⁷ If the accounting measures of these costs reflect any inefficiency, then both the numerator and the denominator of the equation would need to be adjusted. If the indirect cost efficiency adjustment is the same as the direct cost efficiency adjustment, then the two adjustments would net out.

³⁷ See, for example, March Submission (Annexure B).

Network planning costs

- 65 The Commission says that it continues to hold the view about network planning costs that it detailed in its model price terms and conditions and assessment of Telstra's core services undertakings report.³⁸ The Commission states that Telstra's justification for network planning costs as well as the claimed amounts remain of concern to the Commission.³⁹
- 66 Telstra rejects the claim by the Commission that network planning costs are "*hypothetical costs*" and are "*not costs that Telstra needs to recover*". Telstra incurs network planning costs on a day-to-day basis in constructing and maintaining its network. For example, when new estates are developed, Telstra incurs considerable planning and development costs. Telstra must recover the costs of this planning from users of the network. It is not clear on what basis the Commission says these are hypothetical or somehow not real.
- 67 As Telstra has explained to the Commission previously,⁴⁰ although Telstra is entitled to include in the PIE II model the costs of planning and designing a completely new network, Telstra only includes in the model its current expenditure on network planning as an annual cost factor. For this reason, the costs inputs used by Telstra for network planning in the PIE II model are conservative.
- 68 The Commission continues to claim that the O&M expenditure is somehow double counted with the network planning costs. As Telstra has explained previously, this is not correct.⁴¹ In calculating the network planning percentages, all that Telstra has done is capture the costs of maintaining and replenishing the network. Given the network is "new build", Telstra has capitalized this amount and included it as an upfront charge to align it with the general approach of modelling (upfront) network costs in PIE II. In doing so, it has specifically excluded these costs from the ratios for operations and maintenance expenditures.

Trench sharing

³⁸ Draft Decision, page 91 and footnote 146. Telstra responded to the concerns raised by the Commission in this report in its March Submissions (Annexure B).

³⁹ Draft Decision, page 32.

⁴⁰ See, for example, Mitchell report 2003, paragraph 95.

⁴¹ See March Submissions (Annexure B, paragraph 15) and Statement of [c-i-c] dated 26 May 2005.

- 69 The Commission has said that Telstra's assumptions in relation to trench sharing particularly in new estates remain unacceptable.⁴²
- 70 The Commission asserts that the level of trenching in new estates should reflect Telstra's previous ability to share trenches in new estates, as well as its ability to share over the regulatory period.
- 71 Telstra rejects this approach. The Commission argues that TSLRIC prices should reflect favourable cost opportunities available to the incumbent in the past, but not currently available to competitors. That is, past sharing of the costs of trenches with new estate developers. The Commission considers that the relevant network for costing is the incumbent's optimized network, taking into account past opportunities to avoid capital expenditures which are not now available to efficient new entrants. This view is inconsistent with the "scorched node" principle that the network should be costed as if build a new using the existing nodal locations.
- 72 Further, it is clearly inconsistent with the Commission's own views on the TSLRIC concept, which requires the network to be costed as if it were rebuilt today. It is inconsistent for the Commission to embrace this concept when arguing that efficiencies in O&M and network architecture should be built into the model, but abandon the concept when determining the appropriate treatment of trench sharing. In addition, it is important that planning costs are incorporated into the cost pool to ensure that the correct build versus buy signals are provided. An efficient network operator building a network today would incur planning costs and therefore under the Commission's TSLRIC concept should be included in the cost pool. Otherwise, the buy option will appear artificially attractive and could discourage what would otherwise be an efficient investment decision.
- 73 As Telstra has submitted previously, in TSLRIC modelling, there is a need to define the manner and timing of network construction.⁴³ Generally, the model must be built from a particular point in time based on efficient build costs at that date. If Telstra was to construct the network in say 2002/03, the Commission's suggestion is tantamount to saying that Telstra would experience open trenches

⁴² Draft Decision, page 32.

⁴³ March Submissions, Annexure B, page 4.

(and hence no trenching costs) in 13% of cases throughout the whole country.

This is wrong.

74 Further, any proposal that more than 1% of Telstra's network is comprised of new estates, and that the PIE II model should therefore exclude more than 1% of trench costs, is unjustifiable for the following reasons:

- (a) Trench sharing requires that both parties are building the infrastructure at the same time and have a co-ordinated approach. As TSLRIC involves modelling the network at the beginning of each year, it follows that it is only appropriate to use trenches which are open at that time.
- (b) More than 1% is inappropriate, as the trench sharing factor is applied to all ESAs in the network, regardless of their location or characteristics. It is clearly unreasonable to assume that more than 1% of CBD inner metropolitan distribution trenching ever formed part of any "new estates" development arrangement. Similar arguments apply for much of the rural and remote network which do not have any significant "new estate" developments.
- (c) For adjustments of the trench sharing input up to a few percent, the PIE II model will give reasonable estimates of the impact of trench sharing. However, extending this factor beyond 5% is outside the scope of the underlying assumptions on which the model is constructed, and would not produce reasonable results. All engineering and econometric models have some parameters that are variable and some that are not. No model can be built where *all* the input parameters are infinitely variable. Very few models of the size and complexity of the PIE II model could produce sensible results if the basic assumptions are varied beyond a reasonable range.
- (d) The single year figure for new estates is also consistent with the Commission's interpretation of TSLRIC. According to the Commission's 1997 "*Pricing Principles for Telecommunications*", an access price based on TSLRIC is consistent with the price that would prevail if the access provider faced effective competition, and usually best promotes the long term interests of end users. In a competitive market, the price that would

prevail would be equal to the cost that would be incurred by an efficient service provider deploying its network today. An efficient network operator deploying its network today would not be able to share its trenches with other utilities in more than 1% of its network. Therefore, the costs that such a provider would incur would be limited to the new estates in the period of network deployment.

Network design parameters

75 The Commission says that Telstra has failed to prove sufficiently the optimality of numerous assumptions underlying the network architecture produced by PIE II.⁴⁴

Rectilinear distance estimation

76 The Commission has said that it is far from clear that rectilinear distances are appropriate to the extent asserted by Telstra.⁴⁵

“The ACCC notes that, as readily acknowledged by CRAI, while failing to correct rectilinear estimates may on average be reasonable, the higher variance associated with such estimates means that the ACCC cannot be confident that the approach to modeling distances in the PIE II model will yield reasonable estimates.”⁴⁶

77 As Telstra has noted previously,⁴⁷ the PIE II model measures a straight line distance between Telstra’s equipment and each of the geo-coded locations with each distance measured at right angles (i.e. either north/south or east/west) in urban areas. That is, Telstra uses rectilinear distances. This is because the PIE II model assumes that trenches must follow roads, and further assumes the layout of roads to be grid like (being at right angles relative to each other).

78 While there are alternative methods of measuring trench distances, Telstra believes that the rectilinear approach in the PIE II model produces a conservative measure of trench distances given that trenches rarely follow an exact straight line, and, further, because no allowance has been made for changes in surface heights (mountains, valleys etc) that necessarily increase trench and cable distance.

⁴⁴ Draft Decision, page 32.

⁴⁵ Draft Decision, page 92.

⁴⁶ Draft Decision, page 98.

⁴⁷ Kennet and Mitchell report 2005.

79 While the Commission acknowledges Telstra's use of rectilinear distances and raises concerns with this method, the Commission does not offer any other alternative and does not take account of the material that Telstra has provided on this issue as to why Telstra's approach is reasonable.⁴⁸ Telstra submits that if the Commission considers Telstra's approach to be unreasonable, then it should proffer an alternative approach that might be considered acceptable.

80 Telstra considers that the PIE II model is significantly more sophisticated in several respect that the NERA model which is still relied on by the Commission to help gauge the reasonableness of ULLS estimates derived by PIE II (even though the Commission has itself conceded that the PIE II model is likely to be superior⁴⁹ and the Commission no longer uses the NERA model to derive actual cost estimates). To reiterate, Telstra notes that the NERA model:

- (a) uses estimates of average customer distances by area rather than actual customer locations whereas PIE II uses estimates of actual customer locations; and
- (b) relies on older data estimates and forecasts than those used in the PIE II model for key variables such as number of customers, line distribution by area, equipment prices and O&M costs. Many of these were estimated in 1998, several years before those parameters were estimated and forecast for use in the PIE II model.

81 Therefore, Telstra submits that the use of rectilinear distances in the PIE II model is a significant improvement on the Commission's use of the NERA cost model, which it has used to set prices for PSTN OTA since at least July 2000.⁵⁰ On this basis Telstra submits that the Commission has erred in claiming that an improvement on its own modeling is unreasonable.

Minimum spanning trees

82 The Commission asserts that

⁴⁸ Kennet and Mitchell report 2005.

⁴⁹ Commission, *Final determinations for model price terms and conditions of the PSTN, ULLS and LCS services*, October 2003, page 35.

⁵⁰ Commission, *A report on the assessment of Telstra's undertaking for the Domestic PSTN Originating and Terminating Access services*, July 2000.

“PIE II essentially calculates an ‘optimal’ structure based on minimizing the distance of trenches. Copper is then added on the basis of engineering rules. It seems, and has been suggested by n/e/r/a, that at some point copper would become a relevant cost driver that should be optimised in the model rather than set exogenously”.

83 The Commission correctly notes that the PIE II calculates an “*optimal*” structure based on minimising total distances of trenches. Given that around [c-i-c] of PSTN network costs consist of the CAN, and the majority of CAN costs are trenching, Telstra considers its approach of minimising total trench distances will achieve minimum total overall costs of the PSTN network. Telstra notes that while it would be possible to also optimise copper distances in a TSLRIC model, this would have a negligible impact on the model results and would add a huge layer of complexity to the model, which according to the Commission is already too complicated. Telstra submits that the Commission has provided no justification as to why the introduction of other variables into the PIE II model (which would substantially increase the complexity and run time of the PIE II model), would achieve a more accurate measure of total costs and indeed a more efficient network design.⁵¹

84 The Commission makes the following further claim:

“The ACCC acknowledges that the introduction of more sophisticated algorithms has the potential to increase computational complexity, however, given the potential improvements in network optimality which may result the ACCC believes that it is not appropriate for Telstra to continue to advocate its preferred approach as being optimal. Examples of difficulties in applying the approach, such as those given by CRAI (ie. the placement of the Steiner node in an unfeasible geographic point such as the centre of a lake) are insufficient justification for summarily rejecting the Steiner solution.”⁵²

85 In making this statement, the Commission has overlooked that the use of Steiner nodes also involves additional costs of installing the junction node that have to be traded off against any reduced costs of routing infrastructure. This was pointed out in the CRAI report to which the Commission has referred. The value of using Steiner nodes in modelling cable costs is problematic for two reasons:

⁵¹ Telstra responds to reports submitted by Optus on the PIE II model and Optus’ submissions on the PIE II model in Annexure F.

⁵² Draft Decision, page 99.

- (a) calculation of the *optimal* (minimum distance) network is vastly more difficult than calculating the optimal MST network; and
- (b) in order to calculate the minimum *cost* network, it is necessary to include the additional costs of equipment and installation of a Steiner node, costs that are not incurred in a MST network. Inclusion of these costs attenuates the gains of lesser network distances and further increases the complexity of calculating an optimum network.

86 Telstra has also noted previously that without rebuilding the entire model, it is impossible to determine whether the use of Steiner nodes results in lower cost. But even if it did, this might just reflect more downside error than the MST model. Therefore, although the Commission and NERA have come up with one example of where a Steiner nodes model is more efficient, this may not generally be the case.

87 Telstra considers that for the Commission to assert that the use of a Steiner approach to node location modelling would improve network optimality requires, at the very least, that the Commission demonstrate this via its own modelling.⁵³

88 In relation to trench distances, the Commission also appears to have ignored those areas of the PIE II model where a conservative approach has been taken. For example, in the PIE II model:

- (a) no account is taken of the existence of gradients within an ESA or distribution area;
- (b) there is no account taken of obstacles;
- (c) trenches are assumed to follow straight lines even though this is rarely the case and connection points are not always on road intersections;
- (d) in areas where difficult soil conditions occur, the usual response is to route the cable around the difficult areas, however the PIE II model does not seek to capture these additional costs.

⁵³ Telstra responds to reports submitted by Optus on the PIE II model and Optus' submissions on the PIE II model in Annexure F.

- 89 All these factors have an impact on the actual installed length of cables and trenches and should not be ignored in assessing the reasonableness of measure of trench distances in the PIE II model. In the US, both the Hatfield and Federal Communications Commission’s models make allowances for these by using multipliers either as an uplift to the distance or as an uplift to the cost.
- 90 In relation to trench costs more generally, it should also be noted that the PIE II model:
- (a) does not capture the costs of negotiating with Local Government to do the work and getting access to properties to dig the trenches; and
 - (b) assumes a uniform width depth for all trenches. The model does not capture the additional cost associated with trenches that have multiple network elements contained within them.

Telstra submits that each of these factors must be taken account by the Commission in its assessment of the reasonableness of the PIE II model.

Pre-determined engineering rules

- 91 The Commission claims that the “... *use of pre-determined engineering rules does not necessarily produce an optimal network*”. Telstra considers that the question the Commission must ask is not whether engineering rules have been used but whether the engineering rules chosen reflect ‘best in use’ design principles and are therefore reasonable.
- 92 The design rules used in the PIE II model were sourced from Telstra’s Network Deployment Rules (005-747) (“**NDRs**”). These rules are a key component of Telstra’s infrastructure planning, design and delivery processes. The NDRs are available to all staff on Telstra’s internal Intranet website. The content of the NDRs is consistent with the approved strategic initiatives and business objectives of Telstra. The document is also prepared and updated in accordance with a Quality Process as defined by AS/NZS ISO 9001:2000.
- 93 In all cases, the NDRs achieve the regulatory performance objectives set for the Telstra networks and reflect the available technology. Telstra considers that the

engineering rules chosen represent “best in use”, and lead to the most efficient and optimal utilisation of the network over the Undertakings period.

- 94 Telstra has provided explanations of the NDRs in submissions to the Commission.⁵⁴ Telstra rejects the Commission’s claim that the explanations provided to date have been limited.

⁵⁴ See, for example, Telstra’s *Detailed Submission in Support of its Undertakings Dated 9 January 2003*, July 2003.