TELSTRA CORPORATION LIMITED

Telstra's Ordinary Access Undertaking for the Unconditioned Local Loop Service:

Response to Access Seeker Submissions on the ACCC's Draft Decision

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Contents

Executive Summary

Use of TSLRIC vs. historic cost

1. Since 1997, the ACCC has promoted Total Service Long Run Incremental Cost ("**TSLRIC**") as the pricing principle that best meets the objectives and legislative criteria of the Trade Practices Act 1974 ("**the TPA**"). The ACCC most recently reaffirmed this position in June 2008 (3 months after Telstra lodged its undertaking) when it concluded that TSLRIC would continue to apply to the ULLS and met the statutory test of promoting the long term interests of end users. The Australian Competition Tribunal ("**the Tribunal**") and many access seekers including Optus have also strongly supported TSLRIC. Telstra has shown that a properly constructed TSLRIC model, which uses reality based routing and forward looking inputs, produces an efficient cost of over $30 per month. Now Optus has switched to arguing that the ACCC should abandon its long established TSLRIC pricing principles for ULLS, in favour of either pure historic cost or selective use of forward-looking and historic inputs into a TSLRIC model.

2. Departing from the TSLRIC precedent in favour of historic cost would fail to promote the very objectives of the TPA, which require that the ACCC set prices to balance, among other things, the promotion of competition and encouraging efficient investment in, and use of, infrastructure. Over many years the ACCC, the Tribunal and many access seekers have consistently urged that a TSLRIC pricing principle best meets this balance. Further, Australia does not stand alone in applying TSLRIC – numerous other regulators in the US, Canada and the EU have decided that some form of long run incremental cost best reflects economic costs and is the best basis for setting ULLS prices.

3. Using historic cost principles, or a mix and match of historic and forward-looking inputs, designed solely to lower prices without regard to consistent pricing principles, will not send the proper build/buy signal for the new entrant or provide the proper financial cost recovery incentive to investors. Although in the context of cost recovery between different services, rather than setting inputs to ensure cost recovery for one service, the Chairman of the ACCC, Mr Graeme Samuel, says: "the ACCC has objected to attempts by Telstra to 'mix and match'. That is, the ACCC expects Telstra to be consistent in its pricing approaches across different services".[1]

4. Contrary to Optus' speculation, TSLRIC pricing does not allow Telstra to recover costs it never incurred. For example, Telstra has shown that it did incur breakout, trenching and reinstatement costs in urban and developed suburban areas, the same types of costs as are found in the TEA model. Since 1995 Telstra has spent over $13b, in real terms, on the CAN. Indeed, using the level of historical expenditures on breakout, trenching and reinstatement between 2000 and 2009 as the basis for the ratios in the TEA model would increase the monthly cost per SIO by over $11, relative to adopting the forward-looking values in the TEA Model. If one were to adopt an historical cost approach to the CAN, one would need to assess the full life-cycle costs of assets purchased in the past. More fundamentally, even if TSLRIC did include cost elements that Telstra did not incur, as Prof. Robert Harris and Dr. William Fitzsimmons explain, TSLRIC fails to consider vast amounts of costs that Telstra did historically incur as it built its network. This mismatch does not mean that TSLRIC is not the proper

[1] Samuel, Graeme (2007), Communications issues: noise and bluster or just plain facts, *ATUG Annual Conference 2007*, 7 March 2007.

approach, nor does it entitle the ACCC to select an inconsistent approach that yields the lowest price for any particular cost element.

5. Optus also claims that the ACCC should disregard the entire concept of price-setting to stimulate facilities based competition because the National Broadband Network (**NBN**) allegedly will create a monopoly with which no one can compete. An NBN, however, is neither a natural monopoly, nor immune from competition in band 2 areas. Telstra has announced that if another firm builds an NBN, it will compete with that network via wireless services and by upgrading its HFC network. Optus is also well placed with its HFC network, if upgraded to DOCSIS 3.0, to compete against an NBN in band 2 areas. Thus, the NBN may stimulate facilities based competition, rather than discourage it, and the ACCC should not abandon TSLRIC+ pricing because of the NBN.

6. However, Optus' actions show that it currently is more profitable for competitors to purchase below-cost ULLS rather than invest in any landline facilities.[2] Indeed, Optus will not even build lead-ins from its existing HFC distribution facilities to new and many existing homes within 75 metres of its own facilities or to MDUs, but instead buys ULLS from Telstra to service those customers. One goal of telecommunications regulation is to stimulate facilities-based network competition. Proper TSLRIC pricing can stimulate that competition. Until the recent lowering of ULLS prices to $12.30, the ACCC had stimulated some facilities-based competition. The current price has stopped all building of competing networks, as pointed out by the comments of Unwired ("Unwired is concerned that the Commission has been significantly under-pricing the ULL service"[3]) – and thus would not meet the long term interests of end users.

7. Artificially lowering ULLS below the cost of a new entrant prevents potential competing carriers from building competitive networks. Optus' refusal to expand its own HFC network proves this point in Australia. The comments of Unwired, pointing out that it cannot build a WIMAX network to compete against these prices, demonstrate that this is also true for wireless broadband carriers.

The TEA model provides an optimised network

8. Optus claims that Telstra has not properly optimised the network in the TEA model. The Telstra optimisation report proves that the TEA model does optimise the network by eliminating approximately 34.5% of the cable routes, among other efficiencies. The ACCC's consultant, Ovum, agrees that the TEA model optimised the network design. To support its assertion, Optus merely refers to Network Strategies reports that claim the TEA model network route design should be compared to a hypothetical model that does not reflect any engineering rules or reality. Neither Optus nor Network Strategies provides any specific comparison of the efficiency of a network in a hypothetical model with the efficiency of the TEA model, despite undertaking other such exercises for other clients within months of making their submissions. If Network Strategies applied the methodologies adopted in its reports for other clients in this context, as Telstra does in this submission, it would find that the TEA model route design is very efficient. Moreover, even though Telstra does not advocate use of a hypothetical model, the TEA model has 9% less distribution trench distance and 41% fewer kilometres of copper cable sheath than the hypothetical ACCC model. The proof is in the pudding – Telstra has fully optimised the network in the TEA model by

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[2] Telstra, *Competing Infrastructure in Band 2 Areas: The Implications of SingTel Optus' HFC Network for ULLS Pricing*, 20 March 2009
[3] Unwired (2009), *Submission in response to Assessment of Telstra's Unconditioned Local Loop Service Band 2 monthly charge undertaking- Draft Decision November 2008*

creating a network with less cable and trenching than models of Optus' consultants and the ACCC.

The tilted annuity defers depreciation until a time when it cannot be recovered

9. Optus challenges the TEA model's use of a straight-line depreciation, levelised using a flat annuity. Instead, Optus supports a tilted annuity, which postpones the recovery of depreciation costs far into the future when there will be fewer SIOs from which to recover that depreciation. Optus offers an example of the tilted annuity which simply does not reflect the real problems of the tilted annuity, because it does not show the very low capital recovery in the early years and uses an asset life of ten years, even though major costs of the CAN such as copper and ducts have lives of 20 and 40 years, respectively.

10. The reality is that the tilted annuity does a very poor job of approximating economic depreciation, as shown in the NERA Report. If the ACCC were to continue the tilted annuity that it has applied to date, the network cost component of ULLS prices would increase from approximately $10 in 2005/06 to approximately $68. This increase in cost is even starker when a more accurate calculation of network costs, such as the TEA model, is used as a starting point.

11. Even if the ACCC does decide that a tilted annuity is appropriate, copper prices have collapsed to levels last seen years ago and wages and inflation are not expected to rise in the near future. Thus, the tilt of the annuity should be reversed relative to how it has been applied in the past. Such a tilt would result in substantially higher prices than $30.

The $30 undertaking price is supported by any reasonable set of inputs to the TEA model

12. Telstra has provided a series of alternate runs of the TEA model which prove that only by using extreme inputs, such as trenching only in grass, or delaying depreciation far into the future when there is far less demand over which to spread and recover depreciation costs, would the ULLS price fall below the $30 figure set forth in the undertaking.

13. Optus claims that because the retail price of a voice service is lower that the proposed ULLS $30 price supported by the TEA Model, the $30 price must be unreasonable. Optus ignores that ULLS lines are almost always used to provide both voice and xDSL services for which Optus charges approximately $100 and that, according to material that Optus has filed with the Australian Stock Exchange, it would earn almost 50% EBIT margins on the supply of ULLS at a $30 price.

14. Optus also argues that PIE II yielded lower prices than the TEA model. PIE II was a hypothetical model which did not include several factors covered by TEA. In the ULLS arbitrations decided in 2007, Telstra modified and updated PIE II to include these factors and several changes suggested by the ACCC. This modified PIE II yielded a cost estimate for band 2 of $42, which is higher than the current undertaking price of $30 and quite close to the numbers produced by TEA version 1.3.

A Approach to assessing access prices

15. Optus has encouraged the ACCC to find that Telstra's Band 2 ULLS undertaking (**Undertaking**), which applies TSLRIC-based pricing methodologies, is unreasonable for the following reasons:

    - The chief aim of TSLRIC pricing based on forward-looking costs is to encourage efficient entry – as such prices lead to efficient build/buy decisions;

    - The imminent rollout of the NBN means these rationales no longer have force – the NBN tender will put an end to competitive bypass;

    - Consequently, the use of TSLRIC is no longer reasonable, and instead pricing need only allow the recovery of historical costs because this ensures financial capital maintenance; and

    - Telstra has already largely recovered its historical costs, and so access charges may be set at relatively low levels compared to current TSLRIC approaches.

16. Telstra submits that the propositions outlined above are incorrect and, consequently, do not establish that Telstra's undertaking is unreasonable. In particular, Telstra submits that:

    - Optus' contentions about appropriate pricing methodology contradict the ACCC's obligation to assess proposed undertakings under the legislative 'reasonableness' criteria set out in section 152AH of the TPA;

    - Many infrastructure pricing regimes use forward looking optimised costs for sound policy reasons – critically, this pricing method is used even in circumstances where competitive bypass is not relevant;

    - In any case, both competitive bypass can and most likely will occur given an NBN and efficient build/buy incentives remain relevant over the period of this undertaking;

    - The NBN will not, as Optus suggest, represent the culminating step in the evolution of the telecommunications infrastructure. The telecommunications infrastructure will continue to evolve. Prices that discourage efficient bypass by competitors also discourage efficient reinvestment by the incumbents. Setting prices that assume, as Optus suggests, that investment to improve the telecommunication infrastructure will never again be required is a short sighted and flawed policy objective.

    - TSLRIC pricing is more reasonable than historical cost prices, both on theoretical grounds and in practice. Further, international and Australian regulatory preference supports TSLRIC pricing; and

    - Incorrect claims, based on incomplete analysis of CAN asset lives, that Telstra has fully recovered capital costs in the CAN, do not justify adopting historical cost approaches. Calculated on a full and internally consistent basis, historical cost based prices that protect financial capital maintenance may be higher than TSLRIC charges.

17. Each of the factors discussed above is more fully considered below.

A.1 Optus misconstrued the ACCC's role in assessing Telstra's undertaking

18. Telstra submits that Optus' proposal to adopt an alternative pricing methodology fundamentally misconstrues the ACCC's role in the current undertaking process. Notwithstanding Telstra's contention that this proposal has little merit for a number of reasons (see below), such debates are irrelevant to the current process.

19. Telstra has lodged an ordinary access undertaking which, if accepted, would apply until its scheduled expiry on 31 December 2010. Under Part XIC of the TPA, the ACCC must accept or reject the undertaking, with the assessment being based on criteria set out in s.152BV and s.152AH of the TPA. The latter section provides guidance on assessing the reasonableness of the proposed terms and conditions of the undertaking, and imports further guidance from the object of Part XIC set out in s.152AB.

20. The ACCC must determine whether the undertaking proposed is reasonable having regard to the relevant legislative criteria and any relevant pricing principles established by the ACCC. In this case, the ACCC established the relevant pricing principles in November 2007 and reaffirmed them in June 2008, when the ACCC concluded (based on guidance from the Tribunal, the legislative criteria and industry submissions) that TSLRIC+ would continue to apply to the ULLS.[4] As Telstra set forth in paragraph 13 of its response to the ACCC's Draft Decision, the ACCC must follow its established pricing principles.[5]

21. In developing the 1997 generic telecommunications pricing principles and finalising specific ULLS pricing principles in 2002 and 2007, the ACCC has set clear precedent and communicated to industry that TSLRIC pricing is reasonable generally and for ULLS specifically. The ACCC has stated that the development of these pricing principles is an important aspect of any declaration decision. If the ACCC ignores key elements of the 2007 pricing principles to reject Telstra's undertaking, the transparency and integrity of the ACCC's decision making process will be open to question.

A.2 Forward looking optimised costs used where bypass not relevant

22. Optus asserts that a key rationale for the use of, what it terms, a 'pure' TSLRIC approach utilising forward looking costs is to provide efficient 'build/buy' decisions.[6] Yet it is uncontroversial that TSLRIC has also been commonly relied on in other sectors in which questions of competitive bypass are either secondary or wholly absent.

23. Examples include electricity transmission and railway transportation of bulk minerals where, in both cases, bypass is not relevant.[7] In both of these cases regulated prices are typically based on a forward-looking assessment of costs, with asset values typically originally based on replacement cost valuations, updated to reflect subsequently incurred capital costs and depreciation.[8] By contrast, in Australia and

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[4] ACCC (2007), *Unconditioned Local Loop Service: Final pricing principles*, November 2007, page 11
[5] Telstra (2008), *Response to the ACCC's Draft Decision*, 23 December 2008, from paragraph 13 and section B generally
[6] Optus (2008), *Response to Draft Decision*, December 2008, paragraph 2.4
[7] For example in its report *Draft Statement of Principles for the Regulation of Transmission Revenue* the ACCC had a number of specific considerations separate to any bypass concerns to favour a forward looking optimised replacement cost valuation of electricity transmission assets. See *Re: Application by ElectraNet Pty Limited (No 3)* [2008] ACompT 3 at [34-36]
[8] See for example, *National Electricity Rules*, Clause 6A.14.3, Clauses 6A.6.6-7 and Schedule 6A.2. Forward-looking costing for rail networks has been approved by the ACCC and also by state regulators such as the WA ERA. For example in its assessment of the

most comparable jurisdictions historic cost and asset value accounting are relatively rare.[9] Given this, it is plainly unsustainable to argue that TSLRIC pricing for ULLS is dependent on the threat of bypass, or that the use of forward looking approaches is unreasonable even where bypass is unlikely or even impossible.

A.3 Relevance of rollout of the NBN to undertaking assessment

24. Optus has suggested that the planned NBN roll out is a critical factor that renders Telstra's undertaking using the TSLRIC methodology unreasonable.

25. The planned rollout of the NBN, however, provides no grounds for claiming that TSLRIC based prices are unreasonable, because:

    - Both inefficient bypass and efficient entry can occur given an NBN; and

    - Work on the NBN has not started, and is unlikely to be completed for many years, so the basic need for efficient build/buy incentives (along with the other factors that make a TSLRIC approach appropriate) will remain in place for the period of the undertaking.

26. The deployment of the NBN does not inherently make the ULLS loop any greater or lesser of a monopoly service. The NBN, at least as Telstra understands Optus' tender to the government, involves replacing copper main cable with fibre cable. Efficient entry could feasibly occur in the context of a fully constructed NBN just as much as it can occur when main cable is comprised of copper rather than fibre. There is still an ongoing need to provide appropriate build/buy signals. The NBN is not the end of the evolution of the telecommunications infrastructure but rather one step along the path. There is no justification for any 'step change' in regulatory approach.

27. Network deployments in the United States demonstrate that a Next Generation Network (**NGN**) is neither the end of the evolution of the telecommunication infrastructure nor a technology that is immune from meaningful competition. In urban areas of the United States competitive NGNs are being deployed, and in some cases there are up to three competing facilities. In addition, competition may arise from wireless broadband. For example Verizon is deploying a new fibre-to-the-premise (FTTP) network in competition with cable operator Comcast which is upgrading its network to provide comparable download speeds. Meanwhile, Xohm/Clearwire and Open Range are rolling out WiMax networks.[10] Several satellite operators provide satellite broadband including Wild Blue and Hughes Net. Both Verizon and Sprint Wireless have announced their intent to build 4G wireless networks.[11]

ARTC's December 2007 undertaking for the interstate rail network, the ACCC approved of the forward-looking costing methodology used (ACCC, *Australian Rail Track Corporation Access Undertaking - Interstate Rail Network: Final Decision*, July 2008). Similarly, the ERA in WA has approved Costing Principles for Westnet Rail which account for the efficient cost of replacing infrastructure over time (Westnet Rail, *Costing Principles*, September 2007)

[8] 'Comcast Details Its First DOCSIS 3. Deployment', *VON*, 4 April 2008

[9] See for example discussion by the Queensland Competition Authority (2002), *Draft Decision - Burdekin Haughton Water Supply Scheme: Assessment of Certain Pricing Matters relating to the Burdekin River Irrigation Area*, September 2002, page 38

[10] 'Comcast Details Its First DOCSIS 3. Deployment', *VON*, 4 April 2008

[11] See Open Range Home Page, http://www.openrangecomm.com (last visited Mar. 16, 2009); Wildblue - "How It Works", http://www.wildblue.com/aboutWildblue/how_it_works_demo.jsp (last visited Mar. 16, 2009); HughesNet Home Page, http://www.hughesnet.com (last visited Mar. 16, 2009); Chad Berndtson, Sprint: 4G WiMax Plans 'Full-Speed Ahead,' Despite Verizon LTE, ChannelWeb, Feb. 20, 2009, http://www.crn.com/mobile/214502170.

28. With respect to Australia, Optus argues that the ACCC should conclude that cable and HFC networks are not viable competition to NBN due to claimed lack of ability to source content which they say is in turn due to the Foxtel/Telstra relationship. However, this ignores the fact that Telstra is no longer involved in the NBN tender process (but Optus is). Thus, if and when the NBN is built, it is likely that another party (perhaps Optus) will build it. In this case, Telstra will use its HFC and wireless networks to effectively compete against Optus. Thus the NBN may well stimulate both wired and wireless facilities-based competition, in which case ensuring efficient build vs. buy incentives is paramount.

29. Notwithstanding, Optus' claims are also irrelevant to the matter at hand. Even if one accepts the broader Optus argument around the competitiveness of cable networks (which Telstra does not), this does not change the fact that cable provides viable competition for the provision of high speed data services.[12] The extent of that competition has been, and the relevant build/buy decisions will be, affected by ULLS charges.

30. Finally, even if one accepts Optus' assertion that the NBN is a natural monopoly, the rollout timetable makes the NBN irrelevant to the assessment of Telstra's current undertaking. The undertaking expires on 31 December 2010, by which point the initial stages of the NBN are unlikely to be completed.[13]

A.4 Reasonableness of TSLRIC and issues with historical cost approaches

31. This section discusses why TSLRIC pricing is reasonable, while historical cost prices are not, on theoretical grounds and notes that international and Australian regulatory practice supports the reasonableness of TSLRIC pricing approaches.

A.4.1 TSLRIC is reasonable in theory and practice

32. TSLRIC has a number of features which make it reasonable in the context of Telstra's undertaking. TSLRIC seeks to mimic the outcome of a competitive market, provides an internally coherent and consistent approach to cost recovery, and is also the pricing methodology used to set prices for a wider range of services delivered using the CAN.

33. These theoretical strengths have been the basis for reliance on the TSLRIC model by the ACCC, the Tribunal, and Optus in relation to mobile termination charges.

34. For example the ACCC's *Access Pricing Principles – Telecommunications*, set out six rationales for adopting a TSLRIC approach. These include

- encouraging competition in telecommunications markets by promoting efficient entry and exit in dependent markets;
- encouraging economically efficient investment in infrastructure;

[12] Optus is certainly using its HFC network to compete for telephony and broadband customers. In September 2008, Optus was using its HFC network to provide broadband to 419,000 customers – almost half its broadband customer base. Similarly for fixed telephony, more than half of Optus' customers are currently served using HFC – Singtel (2008), *'Management discussion and analysis of financial condition, results of operations and cash flows for the second quarter and half year ended 30 September 2008*, page 47

[13] 'NBN: Analysts, industry divided on consortium speculation', *Computerworld*, 23 January 2009

- providing for the efficient use of existing infrastructure;
- provides incentives for access providers to minimise the costs of providing access;
- allowing efficient access providers to fully recover the costs of producing the service; and,
- protecting the interests of persons who have rights to use the declared service.[14]

35. Critically, and contrary to the claim by Optus that TSLRIC is no longer a reasonable approach, allowing for efficient build or buy decisions is only one factor among five others considered significant by the ACCC. This means that, even if the argument that the NBN will eliminate facilities-based competition is accepted in theory, the consequences suggested by Optus do not necessarily follow. That is, it does not follow that forward looking TSLRIC is unreasonable. This is because one of the goals of TSLRIC is to establish prices that would emerge in an effectively competitive market. To prefer short term goals of lowering prices to access seekers over all these other economic rationales is not reasonable.

36. In its 2007 ULLS Pricing Principles, the ACCC reinforced its view that a TSLRIC methodology 'best accords' with the legislative criteria relevant to assessing Telstra's ULLS undertakings and that the ACCC 'will continue' to apply the approach.[15] In fact, the ACCC did apply the approach when making the *Unconditioned Local Loop Service Pricing Principles and Indicative Prices* in June 2008, notably, after Telstra lodged its ULLS undertaking.[16]

37. In previous proceedings relating to undertakings, Optus has argued that infrastructure competition is viable, and strongly supports TSLRIC methodology. In a submission in response the ACCC Draft Decision on its MTAS undertaking, Optus supported the use of TSLRIC and noted that forward looking costing encouraged efficient investment decisions.[17]

38. Optus bases its historic cost approach on a position that the CAN is a dominant monopoly asset which will never be duplicated or face competitive bypass pressures.[18] This position clearly contradicts previous Optus submissions[19], as well as decisions of the ACCC and Tribunal in the context of the recent rejection of Telstra's 2005 ULLS undertakings proposing averaged ULLS prices.[20]

39. To summarise, in the context of ACCC decision-making and the subsequent appeal:

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[14] ACCC (1997), *Access pricing principles – Telecommunications: a guide*, July 1997, pages 29-30
[15] ACCC (2007), *ULLS Final Pricing Principles*, November 2007, page 11
[16] Available at http://www.accc.gov.au/content/item.phtml?itemId=830403&nodeId=29d9593257bf0c30365af049f90b4a87&fn=Final%20indicative%20prices%20and%20pricing%20principles%20for%20ULLS.pdf
[17] Optus (2007), *Submission to Australian Competition and Consumer Commission on Draft Decision on Optus 2007 MTAS Undertaking August 2007*, August 2007, paragraph 3.25
[18] See Optus (2008), *Public Submission to ACCC on Telstra's Access Undertaking for the Unconditioned Local Loop Service – Discussion Paper*, August 2008, paragraph 2.12
[19] Optus (2006), *Optus Submission to ACCC on Telstra's ULLS Undertakings*, March 2006, generally and paragraph 2.4
[20] *Seven Network Limited (No 4)* [2004] ACompT 11 at [135] to [137]; *Re Telstra Corporation Ltd (No 3)* [2007] ACompT 3 (17 May 2007)

(a) Optus argued that competitive bypass was a continuing potential in urban areas;

(b) The ACCC's final decision to reject the 2005 undertakings was based on the possibility of network bypass and the necessity to promote efficient build or buy' decisions;[21] and,

(c) The Tribunal has endorsed this approach and reasoning.[22]

A.4.2 Effects of applying a historical pricing approach

40. Because a TSLRIC approach has been applied previously to Telstra's ULLS and also is used to set the prices of other declared services, Telstra's reliance on a TSLRIC standard for ULLS is reasonable. Indeed, it would be unreasonable for the ACCC to switch now to applying a historic cost approach and unreasonable to use a mix and match approach, where forward looking and historical inputs are used, whichever yields the lowest result. Rejection of Telstra's TSLRIC-based pricing approach in preference to a methodology based on historic costs would:

- *Undermine investors' capacity to achieve cost recovery* – this would occur due to the recognised flaws in historical cost methodologies and, in particular, their violation of the requirements of intertemporal and inter-service consistency discussed below;

- *Create significant regulatory risk and uncertainty over future decisions affecting cost recovery* – an ACCC decision to apply a new cost methodology to one service would lead to increased risks to investors over the ability to recover forward costs and worry that, once costs were sunk, pricing methodologies will be opportunistically switched to historic cost approaches;

- *Overturn the policy objective of the undertaking mechanism to provide regulatory certainty to applicants* – by requiring the adoption of a new cost methodology without precedent in relation to the CAN in the context of an undertaking, the ACCC would create greater uncertainty for access providers, contrary to the general policy intent that undertakings provide a mechanism for infrastructure owners to 'lock in' approved terms and conditions of access that are reasonable; and

- *Mix a range of cost standards to derive an entirely hypothetical cost base for prices* – the alternative approach suggested by Optus would utilise a forward looking assessment of costs, mixed with a return on capital derived using, essentially, historic accounting records. This approach would estimate forward operating and capital costs assuming a forward looking view of costs required to maintain and upgrade assets that are 'best in commercial use', while the return on capital would be limited to a backward looking accounting records based asset base. This differential treatment necessarily creates circumstances where Telstra might be required to set prices on the basis of costs that neither an efficient new entrant, nor a firm enjoying historical cost advantages could match.

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[21] ACCC *Assessment of Telstra's ULLS monthly charge undertaking – Final Decision*, August 2006, p.89
[22] *Telstra Corporation Ltd (No.3)* [2007] ACompT 3 at [154-164]

41. Pricing to historical costs raises serious problems. For example, historical costs, as conventionally measured, do not correspond to any economic concept of cost because:

- They are a sum of outlays at different points in time in different technologies under different prices, so they do not represent the cost of any particular type of infrastructure; and,

- Accounting depreciation need not bear any relationship to economic depreciation, thus it is unlikely to provide efficient signals for build/buy or consumption decisions.[23]

42. As explained below, a basic flaw in historical cost methodologies is that they violate the inter-temporal and inter-service consistency needed to provide assurance of cost recovery.

43. Starting with inter-temporal consistency, the flaw in the Optus approach can be seen by considering an asset with an initial cost of $100, where, at the time of that asset's entry into service, the cost as recorded in the historical accounts and the costs as evaluated on a TSLRIC basis are equal. However, the path of historical costs, as generally measured, and that of TSLRIC estimates will typically diverge, even if both cost streams have an expected value at the outset of $100.

44. The essence of Optus' contention is that access prices should recover historical costs largely on the basis that these are lower than TSLRIC costs. In terms of the example above, the valuation method would be shifted from TSLRIC – used in the asset's initial stages – to reliance on historical cost as the asset aged. The "lesser of TSLRIC or historical cost" approach will never fully recover either TSLRIC or historic costs (as one would get TSLRIC when it is lower than historic cost and historic cost when it is lower than TSLRIC). The approach, therefore, does not encourage efficient investment in and use of infrastructure and is inconsistent with the legitimate interests of the access provider and direct costs statutory criteria.

45. As regards consistency between services, achieving efficient investment in and use of infrastructure, consistency with the legitimate interests of the access provider and recovering direct costs requires that, at least in expected value terms, the sum of allowed charges for the various services provided by the network equal the sum of costs. It is difficult to see how this condition could be met if charges for some services are based on historical costs while charges for others are based on TSLRIC. Switching between these within any one of those services makes this adding-up constraint all the more difficult to achieve. Indeed, it is not clear what economic meaning, if any, could be given to a cost concept that involved adding up some elements determined on the basis of TSLRIC and others determined by reference to historical costs.

46. These issues are further discussed in Telstra's previous response to the ACCC Draft Decision.[24]

47. Further, as regards 'actual costs', these cannot simply be read off historical cost accounts, for reasons Telstra has noted on numerous occasions. Those reasons include

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[23] Similar issues were discussed by the Australian Competition Tribunal in the context of establishing forward-looking asset valuations and prices in *Re East Australian Pipeline Limited [2004]* ACompT 8 at [28].
[24] See Telstra (2008), *Response to ACCC Draft Decision*, December 2008, section B.1-5, pages 3-13

the need to take account of assets that have been fully written off but remain in service, and the need to correct depreciation to properly reflect the effect of inflation over time. There is a long-standing consensus in the accounting and related academic literature that absent such adjustments, historical costs may be difficult to interpret and cannot be assumed to be consistent with capital maintenance.

48. If what Optus argues is that sunk or stranded costs should be ignored, this would be incorrect. Recovering sunk or stranded costs, unless they have been imprudently incurred, would generally be regarded as in a provider's legitimate interests. Moreover, a new entrant would factor in the risk of asset stranding into the determination of its required charges.

A.4.3 Trends in use of TSLRIC internationally

49. Regulation the world over, including in Australia, has increasingly preferred pricing rules intended to recover forward-looking economic costs.

50. Optus cites a Europe Economics report, *Pricing Methodologies for Unbundled Access to the Local Loop*, to support the proposition that, where a copper network is likely to remain a local monopoly for the foreseeable future, the priorities underlying the use of a TSLRIC approach are less important and hence the use of TSLRIC is less appropriate.[25]

51. The Europe Economics report, however, does *not* provide support for adoption of a changed approach. The report, in fact, highlights that the predominant approach used by EU member states is long run average incremental cost (LRAIC), not historically based cost methodologies. Many states not currently using LRAIC methodology are moving towards implementing it.[26] This consistent pattern should provide *prima facie* evidence that an undertaking based on TSLRIC is reasonable.

52. Critically, the report cited by Optus also argues that the appropriateness of alternative cost methodologies will depend on the policy context and drivers in operation. For example, the recommendations and analysis of the Europe Economics report refer to the EU telecommunications directive goal of "*substantially lowering the costs of using the internet*" and of providing "*maximum benefit*" in terms of price to end users. These are explicit social and economic policy goals for the EU. However, they are not consistent with the legislative criteria set out in the Australian telecommunication access regime on which assessment of the undertaking must be based. Elsewhere, the Europe Economics report makes it clear that regulatory methodologies are critically linked to policy objectives and observes that, if a regulator intends to be "neutral" between 'build and buy' decisions, then a LRAIC (or TSLRIC) approach should be adopted.[27]

53. The section of the Europe Economics report extracted in the Optus submission also suggests that regulatory approaches in electricity, gas and water support a cost methodology for the local loop which focuses only on financing activities (i.e., excludes a return on the assets in place based on current replacement costs).[28] This approach is unrealistic in a regulatory pricing context, as it raises the possibility that cost recovery will not be allowed, even in circumstances where it is possible. This, in

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[25] Optus (2008), *Response to Draft Decision*, December 2008, paragraph 2.4
[26] Europe Economics (2004), *Pricing Methodologies for Unbundled Access to the Local Loop*, May 2004, page 43
[27] Europe Economics (2004), *Pricing Methodologies for Unbundled Access to the Local Loop*, May 2004, page 53
[28] See Optus (2008), *Response to Draft Decision*, December 2008, paragraph 2.4

turn, would distort efficient incentives to finance future activities. It is also inconsistent with the statutory criteria, including direct costs, LTIE and the interests of the access provider.

54. The approach suggested by Europe Economics is not applied to electricity, gas or water networks in Australia, and is relatively uncommon internationally. Most electricity transmission and distribution networks were originally valued by reference to the depreciated optimised replacement cost (**DORC**) methodology.[29] Similarly, DORC values were a common input into establishing the initial capital base of gas networks and pipelines under the National Third Party Access Code for Natural Gas Pipeline Systems. More recently, water collection and distribution infrastructure has typically been valued with regard to DORC approaches.[30]

55. The DORC methodology is based on an assessment of the present day cost of replacing the asset with another asset that offers the same service potential. The approach does not assume that current technology or asset configuration is used, rather it is based on the cost of a set of assets that delivers the current level of service at least cost, using the best commercially available technology.[31] As such, it is conceptually consistent with TSLRIC based pricing. Indeed, the ACCC has in the past commented in its guidance to market participants on access pricing that: [32]

There is a variety of methods of asset valuation (see box on next page). Of these methods, replacement cost is the methodology most consistent with TSLRIC.

56. Given the strong and continuing theoretical consistency between TSLRIC and replacement cost methodologies, Telstra considers that it follows that TSLRIC must be reasonable basis for the purposes of its current proposed undertaking.

A.5 Historical cost recovery for the CAN

57. Optus submits that the TEA model (and TSLRIC more generally) allows Telstra 'to recover its capital costs [specifically the costs of the CAN] many times over':[33]

The current approach thus provides Telstra with a windfall gain in that it recovers costs that have already [been] fully recovered, in respect of assets that were already fully depreciated.

58. This argument relies on a comparison of stated asset lives to the age of the network. It concludes that since the age of the network exceeds the asset life of most key components, the overall capital cost must have been recovered several times over. However this argument is based on two flawed assumptions:

    - First, it assumes that the architecture of the CAN is the same as it was four decades ago. The CAN has been evolving over the past century to keep up with rapidly changing technology and growing consumer demand. This means that some longer life assets have been replaced with more modern technology and some parts of the CAN have been installed more recently than others.

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[29] See for example *National Third Party Access Code for Natural Gas Pipeline Systems*, Section 8.10
[30] See for example discussion by the Queensland Competition Authority (2002), *Draft Decision - Burdekin Haughton Water Supply Scheme: Assessment of Certain Pricing Matters relating to the Burdekin River Irrigation Area*, September 2002, page 38
[31] ACCC (1997), *Access pricing principles – Telecommunications: a guide*, July 1997, page 42
[32] ACCC (1997), *Access pricing principles – Telecommunications: a guide*, July 1997, page 41
[33] Optus (2008), *Response to Draft Decision*, December 2008, paragraph 2.22, page 11

- Second, it assumes that CAN assets do not need to be renewed as they come to the end of their life. The fact is that existing CAN assets are periodically renewed, giving rise to new costs which need to be recovered through access prices. The cost of renewing assets is incorrectly excluded from Optus' illustrations.

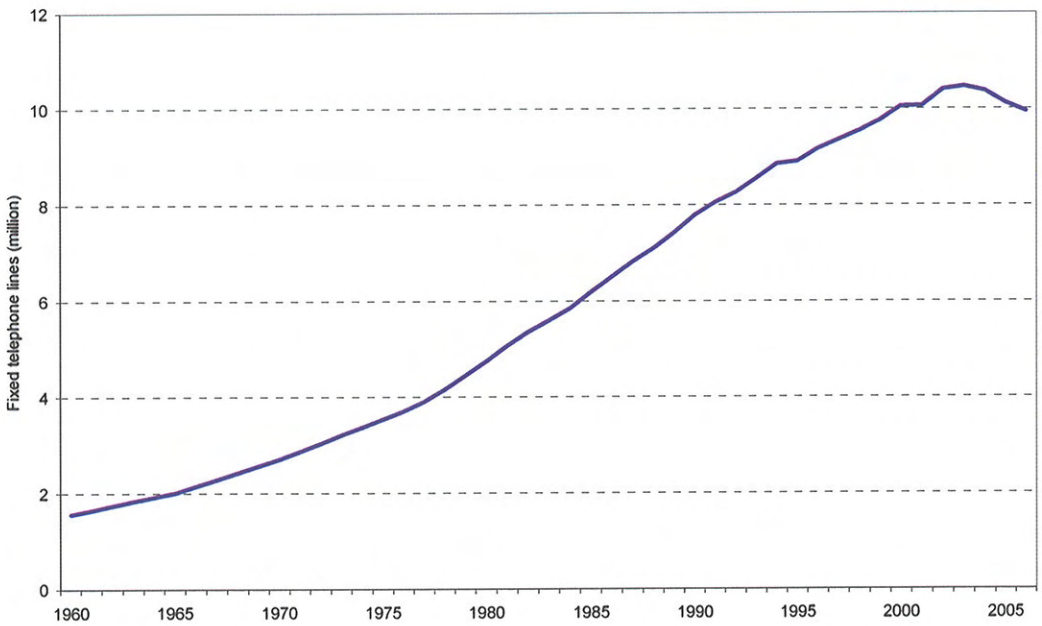
59. The only way in which access pricing might conceivably lead to such a 'windfall gain' is if it is premised on asset lives that are too short (thus allowing recovery of renewal costs before they are actually incurred). However, Optus provides no convincing evidence to suggest this is the case with respect to the costs estimated by the TEA model.

A.5.4 Evolution of the CAN

60. The fixed network has gone through a number of phases, regularly being upgraded and expanded to accommodate new services and changing consumer demand. At each major phase, new foundations are laid and then, as new services and needs emerge, overlays and extensions are added to provide for them.

61. Most obviously, there has been ongoing expansion of the network footprint over the past 50 years as demand for basic telephony services has grown. In 1950, fewer than 1 million customers connected to the PSTN, whereas by 2000 this figure was over 10 million (Figure 1).

Figure 1: Demand for fixed access in Australia 1960-2006



Source: ITU

62. Alongside this expansion of the CAN, there has also been a modernisation of its architecture. Whilst part of the modernisation programs of the 1970s, 80s and 90s was focused on the core (e.g. the FMO program conducted in the late 1980s and early to mid-1990s), there were also significant investments made in the access network.

63. The need for modernisation and upgrades was identified in the *Telecom 2000* report released in 1975. At that time, the network catered for around 3.5 million subscribers and was predominantly used for fixed voice telephony. *Telecom 2000* recognised that

significant investment would be required over the next 25 years to modernise the network and allow it to cater for population growth and growing demand for communications services:[34]

... an expanding role is foreseen for the telecommunications industry of the future as a result of technological innovation and society's increasing dependence on information transfer.

One aspect of this trend, highly significant for telecommunications, is the greater call for accumulation, storage and transmission of information. This is reinforced by the growing use of computers for information processing in both the industrial and social spheres. To cope with this development, telecommunications may well need an increasing share of the sum total of the economy's resources devoted to capital expenditure.

64. At the time, and without knowledge of the technological developments that would follow in the 1980s and '90s, it was forecast that annual investment in telecommunications would need to be around $1.5 – 2 billion.[35]

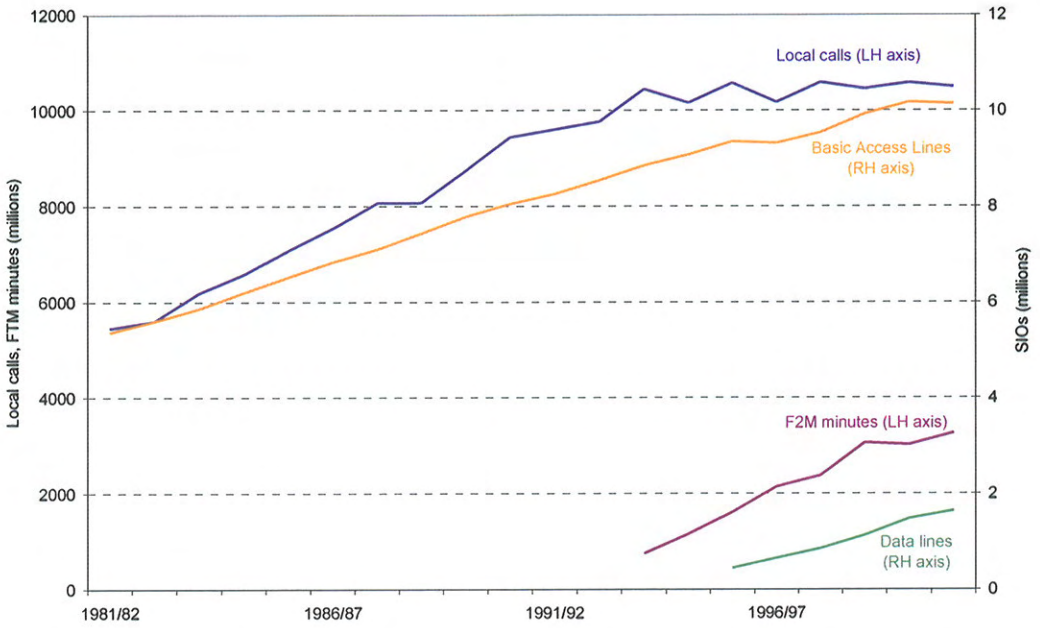
65. Throughout the 1980s and 1990s, the network continued to expand and its architecture became ever more complex and costly as more overlay networks were used to accommodate new needs (fax, data, image and then mobiles). This required ongoing investment throughout this period. Telstra notes in its 1995 Annual Report in relation to its $3.2 billion capital expenditure for that year:[36]

The bulk of this expenditure was attributable to network modernisation and network expansion necessary to meet growing demand for services...

66. Figure 2 shows the growing demand for new and existing services over this period, which contributed to the need for ongoing investment in the CAN.

Figure 2: Demand for network services through the 1980s and '90s

[34] Australian Telecommunications Commission (1975), *Telecom 2000: An Exploration of the Long-Term Development of Telecommunications in Australia*, Melbourne, December 1975, page 14
[35] Australian Telecommunications Commission (1975), *Telecom 2000: An Exploration of the Long-Term Development of Telecommunications in Australia*, Melbourne, December 1975, page 15
[36] *Telstra Annual Report 1995*



Note: 'Data lines' includes fax and ISDN lines

Source: Telstra Annual Reports

67. The evolutionary nature of the CAN implies that static models of investment such as that put forward by Optus (refer to Figure 1 of the Optus submission in particular) are of little relevance. Optus seems to claim that the CAN was entirely built in 1970 and hence the cost of most of the underlying infrastructure (with the exception of the very long-lived components) must have been recovered by now. This is a dramatic oversimplification and ignores the ongoing need for modernisation and expansion of the CAN that has been created by growing demand and technological change. While some of the CAN's underlying infrastructure may have been deployed more than 3 decades ago, much of it is likely to have been deployed since. Hence a great deal of the deployment cost of the CAN remains to be recovered through access prices.

A.5.5 Asset renewal

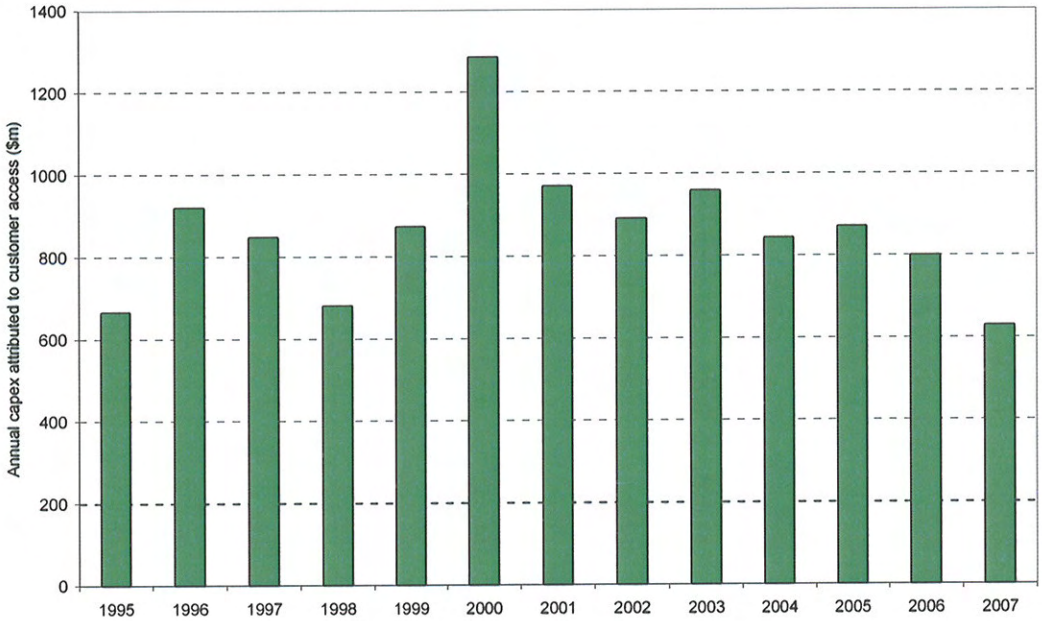
68. Besides the need for expansion and modernisation of the CAN there is (as with any asset) a need to renew the CAN infrastructure as it ages. Once a component reaches the end of its life, there is not only the potential to recover its cost again through access prices (as the Optus submission points out), but there is also the need to incur its cost again as it needs replacing (as the Optus submission ignores). Thus, in net terms, there is no 'windfall gain to Telstra when assets reach the end of their life – 're-recovery' of those asset costs is simply compensation for 're-incurred' costs.

69. CAN components are continually replaced as they reach the end of their life, contributing to ongoing CAN costs of around $1 billion per annum (refer to discussion and chart below). If anything the TEA model under-compensates, rather than over-compensates Telstra for such costs since it only takes into account current, not historic costs. Since current costs of network components are likely to be lower than historic costs due to technological developments, the TEA model will typically under-compensate for historic investments in the CAN.

70. The need for asset renewal combined with the need for modernisation referred to in the previous section have led to Telstra consistently investing heavily in the CAN.

Between 1995 and 2007 for example, Telstra invested almost $1 billion per year ($11.2 billion in total over the 13-year period) in customer access.

Figure 3: Telstra capital expenditure on customer access 1995-2007



Source: Telstra Annual Reports

71. Over this period, the most significant annual investment in the CAN was in 2000, when nearly $1.3 billion of Telstra's capital expenditure was devoted to customer access alone. In that year and in 1999, Telstra invested a great deal in renewing the network and improving its reliability, as it notes in its 2000 Annual Report:[37]

During the last two years we have undertaken an access renewal project to reduce the level of faults in our customer access network. This capital expenditure has focused on improving the quality and reliability of our customer access network and reducing operating expenses.

A.5.6 What this means for Telstra's current costs

72. Optus misrepresents the nature of CAN costs recovered through access prices. Optus seeks to represent the costs included in the TEA model as costs incurred in 1970 and not since. As most of the assets concerned have lives shorter than 38 years, Optus claims these costs must have been already recovered through access prices.

73. As has been illustrated by the foregoing analysis, this simplistic view of Telstra's CAN costs ignores both the evolutionary nature of the access network and the need for renewal of existing assets. Costs sought to be recovered by the TEA model include both the costs of network developments in recent years (for example the cost of upgrades to facilitate new services) and the cost of replacing assets that have reached the end of their life. If Optus argues that these costs are recovered on multiple occasions, it must also acknowledge that they are incurred on multiple occasions. Thus there is no

[37] *Telstra Annual Report 2000*, page 24

'windfall gain' to Telstra from access pricing, but rather fair compensation for capital costs incurred.

74. The only situation in which an access provider such as Telstra might conceivably see a 'windfall gain' is where access prices are calculated based on asset lives that are too short. However Optus has provided no credible evidence to suggest that this is the case with respect to the TEA model. Indeed the evidence provided by Optus on asset lives supports the lives in the TEA model.[38] Telstra has estimated the lives of all relevant CAN assets as accurately as possible to ensure appropriate recovery of these costs in the TEA model.

75. Finally, Optus provides no evidence that Telstra's CAN costs have indeed been recovered in the way it claims. Prior to full corporatisation and privatisation, Telecom had a very low, at times negative, economic rate of return, particularly during the 1980s. Moreover, rentals and connections were price controlled for almost all periods since the 1970s, with controlled price levels creating an access deficit at least through to the early 1990s. Given those facts, and the lack of any evidence on returns in Optus' submission, the ACCC should not give any weight to Optus' contentions.

76. Indeed, Telstra's historic trenching and copper cable costs, which represents the majority of ULLS assets, are likely to be higher than TSLRIC for the following reasons:

- Analysis of Telstra's historical records, provided to the ACCC in response to their information requests, shows that when Telstra's historical trenching activities are inputted into the TEA model, the network costs of ULLS increase by 25% ($11.46 per SIO per month);[39]
- The forward-looking copper cable costs in the TEA model are also below historical costs;[40]
- Telstra has recently achieved considerable savings in contracting with vendors;[41] and,
- [redacted]

[38] Telstra, *Response to Access Seeker Submissions*, 18 November 2008, section F.8
[39] Telstra, *Response to the ACCC's request for further information on Telstra's Band 2 ULLS undertaking made pursuant to s152BT of the Trade Practices Act dated 16 December 2008*, 13 March 2009, table 6
[40] The average cost of reinstatement activities from October 2000 to January 2009 is higher than the prices in the TEA model – Telstra, *Response to the ACCC's request for further information on Telstra's Band 2 ULLS undertaking made pursuant to s152BT of the Trade Practices Act dated 16 December 2008*, 13 March 2009, table 2
[41] 'Telstra Lines up $2.5bn in Contracts', *Australian IT*, 3 September 2007, http://www.australianit.news.com.au/story/0,24897,22353392-5013041,00.html
[42] Telstra, *Response to the ACCC's request for further information on Telstra's Band 2 ULLS undertaking made pursuant to s152BT of the Trade Practices Act dated 23 January 2009*, 13 March 2009 [Category 2 Confidential Material]

B Reasonableness of TEA model assumptions

B.1 Network design

77. Optus claims:

> *3.3 Optus submits that the ACCC's finding is correct; the TEA model has not been demonstrated to be optimised sufficiently. There are two separate aspects to this issue:*
>
> *• First, Optus submits that in many respects, the network design is not optimal and has been demonstrated to be non-optimal.*
>
> *• Second, Optus submits that for certain key aspects of the network design it is impossible for any party other than Telstra to know whether or not that aspect of network design has been optimised sufficiently, since these aspects are not transparent.*

78. These two points are discussed below. Network Strategies, Optus' consultants, make several specific claims in relation to the TEA model's network design. These are addressed in Attachment 2.

B.1.1 Aspects of network design

79. Optus refers to several claims originally made by its consultant Network Strategies.

80. First Optus states:[43]

> *In many respects, the network design employed in the TEA model is not optimal and has been demonstrated to be non-optimal. For example, in its September review of the TEA model, Network Strategies found that:*
>
> *"The underground conduit and pit construction for both main and distribution cables costed in the model is likely to be the most expensive design a telecoms operator could choose when building a copper access."*

81. Network Strategies made the above statement in the concluding paragraph[44] of their September Review of the TEA model. Network Strategies never provided specific basis for the statement, however, they did make the following comments in this section of the report:

- *the per-metre trenching costs are **higher than we expected** (emphasis added)*[45]
- *the per-metre installed cable costs (including jointing and Telstra's loading factor) appear to be around 30% **higher than we would have expected** (emphasis added)*[46]

[43] Optus (2008), *Response to Draft Decision*, December 2008, paragraph 3.4
[44] Network Strategies, Review of the Telstra TEA model version 1.1, September 2008, Section 2.3
[45] Ibid, Section 2.1.1, Pg. 4
[46] Ibid, Section 2.1.2, Pg. 5

- ***We would have expected,*** *for example, zone 1 per metre costs to lay a new duct line would have been many times those of zone 5 (emphasis added)*[47]

Network Strategies also argues that alternative network designs such as overhead lead-ins and alternative cable placement technologies should also be used in the model.[48] These issues are discussed in detail commencing at paragraph 92 below.

82. The trench and cable costs used in the model were derived from Telstra's Access & Associated Services (A & AS) Contracts which were the result of a competitive bidding process. Telstra has provided a witness Statement,[49] which provides a detailed description of the competitive bidding process that resulted in the trench and cable costs that were used in the TEA model.

83. Ovum also compared Telstra's cable costs to international benchmarks:[50]

> *We conclude overall that the cost of cable is broadly in line with international benchmarks.*

84. Further, Telstra's cable costs compare favourably to other cost benchmarks provided by other parties in this Undertaking.

85. Network Strategies produces a chart that shows that the cost of trenching and placing conduit in density zone 5 is 52% of the cost of placing conduit in density zone 1. Based on this chart, they conclude that this difference is less than *"expected"*. They believe the following factors contribute to this unexpected result:[51]

> *Due to the fact that only the percentage of mix of trenching techniques vary between zones.*

They go on to clarify:

> *This means, for example, that the cost per metre of trenching across a road is expected to be the same in both rural and metro areas.*

and

> *The per-metre cost of trenching dirt should always reduce in less dense areas where longer and less obstructed trenching can be expected.*

86. Telstra did assume lower cost placement activities (i.e. trenching turf as opposed to boring) could be employed to a much greater extent in less dense areas. This is reflected in the TEA model by the adoption of different density bands.

87. There are separate breakout and reinstatement costs for concrete and asphalt, depending on the thickness of the material removed or replaced. Asphalt and concrete footpaths, drives and roads might be thinner in rural areas. However the

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[47] Ibid, Section 2.2.1. pg. 9
[48] Ibid, Section 2.2.1, pg. 10
[49] Statement of [redacted]
[50] Ovum Consulting, *Review of the economic principles, capital costs and expense calculations of the Telstra Efficient Access cost model,* Section 2.2 pg 11
[51] Network Strategies, Review of the Telstra TEA model version 1.1, September 2008, Section 2.2.1, pg. 10

model assumes only the thinnest (least cost) category of concrete streets and drives would be encountered in all Band 2 exchanges. The cut and restore assumption used in the model for asphalt surfaces was similarly conservative (i.e. minimised cost), assuming no asphalt surfaces would be more than 50 mm thick.

88. In most models the placement options (i.e. trenching, cut and restore, boring, etc.) vary between density groups as in the TEA model. However, the costs for the type of placement activity generally remain the same for all density groups. For instance, the Fixed Network Services Cost model prepared for the ACCC by Analysys uses a single composite cost for placing each size of conduit in all Bands. It is not possible to adjust the relative mix of boring, trenching and cut and restore, other than by changing the cost of placing a size of conduit.[52] Ovum also recognised the reasonableness of using average prices across all Band 2:[53]

> *The costs between areas are not distinguished and averages have been used throughout the model for the pricing of equipment. Ovum agrees that the use of averages is common in regulatory models and appropriate for the costing overall of Band 2 ESAs.*

89. Second, Optus states:[54]

> *Attached to this submission at Attachment 2 is a Network Strategies report containing additional comments on the TEA model. It contains additional material relating to the key points made in the original Network Strategies report and should be read in conjunction with that original paper. In this new report, Network Strategies states that:*
>
> *"The underground conduit and pit construction proposed by Telstra is expensive mainly because there appears to be little or no optimisation of cable layout to avoid trenching and reinstatement of expensive surface types and the TEA model uses relatively high cost trenching/duct technologies, instead of the more cost-effective technologies that are available, such as shallow trenching and micro-trenching or direct buried cables."*
>
> *After discussing these more cost-effective technologies, Network Strategies states that: "None of these alternative approaches to network deployment are considered in the TEA model" and concludes that:*
>
> *"In its current form, the conduit and pit design used in the TEA model does not accurately model the network that an efficient operator would build in practice to provide ULLS in Band 2 areas."*

90. Network Strategies, made the above comments in an effort to clarify the statement in their original report that the conduit and pit design in the TEA model *"is likely to be the most expensive design"* that could be used to build a new network. However, in this clarification they state that the primary cause of the expensive design is that there *"appears to be little or no optimization of the cable layout".*[55] Again Network Strategies provides no actual data or analysis to support this conjecture. Further this criticism is

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[52] There is an option to use a % for using plowing to place cable in the ACCC model, however, this option is only selected in Bands ¾.

[53] Ovum Consulting, Telstra Efficient Access cost model-economic issues, An advisory Note to the ACCC, Section 2.1

[54] Optus (2008), *Response to Draft Decision*, December 2008, paragraph 3.5-3.6

[55] Network Strategies, Review of Telstra TEA model version 1.1 – additional comments, Section 2.2, page 4

without merit, since the "trenching and reinstatement of expensive surface types", which Network Strategies seeks to avoid, is an input to the TEA model, not a by product of "cable layout". Consequently the amount of each surface type included in TEA is not an indicator of the level of "optimisation of cable layout", rather it is a direct result of model inputs.

91. Telstra filed with the ACCC its report tilted *Measure of TEA Model Efficiency ULLS Band 2*, a comparison of the trench length, the cable length and number of pits and manholes in the TEA network design to the same data for the actual Telstra's network. As shown in that study, the TEA model eliminates 34.5% of the trench length, 83.2% of the manholes and 20.8% of the pits from the actual network design. These 20 to 80 percent reductions prove there is significant optimisation built into the TEA model.

92. Telstra updated this report to also include draft results from the ACCC's Fixed Network Services Cost model. While that model is in draft form and has numerous design flaws making it unsuitable for pricing telecommunications elements or services[56], it does provide a point of comparison between the Telstra model and a model that uses hypothetical mathematical algorithms to determine the network layout. Table 1 below sets out the comparison of the trench and cable sheath length in Telstra's updated report. As illustrated, the TEA model produces significantly less trench and cable length than the ACCC's model. While the ACCC's model produces fewer pits and manholes, Telstra believes this is because of a number of errors in the ACCC's model.

Table 1: Efficiency in the TEA model

Metric	TEA Measure	ACCC Measure	Efficiency Over ACCC	Inventory Measure	Efficiency Over Inventory
Trench km (Distribution Only)	99,893	118,442	15.7%		
Trench km (Total)	111,516	122,031	8.6%	170,291	34.5%
Pits and Manholes	3,086,063	1,662,508	-85.6%	4,029,563	23.4%
Cable Sheath km (Distribution Only)	137,677	236,316	41.7%		
Cable Sheath km (Total)	162,276	275,809	41.2%	375,482	56.8%
Fibre Sheath km (Total)	3,662	92,058	96.0%		

93. Ovum , the ACCC's consultant on engineering issues, agrees that the TEA model design, as revised in Version 1.2, incorporates efficiencies across the network design:[57]

> *With the revised model, as described in our advisory note to the ACCC on engineering issues, we conclude that (p. 4)*
>
> > *"The TEA model, version 1.2, is now working as originally described by Telstra. The cable routes in the model database are the shortest paths within the set of actual paths used for cables."*

[56] See Telstra's *Submission with respect to the ACCC's cost model , Expert report by Prof. Bob Harris on the ACCC's cost model* and *Expert report by Nigel Attenborough on the ACCC's cost model* submitted to the ACCC on 1 April 2009

[57] Ovum Consulting, Telstra Efficient Access cost model-economic issues, An advisory Note to the ACCC, Section 2.1

And:

> *"The dimensioning of cables, ducts, pits, manholes, cable joints, cable gauges and pillars are all appropriate for a "scorched node" model of a copper access network. These calculations include efficiency gains over the existing network."*

This implies that changes have been made, and the TEA model has included efficiency gains. The methods for calculating efficiency gains over the existing network are appropriate.

94. In their original report, Network Strategies argues that it is more economically efficient to use *"direct buried and overhead distribution cabling"*[58] in rural areas. Network Strategies subsequently added *"shallow trenching or micro trenching"*.[59] Network Strategies provides no backup or support as to whether these alternative placement approaches are practical, cost effective, efficient over the short and long run or compliant with the laws and regulations of cities where the network would be placed.

95. Telstra filed a statement with the ACCC that explains that the current construction requirements for cable networks virtually preclude the use of aerial facilities.[60] That statement also discusses the desirability of using conduit to house cable runs.[61] The reasons include:

- Efficiency gains in the ability to install, replace, and remove existing cables;
- The additional protection the conduit provides for the cable; and
- Efficiency improvements in maintaining the cable network.

96. As Optus points out, Network Strategies now supports model options that include the use of shallow and micro-trenching. Network Strategies provides the following justification for incorporating these placement procedures into the model:[62]

> *Shallow trenching, such as the kind deployed by the Marais Groupe in France is used extensively in Europe, can accommodate numerous ducts, is quick to roll-out (around 500 metres per day)and can be more cost effective than the approach used in the TEA model, particularly for smaller cables in high population density areas. Cost is saved through the minimal disruption and damage caused by specialised trenching machines when compared to conventional back-hoe and drilling.*

97. In a recent online paper Network Strategies discussed micro-trenching:[63]

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[58] Network Strategies, Review of the Telstra TEA model version 1.1, September 2008, Section 3.3 pg. 23
[59] Network Strategies, Review of Telstra TEA model version 1.1 – additional comments, Section 2.2, page 5
[60] Statement of [redacted], paragraph 40 to 55
[61] Statement of [redacted], paragraph 64 to 66
[62] Strategies, Review of Telstra TEA model version 1.1 – additional comments, Section 2.2, page 5
[63] Network Strategies, Micro-trenching: can it cut the cost of fibre to the home, http://www.strategies.nzl.com/wpapers/2008019.htm

It makes use of micro-ducts with narrow, vertical cross-sections (12mm by 30mm for example, rather than circular) and very small diameter fibre cables (for example 24 fibres in a 4mm diameter cable, and 72 fibres in a 6.1mm cable).

While digging and re-instating the road for a traditional trench is a time-consuming and expensive exercise, the micro-trench can avoid many costs as it does not penetrate the surface layer of the road (asphalt). This means the crew can dispense with traditional expensive backfill material and road re-surfacing, instead backfilling with grout, concrete or similar substances, which once sealed may be practically invisible.

98. However, in the same paper, not provided by Network Strategies in the context of Telstra's Undertaking, Network Strategies provides a list of the significant problems with micro-trenching:

> *However micro-trenching is not necessarily a panacea for affordable FTTH in New Zealand - there are a number of practical issues that must be addressed:*
>
> *Road movement: The surface of the road can move with the weight of the traffic. Even quite small movements can be sufficient to crush or otherwise damage cables and ducts. To reduce movement, cables are installed along the edge of the gutter of the road, where the curbing will add strength.*
>
> *Road thickness: Micro-trenches must be at least 100mm deep, and thus the road surface needs to be at least that thick. Cutting through the asphalt and into the base of the road will seriously reduce the cost-effectiveness of micro-trenching, as extra measures are required to ensure water does not penetrate the road base (potentially causing subsidence and long term road damage).*
>
> *Road resurfacing: When roads are resurfaced, the fibre must be physically removed from its micro-trench beforehand, and reinstalled afterwards, to avoid any damage being done to it when the old road surface is milled down. This reduces the long term cost-effectiveness of this system.*
>
> *Other utilities: It has been suggested that the trenching saw may "slice through storm water drains, gas pipes and electricity cables before operators even knew they were there" – although we note that in general drains, pipes and other cables are usually well below the asphalt surface of the road. It may be more likely that laying a micro-duct close to the surface of the road will make the telecommunications network more susceptible to damage by general contractors and the maintenance/installation of other utilities.*

99. The following points can be taken from this paper:

- The micro trench cannot hold the standard copper cable 100mm conduit (i.e. in fact copper cables are never even mentioned in the paper);
- Anytime a road is repaved there will be significant service outages as the plant is removed;

- Significant outages will also occur if the road settles or moves; and

- Micro trenching has significant potential to damage roads and other surfaces.

100. Further, micro-trenching does not comply with the Australian standards for building telecommunications networks. The Australian Communication Industry Forum publishes an industry code that specifies a depth of cover over telecommunications carriers of 450mm for most roadways and typically 1000mm to 1200mm for roads controlled by a State or Territorial Road Authority.[64] In order to meet these standards the trench would have to penetrate through the road surface. Network Strategies concedes that trenching to comply with the Australian industry code, "*will seriously reduce the cost-effectiveness of micro-trenching*".[65] The TEA model assumes boring in most instances when crossing roads, a placement method that requires no restoration.

101. Thus, even if none of the problems with micro-trenching existed, Telstra or a new entrant would not be permitted by ACIF codes to undertake such activities.

102. Third, Optus states:[66]

> *Further, in its original report Network Strategies states that: "In using a non-tapered architecture, Telstra is passing on the costs of over-building its network to its ULLS customers." In its new report, Network Strategies discusses this issue in more detail and states that: "In our experience, we have never encountered copper access network models which do not use tapering in the design of the distribution networks." The authors discuss potential justifications for the use of non-tapered architecture in the TEA model, before concluding that "there is no justification."*

103. This issue is discussed in detail in a previous response to Optus.[67] The non-tapered 100 pair distribution architecture is the standard network design used by Telstra when deploying a new network because it increases efficiency and reduces material costs during installation process, eliminates the cost of jointing cables at cable size changes and increases the ability to of the company to rapidly respond to demand fluctuations across the network. The rationale for using a non-tapered design is discussed in detail in a statement filed by Telstra.[68]

104. Future network demand, even in established neighbourhoods, is never a known quantity. As customers migrate throughout the network, the difference in their telecommunications needs travel with them. In order to provide service in a timely manner, Telstra and any new entrant needs to have capacity available to meet changes (including movement from one area to another) in demand. Ovum recognised these potential benefits of using a non-tapered design:[69]

> *With regard to tapering in the distribution, Ovum remains of the view, agreeing with Telstra, that a non-tapered design is standard. Ovum's engineering review showed that tapering the distribution cables would*

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[64] Australian Communications Industry Forum, Industry Code, ACIF C524:2004, Section 9.4.3
[65] Network Strategies, Micro-trenching: can it cut the cost of fibre to the home, http://www.strategies.nzl.com/wpapers/2008019.htm
[66] Optus (2008), *Response to Draft Decision*, December 2008, paragraph 3.7
[67] Telstra (2008), *Response to Access Seeker Submissions*, 18 November 2008, section F.1.3
[68] Statement of [redacted], paragraphs 79 to 100
[69] Ovum Consulting, Telstra Efficient Access cost model-economic issues, An advisory Note to the ACCC, Section 2.1

only save 4% of the cost (see [1], section 4.1) but indicated this would be outweighed by the operational benefits. Non-tapered design of the distribution cables should be used.

105. Ovum also stated:[70]

> *If we set the fill factor to 100% for all cables, then the tapered design for all ESAs is about 4% cheaper per line than the non-tapered one. This supports the view that a non-tapered design, which provides greater operational efficiency, would be preferred by an efficient operator of a copper-cable access network.*

106. The minimal savings in the initial cost of placing a non tapered network would be more than offset by future inefficiencies result from future cable additions required to meet changing demand.

107. Fourth, Optus states:[71]

> *Perhaps the most important single failing of the TEA model is its lack of optimisation through the modelling of hypothetical routes. As Network Strategies have stated, "hypothetical routes are an essential component in any cost model that attempts to build an efficient access network." In their Dec 2008 report, Network Strategies explain why Telstra's criticisms of models which, unlike the TEA model, can determine new efficient cable routes (based on physical obstructions and other arguments) are not generally valid. The authors conclude that:*
>
> *"It is our conclusion that the fact that the Telstra model does not permit re-clustering and hypothetical cable routes is evidence that TEA is not fully optimised and therefore is not capable of estimating the efficient cost of supply of the ULLS."*

108. Telstra disagrees with Network Strategies that "hypothetical routes are an essential component in any cost model that attempts to build an efficient access network". There is nothing optimal about a network design that creates Distribution Areas absent road and geographic awareness, places pillars arbitrarily, and routes cable and conduit "as the crow flies." A network that is efficient must work in practice. Telstra is unaware of a hypothetical route design algorithm that designs a network that would work in practice. Mathematical algorithms (for example clustering algorithms) that design hypothetical networks do not take into account natural and man-made obstacles that, in the real world, make it difficult and costly to build networks. Indeed, the ACCC's Fixed Network Services Model attempts to design hypothetical networks and it fails to build a network that would work in practice[72] and, in any case, results in a network that has 9.4% longer total trench length than the TEA model.[73] The TEA model takes into account these obstacles by starting with the actual rights of way for Telstra's network and optimises the routes by eliminating those that do not provide the shortest way to get between two points. A more complete critique of the use hypothetical networks to "fully optimise" a cost model can be found in Telstra's initial review of the ACCC's Fixed Network Services Model.

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[70] Ovum Consulting, Review of the network design and the engineering rules of the Telstra Efficient Access cost model, Section 4.1
[71] Optus (2008), *Response to Draft Decision*, December 2008, paragraph 3.8
[72] Telstra's letter to the ACCC, dated 20 March 2009
[73] Telstra (2009), *Measure of TEA Model Efficiency: Band 2 – Version 2*, 9 March 2009, section 5

109. The ACCC should consider Network Strategies comments on the efficiency of the TEA model's network design with due suspicion, since they provide no quantification or evidence of their assertion. Not only that, as discussed below, for a different but more recent client Network Strategies conducted an exercise that involved measuring efficient network route length that, if they had done a similar exercise in this context, would show that the TEA model routes are indeed efficient and fully optimised.[74]

110. Additionally, in response to Telstra's submissions, Optus states:[75]

> *Telstra has attempted to refute Optus' criticisms of the lack of optimisation in the TEA model. For example, Telstra states that Optus' criticism that there is little if any network optimisation in the TEA model is based in a large part on the assumption that the TEA model retains the actual location of all network structures or nodes, including the pits and manholes."*
>
> *However, Telstra's statement is incorrect. Optus' criticism that there is little if any network optimisation in the TEA model is not based on the assumption that Telstra notes. In its Dec 2008 report, Network Strategies explains why Telstra's attempted rebuttals (including this specific point) are incorrect, and notes that:*
>
> *"The claim that there is little or no optimisation in the TEA model is based on the observation that it does not attempt to re-define distribution areas based on today's rather than historical demand. This means that inefficient pillar locations and main cable routes are retained. It is also means that inefficient distribution cable routing, based on historical demand growth, is retained. Telstra claims that some of this inefficiency has been removed from the database through its own internal analysis, but we are unable to confirm this. We realise that manhole and pit numbers are re-dimensioned by the model, and this point is irrelevant to the distribution area efficiency and optimisation argument."*

111. Network Strategies and Optus argue that inefficient *"main cable routes are retained in the TEA model."*[76] The model does not retain cable routes, the actual cable routes are only used to determine the location of existing right of ways. There are only three aspects of the actual network that the TEA model retains:

- Exchange locations;
- Pillar locations; and
- The locations of the existing rights of way.

The cable routes are completely re-dimensioned and redesigned using the locations of existing right of ways. This fact was recognised by Ovum when they stated that the TEA cable paths *"represent the shortest paths among the existing paths present in Telstra's cable plant records."*[77]

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[74] Network Strategies (2008), *Broadband Strategies for New Zealand: Analysis of Possible Infrastructure Models*, 10 December 2008, pages 94-95
[75] Optus (2008), *Response to Draft Decision*, December 2008, paragraph 3.9 – 3.10
[76] Optus December 2008 Submission, at paragraph 3.9
[77] Ovum Consulting, Telstra Efficient Access cost model-engineering issues, An advisory Note to the ACCC, Section 3.2.1

112. Retention of pillar locations is necessary to assure that pillars are readily accessible to the main cable network and to the customer locations in the distribution area by cable routes that follow actual rights of way. When pillars are moved in hypothetical models, there is no assurance they remain similarly accessible. The benefits of a network design that uses actual legally prescribed rights of way and pillar locations that are known to be accessible far outweigh any potential benefit from moving the location of pillars in a distribution area. In fact, arbitrarily relocating pillars is more likely to result in pillars that are less accessible to customer locations, than it is to result in pillars that are more accessible, because hypothetical models cannot consider accessibility due to lack of road and geographic awareness. Designing a cable network that realistically reflects cost of constructing efficient cable and conduit runs is critical in identifying a realistic TSLRIC.

113. Approximately 84 percent of the total investment in the ULLS network is attributable to the purchase and placement of cables and conduit. These routes must run down every street where customers are located, regardless of the pillar location. Moving the location of the pillars will not significantly affect the location of the conduit and cable routes. Thus, relocating pillars has no material impact on the overall TSLRIC for ULLS.[78]

114. Ovum recognised the reasonableness of retaining the actual pillar locations:[79]

> *It is legitimate, however, for Telstra to use a scorched node approach – fixing the current pillar points – for purposes of the model.*

B.1.2 Transparency

115. Optus argues:[80]

> *For certain key aspects of the network design employed in the TEA model it is impossible for any party other than Telstra to know whether or not that aspect of network design has been optimised sufficiently, since these aspects are not transparent.*
>
> *For example, if the ACCC is to test whether the TEA model's cost estimates are consistent with the costs of supply for an efficient forward-looking operator, it must be able to test whether the network routes used in the model are reasonable and whether these routes are likely to be consistent with those adopted by an efficient operator. However, the ACCC cannot test this aspect of the model because to do so it would need to be able to identify the actual locations of modelled customers and structure points (pillars, manholes, pits etc), which is impossible because the network database within the model does not allow this functionality.*
>
> *It follows that it is impossible for the ACCC to test whether the TEA model's cost estimates are consistent with the costs of supply for an efficient forward-looking operator. Consequently, it is impossible for the ACCC to be satisfied of the reasonableness of Telstra's undertaking.*

116. The TEA Model designs an efficient access network for every Exchange Service Area (ESA) in Band 2 in two stages. First, it designs a distribution network that efficiently

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[78] Telstra (2009), *The Impact of Distribution Area Design on Customer Access Network Investment Costs*, 9 March 2009
[79] Ovum Consulting, Review of the network design and engineering rules of the Telstra Efficient Access cost model, Section 2.1
[80] Optus (2008), *Response to Draft Decision*, December 2008, paragraph 3.11-3.13 and similarly 3.15. Network Strategies makes a similar argument in Optus (2008), *Response to Draft Decision*, December 2008, Attachment 2, section 2.3.

connects every address in every Distribution Area to the pillar serving that DA. Then it designs a main network that efficiently connects every pillar in an ESA to the exchange building.

117. The model begins design of the distribution network by mapping every address in a DA to the network structure point residing in the legal right of way, which serves that address. The model then identifies the end points of each distribution route (i.e. the address furthest from the pillar) and constructs an efficient route from that point back to the pillar, aggregating demand along the way. The model designs efficient routes by searching all route segments in the existing distribution network, which are known rights or way, and choosing the least distance path from point A to point B at each and every network structure point along the route. The model identifies every point along the route where demand enters the network, identifies the amount of demand entering the network at that point and aggregates total demand on the route for every route segment all the way to the pillar. Aggregate demand is used to determine the size of cable and conduit needed for every route segment.

118. The model then designs efficient main network routes to connect every pillar in an ESA to the exchange building. (Building terminals, which are directly served by the main network, are also included in the routes.) The model designs efficient routes by searching all route segments in the existing main network, which are known rights of way, and choosing the least distance path from point A to point B at each and every network structure point along the route. The model identifies every point along the route where demand enters the network, identifies the amount of demand entering the network at that point and aggregates total demand on the route for every route segment all the way to the exchange building. Aggregate demand is used to determine the size of cable and conduit needed for every route segment.

119. The only step in this process, which is not readily visible in the TEA model's Microsoft Excel spreadsheets, is the selection of least distance route segments from point A to point B from all the route segments in the existing distribution and main networks. Every other step in the process can be tracked in the model's spread sheets. The end point of every distribution and main route is identified. Every conduit segment between the end point and the pillar or exchange building is identified and its length accurately recorded. Every point where a lead-in is jointed to the distribution network or where demand from a pillar or building terminal is jointed to the main network is identified along with the amount of demand entering the network at that point. And aggregate demand and distance from the pillar or exchange building is visible for every route segment.

120. The selection of the least distance route segment between any two points in the network from all the route segments in the existing distribution network is not visible, because it is not done in the Excel modules; the least distance routing selections are done in preprocessing. The source databases are too large and the processing is too sophisticated for the selection to be done in Excel.

121. In any case, an attempt to examine the preprocessing would necessarily require examination of the whole set of actual route segments in Telstra's existing network, from Telstra's NPAMS and CPR2 databases.[81] As explained below, this data cannot be disclosed for national security reasons.

[81] Statement of Frank Hatzenbuehler, 18 November 2008, Annexure A

122. As the Government has previously acknowledged, Telstra's network information data contained in Telstra's databases is subject to some very significant national security considerations. Entirely apart from the potential it may have to harm the commercial interests of Telstra, the disclosure of data about the locations and functionality of telecommunications lines and other facilities poses a real threat to national security.

123. The national security risks associated with the raw data contained in Telstra's NPAMS and CPR2 databases place that data in a different category of sensitivity to the optimised base data contained in the TEA model. Given those risks, disclosure of the data for the purposes of the assessment of Telstra's proposed Band 2 ULLS pricing cannot be justified.

Attacks on facilities and infrastructure

124. It is important to recognise that the risks involved with disclosure of information about the location of telecommunications facilities are not just hypothetical. For instance, numerous incidents have occurred in which telecommunications cabling was intentionally severed or destroyed in order to facilitate large-scale credit card fraud. These incidents have caused disruption to telecommunications services across the local area, as well as to major inter-exchange and inter-state cable links. Several incidents had significant impacts on major enterprise customers such as Coles Myer, Woolworths, National Australia Bank and Westpac, as well as Australia Post and even the New South Wales Police.

125. Attacks have also occurred which were issues-motivated, for example the recent destruction by arson of several telecommunications cables in the Kurnell area (believed to have been the work of persons with motives against the desalination plant located in that area). Such issues-motivated attacks can be well-planned and persistent, and could target any number of high-profile public projects or government or other buildings.

126. These attacks occurred without the assistance of information about the location and connectivity of specific cabling. Targeted attacks would have considerably greater repercussions. And once such information is made available, there is no controlling its dissemination. Considering the purposes and consequences of such attacks, it is clear that specific information about cable routes is extremely valuable and sensitive, and its disclosure has significant security implications.

Government acknowledgment of security risks

127. The Government acknowledged these risks during the course of the recent Request for Proposals for a National Broadband Network (**RFP**) process, when it requested Telstra to disclose limited samples of its network information in order to allow other bidders in the RFP process to formulate their proposals. The information that Telstra voluntarily supplied was disseminated under a statutory confidentiality regime set out in Part 27A of the Telecommunications Act 1997.

128. That statutory regime was specially implemented in order to ensure that the network information disclosed by carriers would have adequate protection while in the hands of both public officials and private companies. The information could only be disclosed to and used by those persons for strictly limited purposes associated with the RFP process. Detailed security and handling rules were formulated which specified the kinds of physical and electronic security measures that recipients of the information were required to implement prior to, and for the course of, their possession of the network information. Among these was a requirement for every

single disclosure of the protected information to be logged and accounted for. Criminal and civil penalties applied to breach of these requirements.

129. That regime was developed to govern dissemination of only a small, redacted sample of the network data that would have to be disclosed in order to understand the optimisation process. It was developed over a period of several months through the combined efforts of Parliament, the Department of Broadband, Communications and the Digital Economy and specialist government security agencies, in consultation with Telstra and other carriers who voluntarily disclosed such information.

130. Further, in the past, Telstra has provided some network data for the purposes of the Critical Infrastructure Protection Modelling and Analysis (**CIPMA**) Program, managed by the Critical Infrastructure Protection Branch of the Attorney-General's Department (**CIP Branch**) in conjunction with Geoscience Australia and the CSIRO. The purpose of that program is to identify interdependencies between key sectors so as to enhance awareness of security vulnerabilities that may not otherwise have been apparent to policy-makers or business participants in the sector. The three priority sectors CIPMA has been examining are banking and finance, energy and communications.

131. The geospatial information and network knowledge Telstra provided for the CIPMA Program is currently held by Geoscience Australia in an ASIO T4-accredited standalone facility. The T4 Protective Security Section of ASIO certifies facilities at a Top Secret security clearance level in accordance with the Government's Protective Security Manual.

Disclosure of network data is not worth the risks

132. These heavy security measures demonstrate how seriously both the Government and Telstra take the potential risks associated with disclosure of any data concerning the actual locations of telecommunications lines and other facilities.

133. It is one thing for the Commission and access-seekers to be able to examine the optimised network models upon which the TEA model operates. Optimised network data pose more limited risks, given that they cannot be used to gain information on the physical location of lines.

134. Raw pre-optimisation data stands in another category altogether. Its sensitivity from a security point of view requires that it be tightly held. Although Telstra would provide the information subject to confidentiality undertakings being signed, those undertakings are of limited utility. In particular, whenever confidential information is disclosed, the undertakings provide no ready means of determining who disclosed it or to whom. This results in considerably greater difficulties of enforcement than would have existed even under the Part 27A statutory confidentiality regime. Confidentiality undertakings are, therefore, patently inadequate for governing access to such sensitive network information.

135. While these concerns mean that the process of selecting the optimised set of routes from the existing routes in Telstra's network is not visible, the efficiency of the results is readily verifiable by several means.

136. Optus made similar arguments to the one quoted above in its submission in response to the ACCC's discussion paper. In response to concerns about the extraction of the base data used in the TEA model from Telstra's engineering databases, Telstra commissioned and filed the statement of Frank Hatzenbuehler, which attached a full

description of the process used to select only the efficient conduit routes in Telstra's CAN in band 2 areas.

137. Telstra submitted this statement to the ACCC on 18 November 2008. It appears, however, that there was a delay between when Telstra lodged the statement and when the ACCC notified parties of its existence and when a copy was ultimately provided to Optus. As a result, it appears that Optus' arguments extracted above have been made without consideration of the material Telstra filed with the ACCC on 18 November 2008.

138. Notwithstanding, Optus incorrectly argues that the ACCC or any party for that matter cannot "*test whether the network routes used in the model are reasonable and whether these routes are likely to be consistent with those adopted by an efficient operator*". While the TEA model does not have geo-coded information in it, this has no bearing on the ability of parties to test efficiency. There are a number of ways in which parties can test efficiency.

139. First, Telstra's *Measure of TEA Model Efficiency: ULLS Band 2* submission shows that the routes in the TEA model are 34.5% shorter than the actual routes in Telstra's network.

140. Second, the ACCC's cost model uses hypothetical algorithms to determine the location of cable routes in band 2 areas. These algorithms ignore natural or man-made obstacles to deploying trenches (e.g. rivers, buildings, houses etc) that add to the length of a telecommunications network and add to cost. Notwithstanding, the ACCC's cost model shows has 9.4% longer trench lengths than the TEA model[82], which adds strong support to the efficiency of the route lengths after the optimisation process as described in the Statement of Frank Hatzenbuehler. While generally the user inputs into the ACCC's cost model are only 'placeholders', Telstra notes that very few user inputs go to trench length. Additionally, Telstra has notified the ACCC of many errors in the ACCC's cost model[83] Telstra considers that, if the model were fixed, the ACC cost model would produce even longer trench lengths than it does presently.

141. Third, in a very recent report, Network Strategies uses other means of measuring route lengths in a cost model it developed for a new customer access network in New Zealand. Network strategies adopted the following approach to estimating route distances for each exchange area:[84]

> *In order to estimate access network (trenching) distances for each exchange area, we have determined the total distance of public roading within the boundaries (represented by the blue and red lines in Exhibit 8.3). Access network cables can be placed on both sides of a road or along one side of a road with frequent underground or overhead road crossings. In all cases, the total access network distance in urban and suburban areas is significantly greater than the total road distance. For costing purposes, we have assumed that the access network distance is twice the roading distance for each exchange area (note that this distance does not include the 'drop' distance from the access network in the road to the building or premises).*

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[82] Telstra (2009), *Measure of TEA Model Efficiency: ULLS Band 2 – Version 2*, March 2009, section 5.
[83] http://www.accc.gov.au/content/index.phtml/itemId/858091
[84] Network Strategies (2008), *Broadband Strategies for New Zealand: Analysis of Possible Infrastructure Models*, 10 December 2008, pages 94-95

142. Network Strategies' approach of measuring the network route distance by twice the road distance yielded a weighted average route distance of 17 metres per home passed in residential areas in New Zealand. Given potential differences between New Zealand and Australian conditions, this figure should not be directly compared to the TEA model. However, Optus and Network Strategies might have conducted the same type of analysis for the Australian network with publicly available data. Table 2 sets out the results from such an analysis. It shows that the route distance in the TEA model is shorter than the route distance derived using Network Strategies approach – Network Strategies measure of network route distance in Band 2 ESAs is 26.53 metres per line and the TEA model's measure of network route distance in the same ESAs is 16.34 metres per line. The network route distance measured by the TEA model is 38% shorter than the measure adopting Network Strategies' approach.

Table 2: Access network per home passed in Band 2 areas in Australia

Measure		Total Distance (km)	Distance Per Line (m)[85]
Network Strategies' measure of network route distance (twice the total road distance)[86]		199,812	26.53
TEA model measure of network route distance	Distribution	100,404	13.78
	Main	19,238	2.55
	Total	119,642	16.34

143. It is disingenuous for Network Strategies to assert that the TEA model's network routes are inefficient with no supporting quantification, while at the same time implementing for another client an approach to estimating network route length that, if undertaken for Optus would have shown that the TEA model network routes are efficient. The ACCC should, not only give little weight to, but completely disregard Network Strategies assertions in relation to network route efficiency. They have made no attempt to make sufficient enquiry or undertake any investigation into relevant matters before making quite drastic conclusions, that they themselves have clearly considered appropriate in other contexts.

144. Fourth, previous Telstra's submissions to the ACCC demonstrate that Telstra's costs are lower than those expected to be incurred by carriers in the US serving a market with the same characteristics as the market Telstra serves in Australia.[87] This study indicates that Telstra's actual network, even before optimisation in the TEA model, is efficient relative to other overseas carriers.

145. Thus, while the TEA model does not include geo-coded information, the efficiency of the routes can be verified by comparing the results of the TEA model with several measures of efficiency. In other words, the proof is in the pudding.

146. Optus also claims:[88]

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[85] These figures are calculated by dividing the total distance by the total number of lines in the TEA model (7.5m), except for the TEA model measure of distribution network distance, which is divided by the number of distribution lines in the TEA model (7.3m).

[86] The road distance in band 2 is measured from StreetNet 2007 and ExcahngeInfo, which are public sources of information available to Network Strategies and Optus.

[87] Telstra (2007), *Submissions in the PowerTel-Telstra ULLS Access Dispute*, 16 August 2007, Annexure 9 titled 'Telstra's Cost Efficiency', Figure 4

[88] Optus (2008), *Response to Draft Decision*, December 2008, paragraph 3.14

> *Network Strategies took issue with this non-transparent aspect of the TEA model, noting that it is not possible to vary the network architecture, and that inputs and assumptions in the TEA model are not visible and cannot be checked because of the way pre-modelling data has been incorporated into the TEA model network database. The ACCC noted in its Draft Decision that Network Strategies did not provide evidence to substantiate this view. However, Network Strategies stands by its original conclusions. An information paper produced by Network Strategies responding to this point in the Draft Decision is attached to this submission at Attachment 1. Network Strategies notes that:*
>
> *"we are not easily able to see customer locations, network topology and the cable routes, because these are not included in the TEA model. We consider this data is crucial to the correct implementation of a model such as the TEA model. Furthermore a significant level of data is stored in the network database and is not easily viewed or able to be modified."*

147. Network Strategies' claim that "*we are not easily able to see customer locations, network topology and the cable routes, because these are not included in the TEA model*" is incorrect. While there is no geo-coded mapping of the network, the TEA model clearly records each customer line (of which there are over 7,532,793), identifies each network structure point (of which there are 7,489,427) with which customers connect to the distribution network, the relative distances between network structure points, and traces (in linear form) the cable routes (for example, the cable route can be traced from one structure point to the next to the next and so on).

148. Network Strategies' claim that "*a significant level of data is stored in the network database and is not easily viewed or able to be modified*" is similarly incorrect. The base data is stored in a Microsoft Access database (TEA-Data-v1.2.mdb in the Data directory where the TEA model is installed) which is a common application (part of Microsoft's Office Suite of applications) that allows one to both view and modify data.

149. Optus states:[89]

> *In the same [Network Strategies] report, the authors explain why determination of distribution area size and line densities are further important aspects of the cost modelling process which are not transparent within the TEA model.*

150. Distribution area size and line counts are transparent in the TEA model. They can be seen in the 'Eng-Dist-Engine' workbook, 'Distribution-Collapsed' worksheet, in the columns labelled 'Demand Served by Pillar' and 'Area (sq. km)'. That data are derived from Telstra's operational databases.

151. Optus asserts:[90]

> *Finally, Optus notes that its access to the TEA model has been inadequate. Optus refers the ACCC to its letter to Telstra dated 7 October 2008, attached as Attachment 5, which makes clear that its access to the TEA model has been inadequate despite Telstra's offer of limited access to a single employee.*

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[89] Optus (2008), *Response to Draft Decision*, December 2008, paragraph 3.16
[90] Optus (2008), *Response to Draft Decision*, December 2008, paragraph 3.17-3.18

Optus submits that due to the restrictions placed on the confidential information relied upon by Telstra in support of its proposed access price, access seekers have not had adequate opportunity to assess and interrogate the accuracy of that information, as well as to provide comments. Accordingly, the ACCC should place limited reliance upon the confidential information relied upon by Telstra, consistent with its approach in assessing the DTCS exemption applications.

152. Telstra's letter to Optus dated 16 December 2008[91] responds in detail to Optus' non-specific and continued claims of 'inadequate' access to the TEA model. Amongst other matters set out in Telstra's letter, as well as in Telstra's *Response to ACCC Draft Decision:*[92]

    - 10 Optus external consultants are approved for full access to the TEA model - 5 of those have elected to execute and return appropriate confidentiality undertakings and have received the TEA model; and

    - 17 Optus employees are approved for access to the 'access seeker' version of the TEA model – 15 of those have elected to execute and return appropriate confidentiality undertakings and have received the 'access seeker' version of the TEA model.

    In those circumstances, Telstra rejects Optus' assertion that Optus' or any other access seeker's access to the TEA model has been inadequate.

153. Over 11 months into the process of considering Telstra's undertaking on 22 January 2009[93], Optus revised its position on allowing Telstra to access material over which Optus purports to claim confidentiality. Telstra's access is currently limited to a total of 12 individuals (comprising both Telstra employees and external advisers). Prior to this change in position, Optus limited access to only 2 Telstra employees[94].

154. Optus' revised position on access to Optus' confidential information includes a restriction denying any Telstra employee access to Optus' vendor pricing. This is identical to the position taken by Telstra in relation to the vendor pricing information contained in versions 1.0, 1.1, 1.2 and 1.3 of the TEA model and is consistent with Telstra's position that the 'access seeker' version of the TEA model excludes Telstra's confidential vendor pricing for reasons set out both in Telstra's letter to Optus dated 16 December 2008 and Telstra's *Response to ACCC Draft Decision.*[95]. Optus criticises Telstra for a position which Optus, itself, has adopted.

155. The only other information excluded from the 'access seeker' version of the TEA model is Telstra's confidential network base data. On 2 September 2008, Telstra offered to provide a nominated Optus employee with access to a modified version of the TEA model which contained Telstra's confidential network base data. That offer was rejected by Optus without any compelling explanation.

156. In summary, therefore, Telstra continues to reject Optus' assertion that Optus', or any other access seeker's, access to the TEA model has been inadequate or has denied

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[91] Letter from Telstra to Optus dated 16 December 2008.
[92] Telstra (2008), *Response to ACCC Draft Decision*, December 2008, paragraphs 198 - 223 in particular
[93] Email from Optus to Telstradated 29 January 2009
[94] Email from Optus to Telstra dated 7 October 2008
[95] Telstra (2008), *Response to ACCC Draft Decision*, December 2008, paragraphs 206 - 208 in particular

those parties an adequate opportunity to comment on Telstra's undertaking. It is evident from the volume and content of submissions made that the contrary is, in fact, the case.

157. Telstra also considers Optus' submission that "*the ACCC should place limited reliance upon the confidential information relied upon by Telstra, consistent with its approach in assessing the DTCS exemption applications*" to be an inapposite comparison and entirely irrelevant.

158. While the ACCC elected to give less weight to some extremely specific evidence in the context of the DTCS exemption, no party other than the ACCC had access to the evidence. The restriction on access was not attributable to Telstra and the ACCC chose to rely on and give weight to alternate evidence, namely Infrastructure Audit Record Keeping Rule (**RKR**) data, instead.

159. Given the highly confidential nature of Infrastructure Audit RKR data, only the ACCC can access this material prior to the ACCC electing to rely on it. It is evident that, in the context of the DTCS exemption, the ability for Optus or other interested parties to access and comment on data is not essential for the ACCC to give weight to that information.

160. The TEA model has been widely accessed and commented upon by Optus along with other interested parties and their external advisors/consultants over an extended period of time. In the circumstances, there is no plausible reason to limit reliance upon Telstra's confidential material and the TEA model in any way. Optus' submissions to this effect must be rejected.

B.2 Inputs costs

161. Optus and Network Strategies claim that Telstra's cable and equipment prices are substantially higher than market prices available to Optus.

162. The vendor prices in the TEA model are based on the actual prices in the A&AS contracts (see Statement of [redacted] Telstra awarded the A&AS contracts after a competitive selection process and they should result in substantial savings to Telstra throughout their term.[96] The winning competitive firms provide similar services to other telecommunications companies (including Optus). The firms include:

- Visionstream – a subsidiary of Leighton Holdings, itself a publicly listed company on the Australian Stock Market, which built optic fibre networks for NextGen[97]; operates, maintains and builds connectivity to the Reef network, which Optus leases[98]; and installs DSLAM infrastructure in Telstra's exchanges for Optus, iiNet, Primus and others[99].

- Servicestream – a publically listed company on the Australian Stock Exchange, which provides conduit and cable installation services for

[96] See, for example, 'Telstra Lines up $2.5bn in Contracts', *Australian IT*, 3 September 2007, http://www.australianit.news.com.au/story/0,24897,22353392-5013041,00.html
[97] http://www2.visionstream.com.au/projectlistingtemplate.php?id=42
[98] http://www2.visionstream.com.au/projectlistingtemplate.php?id=45
[99] http://www2.visionstream.com.au/projectlistingtemplate.php?id=41

Energex in Queensland[100]; installations, maintenance and logistics work for Optus' broadband networks[101]; and the roll-out of Vodafone's 2G and 3G mobile networks in Australia[102].

- Silcar – a company jointly owned by Siemens Ltd and Thiess Pty Ltd, which provides services for Optus, Country Energy and Hutchison[103].

163. These successful Australian companies provide services to many different telecommunications firms (including Optus) and firms in other industries. Their success is driven by their ability to provide competitive rates. In light of the competitive selection process for the A&AS contracts, it is difficult to comprehend how one could conclude that their rates are not competitive, forward-looking and efficient.

164. Despite this, Optus states:[104]

> *However, in its review of the TEA model, in the section on main network cable costs, Network Strategies found that:*
>
> *"the per-metre installed cable costs (including jointing and Telstra's loading factor) appear to be around 30% higher than what we would have expected, based on our experience of similar costs calculated in 2007."*

165. Network strategies provide no evidence or factual material in coming to this conclusion. Network Strategies simply state:[105]

[Optus Cat 1 CiC begins]

[Optus Cat 1 CiC ends]

166. Neither Optus nor Network Strategies provide any detail of Network Strategies' 'estimate'. Even if Network Strategies relied on confidential information, they could at least set out the method with which they carried out their estimate. This is important because, for example, Network Strategies does not state when they have observed input prices in other models. According to the ACCC's past decisions on ULLS copper cable prices have increased by approximately 4-5% per annum.[106] Thus, if the ACCC's price trends are to be considered accurate, input prices in the TEA model should exceed prices Network Strategies might have observed say 5 years ago, even though the prices Telstra pays for inputs have decreased as a result of the most recent contract negotiations.[107]

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[100] http://www.servicestream.com.au/upload/2007-07-03%20Energex%20Major%20Services%20Contract.pdf
[101] Servicestream 2007 Annual Report, at page 11, http://www.servicestream.com.au/upload/2007-09-24%20Service%20Stream%2007%20Annual%20Report%20FINAL.pdf.
[102] Servicestream 2007 Annual Report, at page 13, http://www.servicestream.com.au/upload/2007-09-24%20Service%20Stream%2007%20Annual%20Report%20FINAL.pdf
[103] http://www.silcar.com.au/html/OPE_TP.htm
[104] Optus (2008), *Response to Draft Decision*, December 2008, paragraph 3.21
[105] Optus (2008), *Response to Draft Decision*, December 2008, Attachment 2 (Optus Confidential Category 1), page 3
[106] ACCC (2007), *ULLS Access Dispute Between Telstra and Primus (Monthly Charges): Statement of Reasons for Final Determination*, December 2007, paragraph 419
[107] See, for example, 'Telstra Lines up $2.5bn in Contracts', *Australian IT*, 3 September 2007, http://www.australianit.news.com.au/story/0,24897,22353392-5013041,00.html

167. Telstra, Ovum and Optus provide the only actual data on the record regarding actual cable prices. Ovum found that the Telstra cable costs were *"broadly in line with international benchmarks."*[108] Optus response was confidential and is discussed in detail in a separate confidential submission. All the empirical evidence filed in this Undertaking shows that the Telstra cable costs are reasonable. Network Strategies' opinion is not substantiated and is unverifiable. Consequently, the ACCC should place no weight on it.

168. Network Strategies also claims, in relation to the indirect overhead mark up:[109]

[Optus Cat 1 CIC begins]

[redacted]

[Optus Cat 1 CIC ends]

169. It is not clear that Optus provided Network Strategies with Telstra's documentation setting out the calculation of the overhead mark up.[110] That documentation shows that Telstra incurred network support costs such as planning, supervision and construction, network and contract management that are directly related to a capital build program and are *"allocated to and capitalised as capital costs in Telstra's financial accounts."*[111] The Statements of [redacted] proceed to explain how the indirect capital ratio used in the model was derived from the amount of capitalised network management costs Telstra incurred. Since Telstra capitalises these costs, they are not accounted for in O&M. Further, since they are allocated directly to network assets, they are not otherwise accounted for as indirect capital.

170. Cable costs in the TEA model are derived directly from the AS&S vendor contracts. These contracts prices represent the amount vendors charge Telstra to provide their services, and would never include costs incurred by Telstra for such items as construction planning and contract oversight.

171. Optus also refers to a confidential statement (Attachment 3 to its report) to conclude:[112]

> *Further, Optus submits that many of the costs of cable (as well as the costs of other equipment) included in the TEA model are significantly higher than prices available in the market.*

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[108] Ovum Consulting, *Review of the economic principles, capital costs and expense calculations of the Telstra Efficient Access cost model*, Section 2.2 pg 11
[109] Optus (2008), *Response to Draft Decision*, December 2008, Attachment 2 (Optus Confidential Category 1), page 4
[110] For example, the statements of [redacted] and [redacted]
[111] Statement of [redacted] Page 3
[112] Optus (2008), *Response to Draft Decision*, December 2008, paragraph 3.23

172. This statement was premised on a confidential filing in this Undertaking. The contents of that filing are discussed in detail in a separate confidential submission. This attachment shows that the Optus assertion that the costs in the TEA model are *"significantly higher"* is incorrect.

173. Optus provides additional material in relation to MDF costs in the form of a confidential Optus employee statement, which is responded to in a separate confidential submission.[113]

B.3 Surface barrier costs

174. Optus argues:

- Assumptions about surface barriers should be based upon the surface barriers historically faced by Telstra (paragraph 3.32)

- The extent to which trenching and reinstatement costs were incurred historically remains largely unsubstantiated (paragraph 3.28);

175. In relation to the first point, Telstra considers that the historical costs faced by Telstra are irrelevant in an analysis of forward-looking costs. This is addressed in detail in section A above and in section B of Telstra's *Response to Access Seeker Submissions* dated 18 November 2008.

176. Optus' attempt to draw support for this aspect of its submission regarding surface barrier costs by reference to the High Court's decision in *Telstra Corporation Ltd v The Commonwealth*[114] is misplaced. In that case, the High Court considered the question of Constitutional validity of particular provisions of the TPA in relation to specific declared services including ULLS and whether those provisions effect an acquisition of property other than on just terms.[115]

177. The High Court's judgment does not concern the manner in which the ACCC applies or should apply access pricing methodology to declared services. Nor does it provide any support, directly or indirectly for Optus' assertion that assumptions about surface barriers should rely upon historic experience and costs.

178. In relation to the second point, despite its lack of relevance Telstra has prepared an analysis of the trenching and reinstatement works that Telstra has undertaken in the past. That analysis, discussed further below, shows that Telstra has incurred substantial costs in trenching and reinstatement historically. Indeed, basing costs on Telstra's historical trenching works in the TEA model, from 2000 to the 2008, results in a higher cost estimate.[116] The ACCC has criticised that analysis on the basis that it reflects only a short period of Telstra's history. However, prior to approximately 2000, Telstra's unionised workforce undertook all trenching activities; and consequently, the company did not create detailed records of the type of surface barriers that were dug, trenched through or reinstated, because such a breakdown was not necessary. The external contractors that have undertaken civil works since 2000 do record details

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[113] Optus (2008), *Response to Draft Decision*, December 2008, at footnote 74
[114] (2008) 234 CLR 210
[115] A summary of Telstra's contentions appear in the judgment at paragraph 2, (2008) 234 CLR 210, paragraph 2.
[116] Telstra, *Response to the ACCC's request for further information on Telstra's Band 2 ULLS undertaking made pursuant to s152BT of the Trade Practices Act dated 16 December 2008*, 13 March 2009

of the different trenching activities in order to ensure they charge Telstra the correct cost elements (e.g. reinstating asphalt as opposed to turf) for the work undertaken.

179. The facts contrast starkly with Optus' assertions that Telstra has not incurred costs associated with the breakout and reinstatement of surface barriers. In particular, Optus incorrectly asserts:

- The CAN was constructed in a gradual manner, by 1987 all areas in Australia had basic telephone services, and most CAN construction took place from the 1950s to 1980s (paragraphs 3.34-3.36); and

- The bulk of CAN construction occurred in greenfield developments in farmland where the predominant surface is turf (paragraph 3.37)

180. Optus' assertions are incorrect, as explained below.

181. First, the majority of CAN construction did not take place from the 1950s to the 1980s.

- In the 1986/87 financial year Telstra reported that it had 6.8m basic access lines, just 65% of the total number of lines in 2001/02 (10.6m).[117]

- A significant amount of CAN construction involved adding capacity into the network throughout band 2 areas after the 1980s. The additional capacity was required due to demand from infill housing, for second lines, for fax and later dial-up Internet services, and for the strong growth in apartment complexes and multi-dwelling units in already established areas.[118]

- The real value of Telstra's investment in CAN trenching, ducting and cables from 1987/1988 to 2006/07 is $[redacted] in 2007/08 dollars.

182. Second, it is not true that the bulk of CAN construction occurs in greenfield developments. Instead, Telstra has in recent decades invested, and continues to invest, substantially in the CAN in band 2 areas. Much of this investment is outside of new estates and is undertaken to add capacity to the existing network for infill housing and multi-dwelling units, and for the demand for additional lines from existing customers.

183. Third, while today the developers of new estates typically incur the cost of trenching, this has not always been the case. Indeed, trench sharing in new estates is a relatively recent phenomenon. A statement lodged by Telstra demonstrates that the practice of sharing trenches with developers in new estates became widespread only in the mid 1990s.[119] As explained in those statements, prior to the mid 1990s there were barriers to Telstra sharing trenches with other utilities in new estates.

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[117] See Telstra's Annual Reports 1986/87 and 2001/02, at page 8.
[118] See the statements of [redacted] and [redacted]
[119] Statements of [redacted] and [redacted]

184. Even if a historic approach were adopted, a $30 ULLS price is reasonable. As discussed above (section A.5.6), Telstra's historic costs of trenching and copper cable are higher than shown in the TEA model and would raise the ULLS cost by $11.46.

B.4 Trench sharing

185. A forward-looking assumption for trench sharing in new estates should be applied to a forward-looking cost estimate. The trench sharing variable should be based on the proportion of premises that would be in new estates during the construction of a new entrant's network over the course of one year. Telstra has previously submitted that the proportion of band 2 lots in new estates in a year is [redacted]. Telstra's input into the TEA model is conservative at 1%.

186. Optus argues for a longer time frame than one year. Optus states:[120]

> *Optus is pleased that the ACCC has acknowledged these issues in its draft decision, in which it stated:*
>
> *"The ACCC view is that network construction would generally be planned a significant time in advance and would most likely occur in conjunction with other operators and utility providers resulting in the use of open trenches at no cost to Telstra…In this regard the ACCC considers a trench sharing value of between 13 – 17 per cent approximates cumulative sharing potential in new estates."*

187. Telstra considers that a 1 year build timeframe is a reasonable assumption for a forward-looking cost estimate, particularly since other costs associated with a lengthy build timeframe are not considered in the TEA model but would be incurred by a new entrant building out a new network over an extended period. In particular, a new entrant would incur the costs of capital over the duration of the build of a new network which would not be recoverable from customers (as the network would be unfinished). Also, the new entrant would incur costs associated with building up scale as it deploys the network over time.

188. [redacted]

189. Furthermore, on behalf of Optus, CEG model particular elements of cost that it believes would be incurred by a new entrant, but which are not included either in the ACCC's Fixed Network Services cost model or the TEA model. The CEG report summarises:[121]

> *Using results of the WIK-MNCM, we have modelled the costs specific to termination that an efficient operator would face in achieving scale. The results of this modelling indicates that the WIK-MNCM cost estimate (including adjustments made by the ACCC) of 6.6 cpm should be increased by around 25% (or 1.7 cpm) to adjust for the costs of entry.*

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[120] Optus (2008), *Response to Draft Decision*, December 2008, paragraph 3.45
[121] CEG (2008), *Efficient Operator Benchmark: Report for Optus*, September 2008, http://www.accc.gov.au/content/index.phtml/itemId/854270

190. In short, CEG estimate that a new entrant's costs would increase by around 25% if it had a lengthy network build period to achieve scale. Telstra submits that assuming that a new entrant would build a network over the course of 1 year is conservative as it means that the cost model does not need to include the costs associated with a lengthy network build.[122] Telstra conservatively estimated the costs of holding capital for a network build timeframe of 17 years to be $2268 per SIO which is almost double the $2717 per SIO cost in the TEA model.[123]

191. Optus also implies that the trench sharing input should reflect Telstra's past ability to share trenches:[124]

> *Optus submits that the TEA model significantly underestimates the level of trench sharing in new estates (as the model assumes a new entrant replicating the entire CAN within 1 year) and this is inconsistent with Telstra's prudent past ability to share trenches…*

192. Optus argues that a value of up to 19% would be reasonable, presumably to reflect Telstra's historic ability to share trenches with the developers of new estates:[125]

> *…the Commission should apply a value of at least 17 per cent and that a value of up to 19 per cent would not be unreasonable.*

193. This claim starts with the 13% previously determined by the ACCC, based on an assumption of a new entrant rolling out a network over 10 years and ending 2003. Optus states that the ACCC should update its analysis to 2008, increasing the roll-out timeframe to 15 years.[126] Telstra notes that the ACCC has updated its analysis to 2008 and this provides the 17% figure[127] in the 13%-17% range determined in the ACCC's draft decision. Telstra queries the ACCC's analysis in a separate submission.[128] Further, Telstra notes that Optus built its HFC network in approximately 3-4 years (beginning in 1995 and ending in 1998/99)[129]; and Telstra built its Next G network in 1 year.

194. Optus also presents its own analysis that increases the 13% figure.[130] Optus derives a figure of [Optus Cat 1 CiC begins [redacted] Optus Cat 1 CiC ends] as well but then, without explanation, states that a figure of 19% is appropriate.[132] Notwithstanding this discrepancy, Telstra submits that a 15 year roll-out assumption is not reasonable and would warrant the inclusion of additional costs associated with such a timeframe, as argued by Optus in the context of pricing of MTAS. While Optus admits its analysis is simple[133], Telstra adds that it is wholly inaccurate as it is not forward-looking and fails to consider works that Telstra must undertake in new estates after they have been developed.[134] Further, while it is necessary to consider construction of an all copper network for the purpose of pricing ULLS, it is irrational to imagine such construction 10- 15 years in the future. It is unwise and unnecessary to contemplate such construction beyond the term of the Undertaking.

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[122] Telstra (2008), *Response to the ACCC's Draft Decision*, 23 December 2008, paragraph 331
[123] Telstra (2008) , *Response to the ACCC's Draft Decision*, 23 December 2008, paragraph 331
[124] Optus (2008), *Response to Draft Decision*, December 2008, paragraph 3.47
[125] Optus (2008), *Response to Draft Decision*, December 2008, paragraph 3.46
[126] Optus (2008), *Response to Draft Decision*, December 2008, paragraph 3.48-3.50
[127] Letter from ACCC to Telstra dated 18 December 2008
[128] Letter from Telstra to ACCC dated 17 February 2009. See also statements of [redacted] and [redacted]
[129] BIS (2001), *Telecommunications Infrastructures in Australia*, July 2001, pages 99 and 102
[130] Optus (2008), *Response to Draft Decision*, December 2008, paragraph 3.56-3.59
[131] Optus (2008), *Response to Draft Decision*, December 2008, paragraph 3.58
[132] Optus (2008), *Response to Draft Decision*, December 2008, paragraph 3.59
[133] Optus (2008), *Response to Draft Decision*, December 2008, paragraph 3.57
[134] See also statements of [redacted] dated 11 March 2009, [redacted] and [redacted]

195. Optus also relies on a United States FCC decision which quoted 55% trench sharing.[135] However, as set in Telstra's response to Optus' submission, the FCC expressly warned against using this decision in a context outside of its original intention.[136] The ACCC (and Optus) should heed the FCC's warning on the interpretation of its analysis.

196. In relation to the conduit in the CAN that Telstra leases to third parties, Network Strategies states:[137]

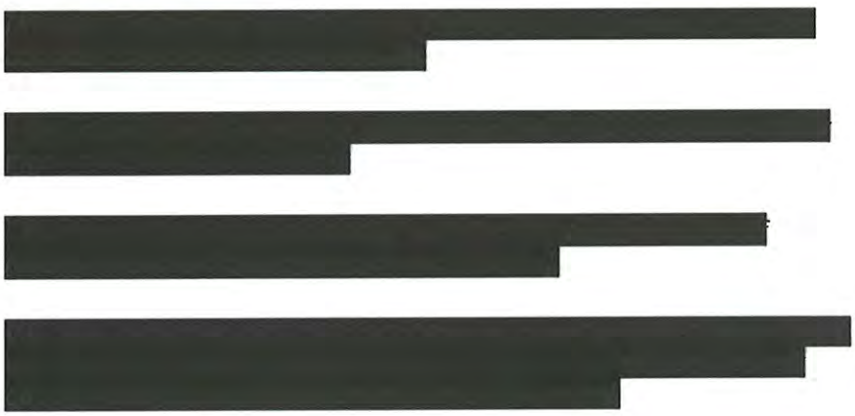
[Optus Cat 1 CiC begins]

[Optus Cat 1 CiC ends]

197. The TEA model adopts the latter approach for conduit leasing, which Telstra agrees is normal in cost modelling.

198. Network Strategies adds:[138]

[Optus Cat 1 CiC begins]



[Optus Cat 1 CiC ends]

199. It is inappropriate to adopt an approach that assumes a cost sharing agreement for conduit space between Telstra and third parties when, in fact, no such agreement exists and conduit space is leased by Telstra to third parties. It is, on the other hand,

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[135] Optus (2008), *Response to Draft Decision*, December 2008, paragraph 3.52
[136] Telstra (2008), *Response to Access Seeker Submissions*, 18 November 2008, from page 61
[137] Optus (2008), *Response to Draft Decision*, December 2008, Confidential Attachment 2, page 11
[138] Optus (2008), *Response to Draft Decision*, December 2008, attachment 2, page 11

perfectly reasonable for a model to reflect the leasing arrangements actually in place, which is what the TEA model does.

200. It is not clear why Network Strategies asserts that [Optus Cat 1 CiC begins] [redacted] [Optus Cat 1 CiC ends]. Where spare conduit exists in Telstra's network, Telstra is obliged to grant a lease to third parties.[139]

B.5 O&M costs

201. Optus states:[140]

> *Further, Optus submits that in the TEA model the O&M mark-up is applied to the total capitalised investment costs which have already been marked up by the indirect overheads loading factor.*

202. The O&M factors are derived by dividing the adjusted O&M cost by the total investment (including capitalised indirect network management costs). For internal consistency and accuracy, these factors must be applied to the total modelled investment including all the same capitalised costs. Most TSLRIC models apply O&M factors to the total investment including capitalised indirect network support costs. In fact, O&M factors in the ACCC's Fixed Network Services Cost Model are also applied to total investment including capitalised overheads. Again, Optus comes to a conclusion based on a Network Strategies supposition that appears to have been made after a less than cursory review of the TEA model.

203. Telstra reiterates that the approach it has adopted to calculate is consistent with international practice.[141]

B.6 Annualisation

204. Optus supports the tilted annuity approach to depreciation that the ACCC applies. Optus argues that because the ACCC revalues Telstra's TEA assets on a two-yearly basis, a tilted annuity is required to prevent Telstra from being overcompensated, "*given the current upward movement of prices*" (Para.3.70).

205. However, neither Optus' rationale for, nor its application of, the tilted annuity stand up to scrutiny. As is set out below and in the following sections, the tilted annuity will prevent Telstra from recovering the costs of its investments:

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[139] Statement of [redacted] at paragraph 13

[140] Optus December 2008 Submission, at paragraph 3.62

[141] Model inputs used by the FCC in its 1999 *Tenth Report and Order in the Matter of Federal-State Joint Board on Universal Service* (CC Docket No. 96-45) and *Forward-Looking Mechanism for High Cost Support for Non-Rural LECs* (CC Docket No. 97-160); State of Vermont Public Service Board, Docket No. 5713, Investigation into New England Telephone and Telegraph Company's (NET's) tariff filing re: Open Network Architecture, including the unbundling of NET's network, expanded interconnection, and intelligent networks In re: Phase II, Module 2 - Cost Studies, Order entered: 2/4/2000; Interconnection Tie Pairs (ITP) Interconnection TELRIC Results, Cost Study, Qwest (Market Services & Economic Analysis), Study ID #7704, Created 06/17/03, Washington; Inputs presented in the context of arbitration proceedings before the Public Service Commission of Utah, in relation to unresolved issues between Eschelon and Qwest in the parties' interconnection agreement negotiations; User defined factors in version 5.3 of the HAI Model, as produced in the context of a review by the Washington Utilities and Transportation Commission concerning, amongst other things, Unbundled Loop and Switching Rates; WIK (1999), *An Analytical Cost Model for the National Core Network*, 14 April 1999; NZ Commerce Commission (2007), Draft Determination for TSO Instrument for Local Residential Telephone Service for period between 1 July 2005 and 30 June 2006, 9 July 2007.

- Forward-looking price trends of raw materials mean that the tilted annuity traditionally applied by the ACCC should, in fact, be reversed if Telstra is to be compensated for its investment;

- Optus' illustrations of the application of the ACCC's approach to depreciation charges for ULLS assets are misleading and fail to highlight important adverse consequences for depreciation and ULLS charges to customers;

- Contrary to what Optus claims, the tilted annuity profile for depreciation reflects neither a 'real world' commercial nor an economic outcome; and,

- The application of a tilted annuity to depreciation for ULLS assets threatens the commercial viability of Telstra's investments.

B.6.1 Optus' approach implies a 'reverse' tilted annuity

206. Telstra has already described the contradictions inherent in the ACCC's asset revaluation approach in detail in its response to the ACCC's Draft Decision. Essentially, this approach relies on applying short-term price trends to important inputs for long-lived ULLS assets (such as copper and labour) to regularly revalue these assets. These price trends are volatile and uncertain, so that the ACCC's approach, if it were applied consistently, would imply frequent and major revisions in the valuations of sunk assets as a result of external factors. Contrary to either standard economic theory or commercial practice, these revaluations would take place entirely independently of underlying demand and supply conditions relevant to the ULLS services provided by the asset in question.

207. Predictions about future input costs, which underpin the 'forward-looking' approach to asset valuations that Optus supports, are demonstrably unreliable. The following analysis of ULLS input costs suggests that:

    - The historical price trends on which the ACCC bases its recommendation for a tilted annuity bear no resemblance to likely future price trends for CAN assets – as such, the ACCC's forward looking tilted annuity calculation is fundamentally flawed;

    - Properly considered, projected price trends for ULLS assets in fact suggest that a 'reverse' tilt should be applied to ULLS capital charges; and,

    - The historical price trends on which the ACCC bases its recommendation for a tilted annuity are positive while the input costs in the ACCC's ULLS cost models have fallen over time.

208. For example, ABARE's 2008 forecasts for prices in the order of $7,000/tonne going forward have been cut by more than half, to around $3,300/tonne in its November 2008 forecast. By the end of 2008, copper was trading at or below $3,000/tonne on the London Metal Exchange and, as at early January 2009, prices had returned to their

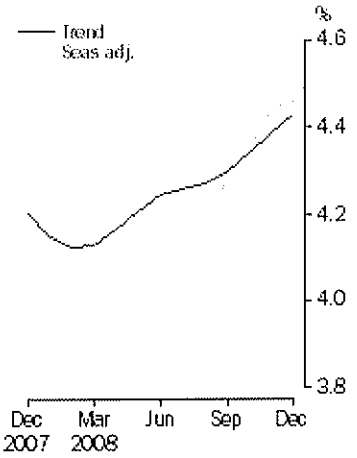
2004 levels.[142] There no reason to think that these dramatic price changes will be short-lived:

- US demand for copper has been severely affected by the collapse in new housing construction in that country, and that trend shows no sign of reversing;[143] and,

- Copper inventories are high and already close to 2004 levels, which will put further pressure on prices.[144] An even larger market surplus is expected for 2010.[145]

209. Similar trends can be expected for future trends in labour costs. Recent estimates of the labour price index are not yet available, but the Australian Bureau of Statistics' December 2008 labour force survey shows that unemployment has, in fact, been trending upwards since the beginning of 2008 (Figure 4), and the OECD, in its most recent (November 2008) Economic Outlook expects unemployment in Australia to rise to 5.3 per cent in 2009 and 6 per cent in 2010.[146]

Figure 4: Unemployment rate (ABS, December 2008)

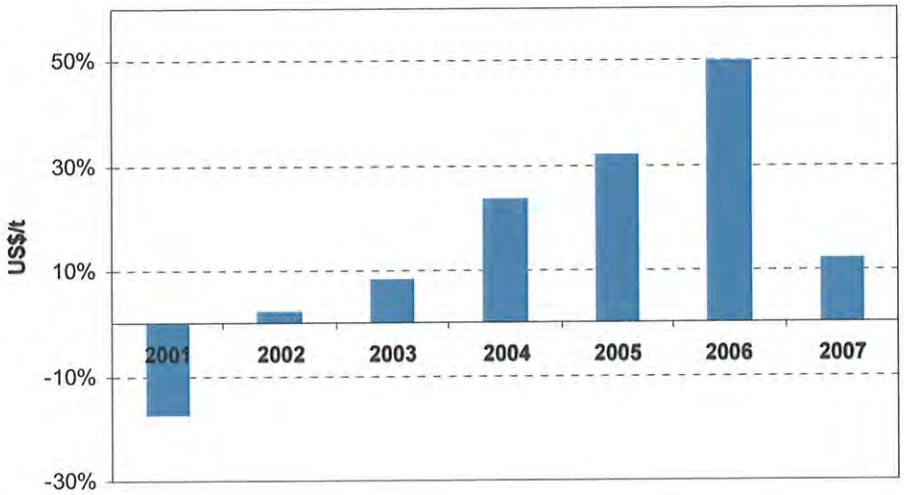


Source: ABS, December 2008 Labour Force Survey

210. There can then be little doubt that the effects of the global economic downturn will depress wages in Australia. Both the OECD and the IMF warn of exceptional uncertainties affecting the world economies,[147] suggesting that any attempt to forecast future commodity and labour cost trends is fraught with risk. But forecasting errors are not simply a function of the current economic environment. Between 2000 and 2007, for instance, ABARE's forecast of copper prices *one year out*, have, on average under or overestimated actual copper prices by 20 per cent (Figure 5).

[142] Copper Price Update, November 17th, 2008.
[143] http://www.bloomberg.com:80/apps/news?pid=20601086&sid=a7Q2VUgEbOGE.
[144] Copper Price Update, November 17th, 2008.
[145] International Copper Study Group, Forecast 2008-2009, Press Release Date issued: 8th October 2008.
[146] http://www.oecd.org/dataoecd/7/0/20209193.pdf
[147] International Monetary Fund, World Economic Outlook, November 2008. OECD Economic Outlook No. 84, November 2008.

Figure 5: ABARE forecast error world copper price as a percentage of actual price



Source: ABARE commodities, December Quarter 2000-2007.

211. It is not surprising that ABARE's forecasts perform quite poorly, even over a one-year forecasting horizon. Many and complex factors determine commodity prices, which are, in any case, notoriously volatile. Prices for commodities such as copper are very difficult to forecast over any time horizon other than the immediate future. Optus expressly concedes this point.[148]

212. The ACCC has made determinations as to the appropriate prices for plant and equipment in the past. These can be compared to the TEA model input prices to determine a trend for asset prices that has actually been used to set price by the ACCC. Table 3 summarises the prices used in the NERA model, used in 2000 by the ACCC, and the TEA model, to be used for prices in 2008. While the ACCC is yet to provide Telstra with the input for some cells in Table 3, it could be used to show two things. First, that the price trends for the plant and equipment that make up a large proportion of costs in band 2 have decreased over the last 8 years, not increased as assumed by the ACCC for its application of the tilted annuity. Second, the reason the ACCC uses the tilted annuity, that the tilt needs to account for increasing asset prices as the asset base is revalued over time, is undermined by the fact that the asset prices determined by the ACCC have in fact been decreasing, not increasing.

[148] Optus (2008), *Response to Draft Decision*, December 2008, footnote 68.

Table 3: Input prices into ACCC cost models and the TEA model

Equipment	Input prices ($/metre)		Price trends (per annum)	
	NERA Model (used in 2000 by the ACCC) [A]	TEA Model (to be used for 2008) [B]	Compound average price trend implied by NERA and TEA models [(B/A)^(1/8)-1]	Price trend used by ACCC in 2000[149]
Copper cable 100 pair	*	[Results Distribution-Costs!D15]***	*	0%
Copper cable 400 pair	*	[Results Distribution-Costs!I15]***	*	-1%
Copper cable 800 pair	*	[Results Distribution-Costs!H15]***	*	-1%
Trench Metro	*	[redacted]**	*	1%

* Input for cells is yet to be released by the ACCC (see letter from ACCC to Telstra dated 18 March 2009 and related correspondence)

**Weighted average cost of main and distribution conduit runs

*** Reference to TEA model

213. To summarise, depending on data yet to be provided by the ACCC, three conclusions could be drawn from this analysis:

214. First, the historical price trends on which the ACCC relies bear no resemblance to the price trends for CAN assets likely to occur over the duration of Telstra's Undertaking or the relevant assets' lives. Those historical price trends are particularly unreliable in the current environment.

215. Second, on *current* price trends – which differ profoundly from those assumed by the ACCC in its Draft Decision – and according to the 'forward looking' asset revaluation approach that Optus advocates, a 'reverse tilt' should be applied to the depreciation schedule for Telstra's ULLS assets. Optus appears to accept this conclusion (Para 3.70):

> *Conversely, if prices were falling then Telstra may potentially be under-compensated*

[149] ACCC (2000), *A report on the assessment of Telstra's undertaking for the Domestic PSTN Originating and Terminating Access services*, July 2000, Table A 5.1

216. Third, the historical price trends on which the ACCC bases its recommendation for a tilted annuity are positive[150] while the input costs in the ACCC's ULLS cost models have fallen over time.

217. In the example calculations presented by Optus at Para. 3.73, therefore, and according to Optus' own logic, the figures in the column headed 'Tilted annuity (-4% price trend)' should, therefore apply to ULLS depreciation charges under the ACCC's approach. The profound implications for the depreciation charge applied to Telstra's ULLS assets – and therefore for ULLS charges – as a result of commodity price trends that are neither predictable nor stable over time only serves to highlight the fundamental contradictions inherent in any attempt to revalue long-lived assets on the basis of short-term cost factors.

B.6.2 Optus' example calculations are misleading

218. Optus' recommendations for the application of a tilted annuity mischaracterise the underlying trends in input prices. While these calculations show total capital charges for ULLS assets, they *do not* show that:

- The implied depreciation profile for these assets (that is, the is profile over time when Telstra can recover the cost of these assets) is significantly more backloaded than the overall capital charge;
- A more realistic asset life and depreciation profile significantly postpone not just the point in time when Telstra will have recovered any given proportion of the cost of its ULLS assets, but also the point when Telstra can even begin to recover the costs of these assets; and
- Also for a more realistic asset life, the tilted annuity calculation implies that the overall capital charge is significantly backloaded, so that customers would have to pay charges that are higher by several multiples towards the end of the asset's life.

219. These points are illustrated below with reference to Optus' own calculations. Optus offers an example of a tilted annuity calculation in table and graph form, and then concludes that Telstra "*will be adequately compensated by the ACCC's proposed approach to annuitisation*".[151] In fact, Optus' calculation provides a very skewed view of the implications of the ACCC's tilted annuity calculation for the depreciation profile of ULLS assets, for two reasons.

220. First, Optus' calculation shows only the total capital charge resulting from the tilted annuity calculation – represented below by the blue columns in Figure 6. Optus does not show the actual cost recovery component of the capital charge, i.e. the depreciation component. Depreciation is shown below by the orange trend line. The moderate tilt implied by the tilted annuity calculation for the total capital charge translates into a far steeper backloaded depreciation profile. The implication is that

[150] Telstra (2009), *Materiality Testing*, 23 March 2009, paragraph 38
[151] Optus (2008), *Response to Draft Decision*, December 2008, paragraphs 3.73-3.76.