20 March 2015

Public

Cross-submission for Chorus in response to

Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 December 2014)

and

Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations (19 December 2014)

Chorus

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EXECUTIVE SUMMARY

Introduction

1 This submission responds to industry submissions that the Commerce Commission has received on its draft determinations of 2 December 2014 for the Unbundled Copper Local Loop (**UCLL**), Sub-loop UCLL (**SLU**) and Unbundled Bitstream Access (**UBA**) services.

2 In this cross-submission we focus on material issues concerning the implementation of the modelling work to set TSLRIC based prices for the regulated services. This focus reflects the advanced stage that the Commission's extended consultation process has now reached, and in particular that:

2.1 the Commission has previously consulted on many of its first order approaches to TSLRIC. We agree with the Commission on many of those key issues, including that an orthodox approach to TSLRIC, incorporating Optimised Replacement Cost (**ORC**) as the valuation methodology for all assets, is the appropriate starting point;

2.2 the Commission's cost modelling experts, TERA, have produced a model that is generally fit for purpose and is broadly aligned with the approach proposed by Analysys Mason on first order issues. Analysys Mason has reviewed the criticisms of the TERA model by the experts engaged by other parties, Network Strategies and WIK-Consult (**WIK**), and confirms that, contrary to those criticisms, the TERA model is generally fit for purpose; and

2.3 aside from some continuing disagreements on some first order issues, the significant differences between the parties now relate to issues about data and parameter choices. On this point, we agree with Spark.[1]

3 Some submitters have expressed a view that the aggregate UBA price proposed in the Commission's draft determination is surprisingly high and that, because the Commission's draft determinations provide only a modest price decrease, the Commission's approach is somehow not credible. This is contrary not only to our view, but also to many public analyst reports that preceded the draft determinations[2] and what was predicted by Telecom in relation to the original UCLL process.[3]

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1 Spark "UBA and UCLL FPP pricing review draft decision" (20 February 2015) at [33].

2 Chorus, "Submission in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Updated Paper" (20 February 2015) at [331].

3 Telecom New Zealand Limited "Submission on Draft Standard Terms Determination for the Unbundled Copper Local Loop" (2007) at [24], [90].

4 While parties rely on data from other countries to argue that the draft UCLL price is too high,[4] it is based on reasoning and analysis that does not withstand scrutiny. For example, prices for high cost rural areas in Australia have been excluded from the data set.[5] The analysis also does not meaningfully reflect expected differences between the TSLRIC cost in different countries – such as population density, urbanisation and teledensity. These factors were debated extensively in the Commission's IPP processes,[6] with many countries excluded from the Commission's benchmarking set because these differences meant they were not comparable. The conclusions also don't sit well with the New Zealand based sense-checks that Chorus has put forward.

5 More fundamentally, this process is a cost modelling exercise that asks the question of what it would cost to deliver the regulated services in New Zealand today. It is not a benchmarking exercise. The primary purpose of the FPP process is to move from using international benchmarks as a "*proxy*" to a more precise estimate of the efficient cost of providing the regulated service in this country through modelling[7] – a cost modelling process that Chorus, Spark, Vodafone and CallPlus all requested. Drawing the debate back to the matters discussed in IPP determinations (and which the FPP process was supposed to avoid) is an irrelevant distraction.

6 What the Commission is required to do is to set a price for the regulated services based on a predictable application of orthodox TSLRIC, using the best information available about the actual costs of, and constraints on, building and operating a network in New Zealand. That is what the Act requires, and what will promote competition for the long-term benefit of end-users.

7 In the particular context of the UCLL, SLU and UBA services, setting the right TSLRIC based price point is essential to promote investment to deliver the growth in bandwidth which has the potential to deliver large social and productivity gains to end-users through enhanced competition for the delivery of new and better services.

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4 Vodafone "Vodafone on process paper and draft pricing review determinations for Chorus' unbundled copper local loop and unbundled bitstream access services and comments on Analysys-Masons' TSLRIC models" (20 February 2015) at Executive Summary [v]; Spark at "UBA and UCLL FPP pricing review draft decision" (20 February 2015) at [67].

5 It does not, for example, include Australian rural (Band 4) areas more relevant to a geographically averaged UCLL price. In 2011, the ACCC moved to building block pricing and introduced a standard ULLS monthly price across Bands 1 to 3 (which covers CBDs of major capitals, metro regions and large provincial centres, and semi-urban areas). The price for those areas was set at $16.75 which appears to be the price used in Spark's chart (below). However, a $48.19 price was also set by the ACCC for Band 4 (rural) areas and this does not appear to be included in the Australian pricing referenced by Spark. Unlike Australia, NZ has a nationally averaged price regime which means the NZ FPP draft price of ~$28 referenced in the chart covers the equivalent of Australia's Band 1-4. Note: Prior to 2011 and the shift to a building block approach, the ACCC had been conducting a TSLRIC review of pricing. Indicative pricing from the ACCC modelling (by Analysys Mason) suggested Zone A pricing of $23.60 and Zone B pricing of $62.70 for 2011-2012.

6 For example, the issues debated in relation to the UBA IPP determination: see Commerce Commission "Unbundled Bitstream Access Service Price Review" [2013] NZCC 20 at [212] – [215].

7 *Chorus v Commerce Commission* [2014] NZCA 440 at [34].

8 Being a champion for consumers is about much more than arguing for lower prices. It's about asking what consumers will want and need in the future, how those things will contribute to social and economic growth, how they will be funded and how they can be delivered efficiently to ensure fair prices. Ignoring these broader considerations simply short sells the opportunity for every New Zealander that comes from higher quality broadband services. The Commission is rightly focused on balancing an appropriate price, based on efficiently incurred costs in New Zealand, with the importance of investment in new technologies and migration to fibre.

9 Incentivising the transition to fibre is central to unlocking those benefits. As recognised by the New Zealand Productivity Commission:[8]

> ICT is catalysing social and economic change on a scale comparable to those resulting from previous technologies such as steam power, the internal combustion engine, and electricity… Such breakthrough technologies occur rarely – perhaps less than once in a generation.

10 The FPP review is a more detailed cost modelling process to review and replace the IPP price determined through a benchmarking exercise. This two-step process has been part of the regulatory framework since 2001 – and within this framework, backdating of prices has been supported by a Court of Appeal 2006 judgment and implemented by the Commission recently in relation to UCLFS transaction charges. Consistent with the Telecommunications Act 2001 (**Act**) and these previous decisions, the Commission should also backdate all FPP prices to replace the IPP prices in full. A consistent approach will support certainty for the industry.

11 In today's industry structure - with wholesale only providers investing significant sums – it is not credible to argue that there are windfall gains if backdating is implemented in a way that is consistent with past decisions.

12 Based on the draft FPP pricing, backdating sums are expected to represent only around 5% of total annual industry revenue. Any backdating payments would also be commensurate with the size of the retail service providers - with our customer base being wide and varied. We have consistently said that we will work with customers and/or the Commission on appropriate repayment plans that take account of the credit and financial strength of the customer. This is consistent with existing customer credit policies which recognise that some customers have investment grade credit ratings and some do not.

13 The parties with the largest potential backdating exposures are also those with the greatest ability to pay. By way of example, at 30 June 2014 Spark had $208 million cash on hand and Vodafone NZ had $36.5 million cash on hand. Chorus is proposing to make repayment terms available to parties that take account of their ability to pay. This includes offering non-investment grade parties repayment tenor and terms that are more favourable than Chorus received when it was required to pay backdated

[8] New Zealand Productivity Commission "Boosting productivity in the services sector" (January 2014) at page 89.

UCLFS transaction amounts last year. Further, when repayment plans are considered for smaller customers over a reasonable timeframe, backdating sums are not material on a monthly basis. In our view, most RSPS should be able to manage potential repayment sums via a mixture of capital management and cost economy measures. In the event these initiatives don't address the full liability, any residual liability that may be passed onto end users – and also bearing in mind that there have already been retail price changes made – should be immaterial under Chorus' proposed repayment terms.

14 The Commission has undertaken extensive consultation since the UCLL FPP applications were made over two years ago and the UBA FPP applications were made over a year ago. These are processes requested by both Chorus, Spark, Vodafone and CallPlus, and the Commission is taking a forward looking TSLRIC approach, as required by the Act. There have been a number of process changes and delays as the Commission has added additional consultation steps into the process. Moving towards completion of these processes as soon as possible will provide certainty for the industry.

15 We note that the Commission intends to provide its views on transaction charges in the revised draft determination. This is a legitimate process for the Commission to follow. Our view remains that the exercise for identifying transaction charges is a relatively simple one, as the Commission can use existing service company cost information (with these costs determined by way of a competitive tender process) plus a mark-up for overhead costs as the basis for forward looking transaction charges.

16 In Chorus' submission we identified a number of omissions and oversights in the TERA model, and proposed solutions for addressing these. We have provided a copy of the summary of Chorus' submission in Appendix A to this submission. By providing evidence-based information, and practical solutions to outstanding issues, the Commission can move quickly to completing the FPP process and providing the industry with certainty.

17 In the following section we provide a summary of our responses to issues raised by other parties.

Material issues

18 In the table below, we summarise below the main sources of our disagreement with submissions received from other parties. As in our submission, at this stage in the process, we focus on material issues that have been identified at this time.

19 Our response to the issues given particular prominence in other parties' submissions, are described briefly below.

Issue	Why we disagree with other parties
• Use of DORC for re-useable assets that will not be replaced • Use of FWA in MEA • Optimisation of exchange and first data switch (**FDS**) locations and numbers	*Inconsistent with statutory framework and orthodox TSLRIC*
• Exchange locations • Aerial sharing • Equipment costs • Optimisation of UBA additional costs and core network	*Misunderstanding of Commission's model or underlying data*
• Trenching costs • Trench sharing assumptions • Aerial deployment assumptions • Equipment costs • Operating costs	*Reliance on international benchmarking when New Zealand data is available*
• FWA modelling • ESA by ESA optimisation • Route optimisation • Investment incentives (uplift)	*Our experts take a different view from other parties' lay or expert views*

First order issues

20 The Commission's draft TSLRIC models and the models developed by Analysys Mason for Chorus are broadly methodologically aligned on first order approaches. We agree with the Commission's methodology on a number of key framework issues. These include:

20.1 an orthodox approach to TSLRIC should be the starting point, consistent with the promotion of market predictability and investment efficiency;

20.2 ORC is the appropriate asset valuation for all assets required to provide the service; and

20.3 a scorched node approach to modelling the service provision network.

21 Most parties appear to support an orthodox approach to TSLRIC, at least in principle. However, a number of parties are critical of the Commission taking into account predictability in its assessment of how to achieve the s 18 purpose statement in the context of estimating TSLRIC. We disagree.

22 The Commission is entitled, as an important element of achieving the s 18 purpose statement, to consider whether its approach results in a predictable application of the regulatory framework, including TSLRIC. Promoting a predictable outcome is an obvious approach to promoting competition for the long-term benefit of end users and efficient investment incentives. Elaborating upon how the Commission considers that s 18 should apply in these circumstances is entirely appropriate.

23 Some parties have also said that they continue to disagree with the Commission's use of ORC. This is an issue that has already been the subject of multiple consultation rounds. Our view remains that the forward-looking TSLRIC pricing principle by definition excludes historical network considerations. The Commission's use of ORC is also consistent with its past decisions and with other jurisdictions' approach to TSLRIC.[9]

24 It would be inconsistent with past guidance and the modelling approach already extensively consulted on to change approach to these first order issues.

Incentives to invest

25 The Commission's draft determinations rightly emphasise the importance of ensuring incentives to invest and innovate in assessing what will promote competition for the long-term benefit of end-users. It is not just about securing the short term benefit of lower prices, even assuming that gains to RSPs will be passed though.

[9] Commerce Commission "Application of a TSLRIC Pricing Methodology – Discussion Paper" (2 July 2002) at page 44 and Commerce Commission "Implementation of TSLRIC Pricing Methodology for Access Determinations under the Telecommunications Act 2001" (20 February 2004) at [142]. Commerce Commission "Implementation of TSLRIC Pricing Methodology for Access Determinations under the Telecommunications Act 2001" (20 February 2004) at [138].

26 The Commission is right to approach issues of the long-term benefit of end-users in this way, and it is consistent with the extensive body of regulatory precedent developed in this country and in other jurisdictions.

27 Chorus is passionate about building a broadband future that will lead to step changes in New Zealand's social and economic well-being. Nobody would have thanked the network operator for waiting until dial-up internet was no longer fit for purpose before starting to invest in broadband. It is the same with fibre, which Chorus is rolling out with a relentless focus on efficient build. Anticipating what consumers need, and incentivising investment and migration to meet those needs is in the long term interests of end-users.

28 Extensive economic evidence supports this. For example, Professor Hausman's advice is that:[10]

> if regulated prices are set too low or regulation does not correctly take into account the risk of investment in sunk cost infrastructure …, regulation will decrease the incentives to invest in new and improved quality services below the level which maximizes consumer welfare. Academic research has found very large welfare gains to consumers and business end-users from new and improved telecommunications services.

29 Similarly, CEG concludes that:[11]

> we have considered the effect a higher price of the UCLL and UBA services would have on migration to fibre-based services and the welfare gains this may deliver in terms of new applications that rely on the higher quality of service fibre can deliver. The Commission has already commented, higher prices for UCLL and UBA will encourage migration to fibre. Such new investment is likely to lead to significant long-term benefits for end-users.

30 In the New Zealand context of investment in fibre based broadband services, CEG states that:[12]

> In 2012, Alcatel-Lucent estimated the consumer surplus a select number of some high-speed broadband applications which will be enabled by ultra-fast broadband and the Rural Broadband Initiative in New Zealand. It estimated $32.8 billion in likely end-user economic benefits (consumer surplus) over a 20 year period ….
>
> …
>
> As described by the Commission, if the price of copper services is set too low, migration to ultra-fast broadband would be slowed.

[10] Professor Hausman "Response to the Commerce Commission's draft determination on uplift" (20 February 2015) at [7].

[11] CEG "Uplift asymmetries in the TSLRIC Price" (20 February 2015) at [9].

[12] CEG "Uplift asymmetries in the TSLRIC Price" (20 February 2015) at [116], [119] and [124].

> …
>
> These results show that if a low copper price slows the speed and steady state level of high-speed broadband application uptake by 20%, the costs associated with reduction in consumer surplus over Alcatel-Lucent's estimated 20 year benefit period is very large - between $2.9 billion and $5.8 billion in net present value terms.

31 In other contexts, other parties have supported this approach. For example, Vodafone[13] commented on Ofcom's approach to risk in the assessment of the cost of capital in an Ofcom consultation document:[14]

> It follows, therefore, that Ofcom would be well advised to err on the side of over-compensating for risk when setting a regulatory cost of capital.
>
> ….
>
> Real Option Theory can give helpful insights into the nature of decisions, and consequential uncertainty faced by a telecommunications operator. For example, as Ofcom point out, prior to investment in an NGN access network, BT would have processed a Real Option to "wait and see". The value of this option was foregone when the investment was committed.

32 In contrast, Spark's submission makes an attempt to estimate the social costs of smaller reductions from existing price levels.[15] Given the significance Spark attaches to this analysis, we have asked for it to be reviewed by an expert economist.[16] That review concludes that every step in Spark's analysis of welfare losses has flaws, leading Spark to overestimate the effect on welfare of reducing the price. Spark's analysis also ignores the substantial body of literature documenting the significant welfare gains associated with prices that incentivise transition to fibre products.

33 There is also direct evidence about the effect of Commission decision-making on investment incentives in the telecommunications industry. Chorus has been clear that a combined UCLL and UBA price at the IPP level has required it to cut discretionary activity, including growth-related capital investment, and generally manage for cash until the FPP process is resolved.[17] Even in the short term, pending the outcome of the FPP determinations, Chorus has:

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[13] Vodafone "Response by Vodafone: Ofcom's approach to risk in the assessment of the cost of capital Consultation Document" (1 April 2015) at pp4, 15.

[14] Ofcom "Approach to risk in the assessment of the cost of capital" (26 January 2005).

[15] Spark "UBA and UCLL FPP pricing review draft decision", Attachment D "Illustrative estimate of social cost of high price" (20 February 2015) at page 80.

[16] HoustonKemp Economists "Response to Spark New Zealand's attachment D: illustrative estimate of social cost of high price" (12 March 2015).

[17] See Chorus Letter to shareholder (11 December 2013), available at https://www.chorus.co.nz/file/31233/186742.pdf.

33.1 reduced pro-active maintenance of its network, and explored other mechanisms to reduce costs so as to manage cash flow issues generated by the IPP determinations;

33.2 commenced seeking capital contributions for newly deployed connections;

33.3 suspended payment of dividends to its shareholders (now for a period of over 12 months)

33.4 experienced a material fall in its share price through this period; and

33.5 suffered a credit rating downgrade and incurred greater funding costs as a result.

34 It is therefore incorrect to suggest that Chorus has sufficient funding and is able to continue investing at efficient levels at the IPP prices for UCLL and UBA. Chorus does not regard the steps it has been required to take, such as reducing pro-active maintenance, as efficient or in the long-term interests of end-users.

35 It is also not just Chorus' incentives to invest that are affected by this process. Investment incentives in telecommunications products by RSPs, other Local Fibre Companies and potential new entrants will be affected by the Commission's decision making. In addition, any suggestion that the Commission will depart from orthodox and well-understood approaches to the long-term benefit of end-users by favouring short-term price reductions over long-term investment and innovation will be a matter of serious concern for all regulated businesses in New Zealand.

36 Instead, the Commission should assess its parameter and price point selections against its own orthodox understanding of what will promote competition for the long-term benefit of end-users.

37 The assumptions made in adopting a predictable (and orthodox) approach to forward looking TSLRIC are not generous. TSLRIC is a risky pricing principle for access providers and investors. It follows that on the Commission's own, orthodox approach to assessment of asymmetric consequences and risks to the long-term benefit of end-users, a higher WACC percentile and an uplift to the TSLRIC price is appropriate.

38 After years of regulated access pricing in Europe (including countries against which New Zealand prices have been benchmarked), European countries have found that it has not brought about investment. Years of potential opportunity from productivity gains that come from investment have been lost, and there is now a substantial effort underway to send investment signals and greater predictability.

39 Other parties have raised the importance of quantification to justify an uplift. We provide with this cross-submission a quantitative analysis prepared by CEG which demonstrates that the welfare benefits associated with an uplift can be expected to exceed any social costs. This analysis establishes that including a price or WACC

uplift, when properly carried out, brings significant end-user benefits, due to the welfare benefits of faster migration to fibre and the impact on Chorus' incentive to invest in new and existing services. They calculate that an uplift at least equivalent to the 75th percentile above the mid-point WACC is optimal in order to incentivise investment in existing and new services. Such services are likely to yield significant welfare benefits to end-users (an estimated $5 billion). We have submitted this report at the earliest opportunity to allow the Commission to consult on it prior to conference or as part of its revised May draft determination.

UCLL and SLU services

Fixed Wireless Access

40 FWA is not capable of delivering either the full functionality or core functionality of the regulated service. In particular, it is not capable of delivering an unbundled Layer 1 service to RSPs with the required capacity.

41 It would be an error if FWA was included as part of the MEA. It cannot deliver any form of unbundled Layer 1 service. Even on the Commission's view, it doesn't meet the "*core functionality*" of the service being priced.

42 If, contrary to our view, FWA is to be included in the MEA, then the Commission is correct to limit the technology to, at most, areas where it has been deployed for the RBI initiative, consistent with the model developed by TERA. Outside of those areas there is no evidence that FWA is capable of being deployed to provide a service that is comparable to an ASDL equivalent wireline retail or wholesale broadband service.

43 However, if wider deployment is to be modelled, then neither the current TERA model nor the Network Strategies model (if admitted by the Commission, given that it was provided nearly 3 months after the Commission's deadline for model submission) are fit for purpose. Analysys Mason has reviewed the Network Strategies model and concluded that essential elements of the model are missing or undocumented, and that other omissions and errors in the model means that it will produce a material under-estimate of the actual TSLRIC costs of FWA deployment.

Capital contributions

44 As set out in our submission, the TSLRIC price for the service must take account of the replacement costs of all the assets that an HEO would deploy to provide the regulated service. This ensures that the price set by the Commission, however structured, will recover the total cost of providing that service.

45 The Commission should not exclude capital costs from the TSLRIC model on the basis that those costs will be notionally recovered through a hypothetical capital charge which does not actually form part of the price for the service.

46 The same reasoning applies to the additional subsidies, based on funding received by Chorus and other network operators, which other parties have suggested should be taken into account. But there are other important and independent objections to each of the funding sources RSPs rely upon. None of the funding sources provide any

basis for assumptions as to what, if any, funding, an HEO would require in order to deploy and maintain network outside of the monthly rental charge.

47 Finally, even if some account were to be had of hypothetical contributions, the Commission has already done so via its TSO area proxy. This proxy already addresses any issue of "lead in" contributions, as Chorus cannot and does not seek contributions for residential connections that existed in December 2001. In respect of other claimed contributions, the Commission has acknowledged that there may be end-users that an HEO would not seek capital contributions for outside these areas and that some contributions might be sought within it. It is a proxy only, and there is no non-arbitrary basis for suggesting that this proxy does not adequately address all other issues raised by parties.

Optimisation

48 The Commission has adopted a generally appropriate level of optimisation in its model. In particular, the Commission is correct not to optimise the number and location of exchanges for the UCLL and SLU services. To do so would mean that the handover locations for the regulated service would not be costed. Analysys Mason has reviewed WIK's criticism of TERA's route optimisation algorithm, and concluded that the TERA algorithm is reasonable.

49 The Commission could consider selecting a MEA for each ESA. To do so, the Commission would need to include the additional costs of operating multiple technologies, and reduce any efficiency adjustments to operating costs. Once these costs are taken into account, an HEO may simply conclude that it is more efficient to select a single technology based on a nationwide comparison of cost.

Asset sharing

50 Chorus accepts that, in principle, asset sharing could be allowed for network deployed underground. However, the level of sharing able to be achieved is limited, reflecting that:

50.1 unlike other jurisdictions New Zealand has no legislated shared access regime for ducts or trenches. International benchmarks of sharing achieved in countries with legislated shared access regimes and vertically integrated companies are inappropriate for New Zealand conditions;

50.2 where sharing is potentially possible, it is on commercial terms and subject to the duct owners' safety and network protection requirements (each of which may increase costs); and

50.3 shared trenching is difficult to co-ordinate with other companies and involves additional costs, and so is typically only undertaken in limited circumstances.

51 If the Commission considers it appropriate to make an adjustment to the TERA modelled costs to reflect shared ducts and coordinated civil works, it should be in the

order of 5%, consistent with the Commission's previous decisions and Chorus' experience.

Trenching and equipment costs

52 There appears to be general agreement between the parties that there are serious concerns with the use of the Beca analysis as the basis for the trench cost assumptions in the Commission's model, particularly in urban areas such as Auckland and Wellington. This is an area of the Commission's model that clearly requires revision.

53 As emphasised in our submission, the statutory task requires a particular focus on the actual constraints and costs of network deployment in New Zealand. This requires the use of New Zealand evidence, where available. Setting key parameters based on international benchmarks rather than New Zealand evidence – as other parties suggest - risks converting the TSLRIC final pricing principle (**FPP**) into just another international benchmarking exercise. This is inconsistent with the statutory structure.

54 The actual costs incurred by Chorus in UFB and RBI deployment are better evidence of the costs that a real-world HEO[18] would face than the Beca analysis. Given the availability of this evidence, not relying on this evidence and instead using less robust benchmarking, would be a significant error and raises concerns about the robustness of this important exercise.

55 Use of the Chorus data would also resolve many of the concerns of WIK and some parties that the Commission's model does not account for scale discounts, and modern trenching techniques (such as micro-trenching) which may have lower costs. Chorus' UFB deployment is the largest fixed line telecommunications infrastructure project currently being undertaken in New Zealand, and uses the most cost efficient technologies available – including micro-trenching – where this is possible. Reliance on Chorus data would give direct information about the scale discounts and technology efficiencies able to be achieved in New Zealand, and also an accurate picture of consenting, reinstatement and traffic management costs. Each of these matters appears to have been materially underestimated by Beca. Chorus' data is more meaningful and relevant than the international benchmarks referred to by WIK.

56 In addition, many of WIK's concerns about equipment costs result from misunderstandings as to the data provided by Chorus and used by the Commission. Chorus has provided data on its negotiated equipment costs. Again, the direct evidence of Chorus' costs are a considerably better proxy for the costs able to be achieved by an HEO than international benchmarks or a notional discount rate applied to rack prices.

[18] Chorus has adopted the Commission's use of the term "hypothetical efficient operator" in its draft determination in place of the term "hypothetical new entrant". Chorus understands the HEO concept to be essentially consistent with the HNE concept previously used by the Commission and orthodox TSLRIC, and uses it in that sense.

Operating costs

57 We support the Commission using Chorus' operating costs as a starting point for the HEO. Chorus' actual operating costs are the best available evidence of a nationwide fixed line network operator in New Zealand, regardless of the type of MEA being modelled. Use of actual operator accounts is in line with an orthodox TSLRIC approach, and there appears to be common ground between Network Strategies, Analysys Mason and TERA on this issue.

58 The Commission should resist use of a mark-up capital expenditure to determine operating costs, as proposed by WIK. Such an approach provides no evidence of New Zealand drivers of operating costs, and as such is inherently less reliable than orthodox use of actual operator accounts as the starting point.

UBA service

59 We continue to agree with the Commission's approach to selection of an MEA for the UBA service. While Vodafone has, at this late stage, provided a legal opinion that the Commission must select an MEA for UBA that is capable of interacting with the MEA for the UCLL service, this view does not appear to be shared by any other party,[19] and in our view is flawed. In particular, it adopts an interpretation of the UBA FPP that is unworkable in a context where the UCLL service is priced in accordance with the IPP for that service, rather than an FPP, and gives insufficient weight to the statutory purpose of promoting relativity between the UCLL and UBA services.

60 In terms of throughput, there appears to be common ground between the parties that the Commission's model should be capable of accounting for expected growth in throughput demand in the regulatory period. We have explained how this can be achieved in our submission.[20] It would be inconsistent for parties to argue in one process that Chorus must grow UBA throughput to meet market growth and then in this process argue that that growth should not be factored into any forward looking price

61 On the issue of optimisation, the level of optimisation proposed by WIK for the UBA service is inconsistent with the Act and reasonable assumptions about network deployment. TERA has correctly assumed that each FDS location must be served – as it is a requirement of the regulated service – and has reasonably assumed that the HEO would not incur the additional complexity and cost of deploying multiple manufacturers' equipment to enable more precise dimensioning of the equipment to current demand.

62 Finally, regarding cost allocation, we continue to believe that allocation of passive assets based on service revenue is the most appropriate proxy to use for cost, given absence of traffic data. WIK's proposal of an allocation of backhaul costs 1/3 UBA

[19] It is possible that the Wigley + Company submission also takes this position. However, that submission is ambiguous as to whether is supports the Vodafone submission or the Spark submission on this point.

[20] Chorus "Submission in response to draft pricing review determinations for Chorus' unbundled copper local loop and unbundled bitstream access services" (20 February 2015) at Appendix G.

and 2/3 leased lines based on fibre counts should be rejected. Chorus' own analysis indicates that UBA is responsible for approximately **[RI:]** of peak busy hour traffic, which is what drives network dimensioning and cost.

Backdating

63 Contrary to the submissions' of other parties, the issue of backdating is not solely, or even primarily, concerned with a so-called "*wealth transfer*". Rather, as the Commission has correctly identified, the purpose of backdating is to promote efficient investment incentives in the period prior to the FPP determination being made.

64 End-users can expect tangible benefits if the Commission's preliminary view on backdating is confirmed and extended. Backdating will promote future efficient investment and, over time, allow reversal of the effect of inefficient decisions made during the period during which cash flows have been constrained due to application of the IPP pricing.

65 In contrast, the benefit of not backdating identified by RSPs appears to lie exclusively in an undertaking by one RSP (but no others) that its contribution to what appears to have been a simultaneous uniform price increase by the two largest RSPs in the market for broadband services will be repaid to its end-users.

66 Such a claim requires critical consideration, not least in relation to the implicit claim that retail prices prior to the price increase reflected expected lower prices from 1 December 2014. Chorus has seen no reliable evidence that expected reduction in prices were passed onto end-users, and the RSPs have not offered any in their submissions. To the contrary, the submission from at least one analyst indicates that RSPs largely retained the benefit of lower wholesale prices.[21]

Transaction charges

67 We do not intend to submit in any detail on transaction charges at this stage of the process, while we are awaiting the Commission's draft views. We simply respond to a couple of submissions that raised issues around new connections.

68 We agree that some RSPs' new connection charges may have increased since December 2014 as a result of changes to the UBA and UCLL transaction charges in the UBA IPP decisions. In particular, in terms of UBA pricing, prior to 1 December 2014 Chorus' new "connection only" charges were based on retail minus pricing.

69 As we said in our cross-submissions on transaction charges dated 16 October 2014, the mix of new connection charges at any time depends on the circumstances. For example, how the RSP orders the service (new connection or transfer), what other services are ordered (if a UCLF service is also ordered a jumpering at the cabinet or exchange will be required), and what services were previously provided to the premises. These factors will determine whether the service companies need to roll a truck to the exchange, cabinet or the end user premises to carry out the work.

[21] L1 Capital "Submission on draft determinations for UBA and UCLL services" (20 February 2015).

Timetabling issues

70 A number of the submitters take issue with what they appear to regard as the undue speed with which the Commission has undertaken the pricing review determination process.

71 No legitimate criticism can be made of the Commission in this regard, nearly two years into the process. The Commission has already undertaken extensive public consultation at multiple stages of the process, including already on many of the issues which the parties continue to submit. The Commission engaged TERA in March 2014, which is more than enough time to produce a final model, with the assistance of the parties, by September 2015.

Submission

INTRODUCTION

The structure of our submission

72 This submission provides our cross-submissions in response to submissions received on the following papers published by the Commission in December 2014:

72.1 the draft pricing review determination for Chorus' unbundled copper local loop service dated 2 December 2014;

72.2 the draft pricing review determination for Chorus' unbundled bitstream access service dated 2 December 2014;

72.3 the draft decision on cost of capital for the UCLL and UBA pricing reviews dated 2 December 2014; and

72.4 the process and issues update paper for the UCLL and UBA pricing review determinations dated 19 December 2014.

73 For convenience, we have adopted the same structure for our cross-submission as we adopted for our submission. That is:

73.1 **Part One** responds to submissions received on the Commission's draft determination for the UCLL and SLU services that are specific to those services;

73.2 **Part Two** responds to submissions received on the Commission's draft determination for the UBA services that is specific to that service;

73.3 **Part Three** responds to submissions received on the Commission's approach to the calculation of an annualised TSLRIC and selection of a TSLRIC based price that are common for the UCLL, SLU and UBA services. This includes the issues of:

(a) WACC;

(b) recognising asymmetries in estimating WACC and the TSLRIC price;

(c) demand; and

(d) depreciation and price trends.

73.4 **Part Four** responds to submissions on the Commission's proposed approach to replacement of the initial price (backdating) in its 19 December 2014 update paper;

73.5 **Part Five** responds to submissions on transaction charges.

Summary of Chorus' cross-submission

74 Our response to the issues raised in the submissions received on the Commission's draft determinations for the UCLL, SLU and UBA services is summarised in the following tables.

UCLL and SLU service

Issue	Other parties' Submissions	Chorus' response
ESA by ESA selection of MEA	FTTH or FTTN/Copper should be selected as the MEA for each ESA depending on which technology choice is the MEA for that ESA.	The Commission can reasonably conclude that, once the higher costs of operating multiple technologies are accounted for, an HEO would rationally choose a single technology to deploy based on nationwide end-user to Exchange costs. If the Commission does model different technologies for each ESA, the additional costs of managing multiple technologies must be accounted for in its model (including by reducing any efficiency adjustments of operating costs).
FWA	FWA has been artificially constrained – FWA as UCLL MEA should not be restricted to RBI areas. Even where FWA technology is used, the model doesn't use the most efficient FWA technology available or model its coverage correctly. Spark and Vodafone have submitted an FWA model by Network Strategies.	FWA is not capable of delivering either the full functionality or core functionality of the regulated service: in particular, it is not capable of delivering a Layer 1 service to RSPs. If FWA is included in the model, it should be, at the most, at the margins of the network, consistent with regulatory precedent. There is no evidence that fixed wireless technologies are being deployed to provide comparable services outside of RBI areas. The TERA model, if corrected in accordance with our primary submission, is capable of modelling costs in RBI areas. The Network Strategies model is flawed and not capable of robustly modelling costs of FWA deployment.

Issue	Other parties' Submissions	Chorus' response
Hypothetical capital contributions	Assume current coverage requirements and include related subsidies from: • Central Government (UFB and RBI funding) • Industry (TSO funding) • End-users (contributions to lead-in costs and network extensions beyond the TSO boundary). Ignoring subsidies and customer contributions leads to double counting.	The TSLRIC for the service must take account of the replacement costs of all assets that an HEO would deploy to provide the service Chorus is required to provide, and cannot assume that these assets will be funded by hypothetical capital contributions. Assessing those hypothetical contributions by reference to contributions that Chorus and other network providers may have received in the past is inconsistent with a forward-looking approach. There are further issues with each of the subsidies referred to by other parties which mean that they are not a reliable proxy for funding that an HEO might require outside of the monthly rental charge for network deployment.
Optimisation	The Commission should: • optimise exchange locations and numbers (Vodafone but not Spark); • optimise ESA boundaries; and • modify the TERA shortest path route algorithm. TERA has not employed an augmented shortest path algorithm designed to minimise trenching cost, over-dimensioning of sub-ducts, leading to trenches that are unnecessarily large.	The Commission cannot optimise away elements of the service to be costed: this includes handover points to which Chorus is (and any HEO would be) required to provide the service. We agree that an approach to optimisation of route length that minimises total cost rather than route length is preferable. The TERA approach is an appropriate one, which is supported by Analysys Mason.
Trenching costs	Beca's analysis of trenching costs is not reliable. Trenching costs are overstated by the unrealistic assumptions an HEO would not achieve any "large	There is general agreement that Beca's analysis is not reliable. The Commission should adopt the Analysys Mason UCLL

Issue	Other parties' Submissions	Chorus' response
	works" discount to list price for trenching contractors,	model trenching cost data, which is based on a careful assessment of Chorus' actual trenching costs from its UFB and RBI deployment. This would take account of discounts for scale able to be achieved in the market, as well as new technologies (such as micro-trenching) which are being used by Chorus.
Trench sharing	The Commission's model assumes the HEO shares overhead infrastructure with external parties but provides for no such sharing of underground infrastructure. WIK note that, in its experience, other regulators assume between 5% and 30% cost trenching reductions as a result of external underground infrastructure sharing.	Chorus accepts that a limited degree of trench sharing should be allowed for in the Commission's model – in the range of 5%. This was included in the Analysys Mason hybrid model. Material constraints exist on the ability to share trenching costs with other utilities. In particular, the assumed roll-put period for the HEO's network is inconsistent with any material element of shared trenching. Unlike other jurisdictions (such as in Europe) that may require an incumbent to grant access to its underground ducts, there is no such regulation in New Zealand. Duct sharing and coordinated trenching is ad hoc and on commercial terms. International benchmarks of sharing achieved in countries with shared access regimes are not appropriate for New Zealand. There are also other practical considerations and cost implications of sharing that need to be taken into account.
Aerial deployment	The Commission should use the proportion of aerial deployment for distribution cable as for lead-ins (i.e. 49% rather than 36%).	There is extensive evidence, including advice from expert planners, indicating that aerial deployment in all locations where electricity lines companies' aerial network exists is not possible in New Zealand.

Issue	Other parties' Submissions	Chorus' response
Equipment costs	There is systematic overstating of equipment prices in the Commission's models. The Commission's model should incorporate equipment prices that reflect the global nature of equipment markets these days, and the reality that all operators of even New Zealand scale expect, and receive, substantial discounts off list prices for telecommunications equipment. WIK's experience is that discounts of 20%-40% are common in Europe. RSPs' internal experts believe even larger discounts are commonplace.	Chorus' equipment costs provided to the Commission take account of discounts that a larger operator is able to achieve in New Zealand **[CI:** **]**. No further adjustment based on international benchmarking is appropriate.
Operating costs	WIK do not agree with the Commission's approach, of starting with Chorus' opex. They agree with the use of an LFI adjustment, but the Commission's approach of benchmarking to one country is highly questionable. In addition they agree to an efficiency adjustment, but applying 50% across opex categories is highly subjective and unsubstantiated.	Chorus' actual costs of operating a network in New Zealand are better evidence than international benchmarking, which do not account for New Zealand specific conditions. This is consistent with regulatory precedent.

UBA service

Issue	Other parties' Submissions	Chorus' response
MEA for UBA	Vodafone has submitted that the Commission is required to select an MEA for the "additional costs of the UBA service" based on the UCLL MEA/model used in setting the UCLL FPP price (i.e. fibre and FWA).	We agree with the Commission's general approach to, and selection of an MEA for the "*additional costs of the UBA service*" – i.e. based on Chorus' existing FTTN/Copper network. No error of law is involved in this approach.
Optimisation	The Commission should: • optimise the number and location of FDSs; • adopt much greater scaling of active and passive equipment above – from DSLAM and FDS sizes to sub-ducts and trench sizes.	The Commission cannot optimise away elements of the service to be costed: this includes FDSs to which Chorus is (and any HEO would be) required to provide the service. Greater optimisation of active and passive equipment would involve: • use of multiple manufacturers' equipment, which is contrary to what an efficient but prudent HEO would do to ensure efficient network monitoring and maintenance; and • use of equipment which makes no allowance for growth in demand in the regulatory period.
Equipment costs	There is systematic overstating of equipment prices in the Commission's models. The Commission's model should incorporate equipment prices that reflect the global nature of equipment markets these days, and the reality that all operators of even New Zealand scale expect, and receive, substantial discounts off list prices for telecommunications equipment. WIK's experience is that discounts of 20%-40% are common in Europe.	Chorus' equipment costs provided to the Commission take account of discounts that a larger operator is able to achieve in New Zealand **[CI:** **]**. No further adjustment based on international benchmarking is appropriate.

Common issues

Issue	Other parties' Submissions	Chorus' response
Optimised Replacement Cost	ORC is inappropriate and inconsistent with the Act and TSLRIC pricing. Vodafone says that applying ORC to reusable assets (rather than an historic cost approach) is contrary to HEO deployment, Chorus' actual deployment and regulatory best practice elsewhere. Chorus is double recovering on some replicable or reusable assets.	We support the use of an ORC methodology for all assets. The forward-looking TSLRIC pricing principle by definition excludes historical network considerations. No double recovery has been established and no error of law is involved in this approach.
WACC	Asset betas are overestimated due to a failure to place weight on the period 2009 - 2014. The debt premium term should be aligned with the regulatory period.	Less, rather than more, weight should be placed on asset betas observed in the period affected by the GFC. We support the Commission's approach on debt premium term. The Commission should also reconsider its approach to estimating the risk free rate to address issues of alignment between a longer debt premium term and a short term risk free rate.
Investment incentives	Predictability externalities should not be relied on to support a s 18 uplift.	The assumptions made in adopting a predictable (orthodox) approach to forward looking TSLRIC, after taking into account all modelling decisions and parameters, are not generous. It follows that asymmetric consequences and risks should be recognised by adopting a higher WACC percentile and an uplift to the TSLRIC price. An uplift will produce social benefits for the long term benefit of end-users, including generating incentives for new investment and for UFB migration. As the quantitative analysis shows, these social benefits can be expected to exceed any social costs.

Issue	Other parties' Submissions	Chorus' response
Demand	Demand should be the whole market and capture population growth. It is wrong to assume constant demand over the regulatory period.	We agree that the Commission should use the best forecast of demand in the regulatory period. However, this must take into account all factors that affect demand, not just population growth, including migration to other networks.

PART ONE: UCLL AND SLU SERVICES

The service to be modelled

Selection of MEA

75 It appears to be common ground between TERA, Analysys Mason and WIK that the fixed line component of the MEA is a choice between:

75.1 a FTTN/copper network; or

75.2 a P2P FTTH network.

76 Chorus' position is that, in making this choice, the full costs of each service from exchange to end-user must be assessed.

77 WIK's proposition is that the least cost technology based on annualised cost is inconsistent with orthodox TSLRIC.[22] Instead, the technology with the lowest NPV of costs should be selected.[23]

78 Having observed that the costs of a FTTN/Copper network are lower than the costs of an FTTH network in some ESAs even on the Commission's assumptions, RSPs now suggest that the MEA selection should be made for each ESA and FTTN/Copper should be deployed in ESAs in which it is the cheaper technology.[24]

79 Chorus' position has always been that the selection of an MEA is largely an empirical question.[25] This is also the case for the decision whether to select a single or multiple MEA, although this may be an issue on which the Commission can form an appropriate conclusion without undertaking detailed modelling.

80 Selecting multiple technologies will add complexity to the modelling, but it is unclear whether the price impact is material. If multiple technologies are deployed, this will increase the complexity of the systems required to operate the technologies and the costs required for interconnection of multiple systems will need to be added.[26] In particular, operating costs will be higher to address this complexity: for example, staff will need to be multi-skilled and additional training and equipment will be required to manage the networks. (There will also be additional complexity for RSPs in terms of interfacing with multiple technologies, and in marketing and sales of

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[22] WIK-Consult "Submission on behalf of Spark NZ and Vodafone NZ for UBA an UCLL services draft determinations" (20 February 2015) at [4.3].

[23] Analysys Mason "Draft UCLL and UBA FPP draft determination cross-submission" (20 March 2015) at [2.4.3].

[24] Spark "UBA and UCLL FPP pricing review draft decision" (20 February 2015) at [254]-[255].

[25] Analysys Mason "Draft UCLL and UBA FPP draft determination cross-submission" (20 March 2015) at [2.3.1]; Chorus "Submission in response to the Commerce Commission's consultation paper outlining its proposed view on the regulatory framework and modelling approach for UBA and UCLL services (6 August 2014) at [223]; Chorus "Submission in response to draft pricing review determinations for Chorus' unbundled copper local loop and unbundled bitstream access services" (20 February 2015) at [81].

[26] Analysys Mason "Draft UCLL and UBA FPP draft determination cross-submission" (20 March 2015) at [2.3.4].

products delivered over different technologies with different functionalities.) In addition, LFI and copper/fibre efficiency adjustments would not be appropriate if the MEA was a combination of FTTH and FTTN/Copper. These higher costs are likely to off-set any build cost savings by deploying different technologies in each ESA.

81 In these circumstances, it appears reasonable for the Commission to conclude that an HEO would rationally select a single technology as the MEA based on a national comparison of costs.

Inclusion of FWA

The legal requirements of the MEA for the UCLL service

82 Contrary to submissions, FWA should not be a component of an MEA for the UCLL service currently provided by Chorus today for the following reasons:

82.1 FWA does not meet the full functionality of the regulated UCLL service;

82.2 FWA does not provide the core functionality of the regulated service (which must include the ability to be unbundled at Layer 1.[27]

83 Failure to include the ability to unbundle at Layer 1 as part of core functionality of the UCLL service cannot be justified by reference to a "*workably competitive market standard*". Spark's submission on this point appears to accept that FWA cannot be used to deliver the functionality of the UCLL service, but argues that FWA can be included in the MEA on the basis that an "*analogous*" FWA service would be a price constraint for the UCLL service in a workably competitive market.[28]

84 Part 2 of the Telecommunications Act 2001 does not provide for a "*workably competitive market*" standard akin to Part 4 of the Commerce Act 1986. That standard is designed to apply to the price regulation of markets in which there is little or no competition (and little or no prospect of competition increasing).[29] In contrast, s 18 of the Act is a conscious[30] adaptation of the separate purpose statement in s 1A of the Commerce Act, and is concerned with the *promotion of competition* in telecommunications markets for the long term benefit of New Zealand consumers.[31]

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[27] Analysys Mason "Draft UCLL and UBA FPP draft determination cross-submission" (20 March 2015) at [2.3] ("*The required "Core functionality" is not provided by FWA. FWA is not capable of providing a non-blocking layer 1 service with sufficient capacity. Not only does this mean that it cannot be used to price UCLL where unbundling occurs, it cannot provide UCLFS either*.").

[28] Spark "UBA and UCLL FPP pricing review draft decision" (20 February 2015) at [244].

[29] Commerce Act 1986, s52.

[30] Telecommunications Bill 2001, No 124-2, Select Committee Report at page 8.

[31] The difference between the Part 4 purpose of the Commerce Act (provided in s52A) and the purpose statement in s 1A is confirmed by the statutory history of the former provision: see (20 March 2008) NZPD 15157-15159; Commerce Amendment Bill 2008, No 201-1, Explanatory Note at p 3; and *Wellington International Airport Ltd & Ors v Commerce Commission* [2013] NZHC 3289 at [6] – [7].

85 Consistent with that purpose, as the Commission has correctly recognised, TSLRIC is designed to promote competition, including by incentivising efficient build/buy choices.[32] It is therefore incorrect for Spark to contend that the s 18 purpose statement equates to a "*workably competitive market*" standard. The Commission's task is to set a TSLRIC based price for the UCLL service, and that requires it to determine the price for a service which must be a service that includes the ability to unbundle at Layer 1.

FWA deployment only in areas where there is no unbundling

86 In practical terms, the Commission's approach has been to adopt FWA in areas where it considers unbundling is unlikely to be economically feasible.[33] This approach has led to submissions that the Commission should extend the use of FWA to additional areas outside of RBI deployment areas in which unbundling is said to be unlikely to take place.

87 These submissions illustrate the difficulty with the Commission's approach. In essence, for areas the Commission believes will not be unbundled, it has not modelled and determined the costs of deployment and maintaining the equipment necessary to provide the UCLL service – i.e., a service that can be unbundled - in those areas.

88 This approach is inconsistent with Chorus' obligation (which would also apply to the HEO) to provide the UCLL service nationally (at geographically averaged prices) in addition to providing the UBA service under the Act. The Commission is required to determine the TSLRIC based price for that obligation. It also imports a competition test into the design of the MEA for the UCLL service which is not present in the Act (in contrast, the requirement to provide the UBA service is dependent on competitive conditions in different geographic areas).

89 In any event, the submissions suggesting that the Commission assume that broader areas than RBI areas will not be unbundled do not take into account the need for the network deployed to provide the UCLFS, which itself is an unbundled service at Layer 1. While the Commission is not directly modelling the cost of providing the UCLFS, the price for that service is "*the geographically averaged price for Chorus's full unbundled copper local loop network*".[34] This indicates that Parliament understood that the network modelled to provide the UCLL service would also reflect the network required to provide the UCLFS.

90 The UCLFS, or its commercial equivalents such as Baseband Copper, is available to RSPs at **[RI:]** of 778 ESAs (including notional exchanges). If FWA was deployed

[32] Ministerial Inquiry into Telecommunications (27 September 2000) at pages 65 – 66 and 68.

[33] Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" (2 December 2014) at [555].

[34] Telecommunications Act 2001, Schedule 1, "Chorus's Unbundled Copper Low Frequency Service".

as the MEA in any of those ESAs, the UCLFS would not be able to be provided by the HEO.

91 If the concept of "*an area in which unbundling is unlikely to take place*" is to have meaning, it must refer to all services which are provided at Layer 1 and which cannot be provided by FWA. Accordingly, if the RSPs' submission were to be adopted, FWA should not be deployed in any ESA in which either UCLL or UCLF or a UCLF commercial equivalent is acquired by an RSP.

Evidence of actual FWA deployment in New Zealand

92 The RSPs' position on FWA also fails a reality check. If FWA costs are as suggested by submitters, and if FWA provides a true substitute for fixed line services, we would expect to see mobile operators competing more vigorously for the provision of voice and data services at both the retail and wholesale levels.

93 In fact, outside of subsidised RBI areas, general retail offerings of mobile broadband are an order of magnitude more expensive than broadband offerings based on ADSL for equivalent monthly data allowances and appear to operate in a completely separate market. These offerings are not equivalent to the UCLL service. In addition, as noted in our submission, retail mobile broadband offerings come with a number of caveats as to service availability and functionality that are inconsistent with the UCLL service.

Relevance of Government funding

94 Network Strategies argues that, to the extent that the Commission's model extends a FTTH network beyond a footprint of "commercial investment", it should assume that such deployment is subsidised because a commercially rational HEO would not deploy network without such a subsidy. In particular, Network Strategies argues that the Commission must therefore take account of UFB funding if the FTTH network is deployed to meet at least 75% coverage.[35]

95 We repeat that what MEA an HEO would select is primarily an empirical question, which should be answered without regard to hypothetical subsidies. In this regard, Network Strategies' premise is flawed, because:

95.1 an HEO cannot select a technology (FWA) that is incapable of delivering the service; and

95.2 in any event, for reasons we explain later in this submission, Network Strategies' analysis of the extent to which FWA deployment is cheaper than FTTN is unreliable.

[35] Network Strategies "Commerce Commission draft determination for UCLL and UBA: a review of key issues" (20 February 2015) at page 25.

96 We therefore do not agree that an operator would deploy FTTH (or FTTN/Copper) rather than FWA to provide the regulated service only because it is subsidised to do so; it would do so because it is the most efficient technology choice.

97 It is worthwhile noting that Network Strategies' analysis of subsidies on network deployment in New Zealand is also deeply historic. As we explain later in these submissions, the UFB initiative was designed to accelerate fibre deployment that was already forecast to occur but over a longer period of time, in a context where a key economic constraint on deployment was the existence of the existing copper network. That rationale has nothing to do with the availability or otherwise of FWA, and in any event says almost nothing about the economics of network deployment in the very different hypothetical the Commission has constructed to price the efficient cost of the copper network.

98 Further, it is notable that RBI– which incentivised FWA deployment to serve some broadband demand – preceded the UFB initiative. On Network Strategies' account, such funding would be pointless – a rational operator should have deployed FWA anyway. And there would be no reason why UFB funding, which did not then exist, would act as a constraint on the extent of FWA deployment. Yet, as we note above and discuss further below, widespread FWA deployment supporting equivalent services to UCLL is not observed.

99 Ultimately, the parties' arguments as to the selection of a MEA and the taking account of various so-called subsidies fall to be assessed separately on their own merits. There is no necessary linkage between the two. Certainly, Network Strategies is wrong to suggest that, if it is unsuccessful in persuading the Commission to adopt a widespread FWA MEA, it must necessarily be successful in its arguments that subsidies must be taken in into account.

Optimisation

100 Certain submissions have raised concerns with the optimisation levels in the Commission's model. We believe the Commission's model assumes a reasonable level of optimisation, subject to the comments in our submission. Any additional optimisation must be consistent with:

100.1 the statutory test. The Commission cannot optimise away elements of the service required to be costed under the Act and ultimately supplied by the HEO. This includes the geographic locations of handover points and (for the UBA service) the geographic locations of FDSs; and

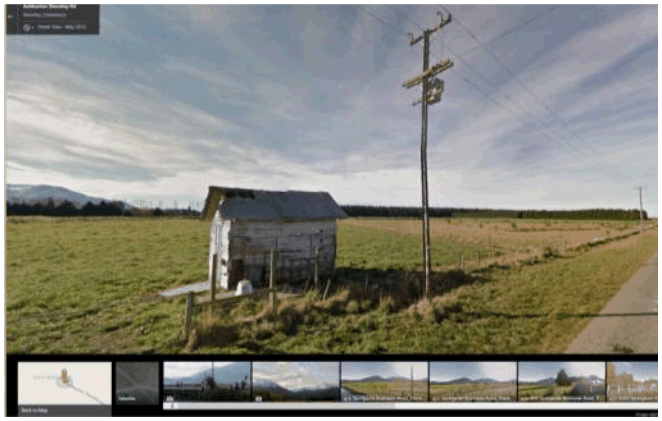
100.2 reasonable levels of efficiency able to be obtained by network operators in practice.

Optimisation of Exchanges

101 Spark claims that a "cursory" examination of the nodes classified as Exchanges reveal issues in the data provided by Chorus.[36] We have reviewed each of the three examples provided by Spark in its submission. Each node is correctly classified in the data provided by Chorus to the Commission and in the Commission's model:

101.1 the "SB" example identified by Spark[37] is classified in the data provided by Chorus to the Commission as a "Notional Exchange". A notional exchange exists where Chorus has decommissioned the exchange building and replaced it with a cabinet. The exchange service area still exists, but is referred to as a notional exchange area. In the example cited by Spark, the exchange building has been decommissioned because necessary equipment is now smaller and does not require a building to house it;

Figure 1: SB notional exchange



[36] Spark "UBA and UCLL FPP pricing review draft decision" (20 February 2015) at [269(a)].

[37] Spark "UBA and UCLL FPP pricing review draft decision" (20 February 2015) at [268(a)(xi)].

101.2 the "MJK" example identified by Spark[38] shows an exchange building in relatively good condition. We are unsure on what basis Spark identifies this building as clearly not housing an exchange. We have investigated the exchange building in question and confirm that it is operational;

Figure 2: MJK exchange building

101.3 the "MMVG" example identified by Spark[39] is classified in the data provided by Chorus to the Commission as a "Site". A "Site" refers to a non-cabinet site, often located at or near end-user premises (in this particular case, a residential retirement community), which houses active equipment for the UBA service (such as DSLAMs). We have reviewed TERA's model and confirm that this site is not reflected in the UCLL 'access' model. Instead it has been treated as part of the 'core network'. This treatment is consistent with its function as a site in which equipment to provide the UBA service is present, rather than a UCLL exchange.

[38] Spark "UBA and UCLL FPP pricing review draft decision" (20 February 2015) at [268(a)(xii)].

[39] Spark "UBA and UCLL FPP pricing review draft decision" (20 February 2015) at [268(a)(xiii)].

Figure 3: MMVG non-cabinet site

102 While the data supplied by Chorus to the Commission is dependent upon operational records which may contain some errors, there is no evidence in Spark's submissions or elsewhere that the data provided is not fit for purpose for inclusion in the Commission's model.

Optimisation of routes

103 WIK claims that the shortest path algorithm used in TERA's model (while not specified in detail) has resulted in modelled trenches that are not efficient, and therefore overestimates trenching costs.[40] For the reasons explained by Analysys Mason in its expert report, this issue is unlikely to be material in practice because, in reality, New Zealand roading networks are not "grids". Nor does WIK provide any evidence for its assertion that a 5% saving in trenching costs[41] is potentially achievable by using a different algorithm.

Exclusion of capital costs

104 Contrary to some submissions,[42] we maintain our view that the TSLRIC for the service must take account of the replacement costs of all assets that an HEO would deploy to provide the service Chorus is required to provide. Accounting for all asset costs ensures that the price set by the Commission, however structured, will recover the

[40] WIK Consult "Submission in response to the Commerce Commission's draft pricing review determination for Chorus' unbundled Bitstream access service and draft pricing review determination for Chorus' unbundled copper local loop service including the cost model and its reference documents" (20 February 2015) at [136].

[41] WIK Consult "Submission in response to the Commerce Commission's draft pricing review determination for Chorus' unbundled Bitstream access service and draft pricing review determination for Chorus' unbundled copper local loop service including the cost model and its reference documents" (20 February 2015) at [451].

[42] Spark "UBA and UCLL FPP pricing review draft decision" (20 February 2015) at [256] – [264]; Vodafone "Submission on process paper and draft pricing review determinations for Chorus' unbundled copper local loop and unbundled bitstream access service and comments on Analysys-Mason's TSLRIC models" (20 February 2015) at [J1-J10].

total cost of providing the service. Accordingly, the Commission should not exclude capital costs from the TSLRIC model on the basis that those costs will be notionally recovered through a hypothetical capital charge which does not actually form part of the price for the service.

105 In summary, the reasons for not excluding actual costs required to provide the regulated service from the TSLRIC calculation based on hypothetical alternative revenue streams are:[43]

105.1 Chorus has an obligation to maintain all existing connections where the service is currently taken by an RSP and to provide the regulated service in respect of any end-user connected to its copper network under s 30S of the Act;

105.2 the statutory question is what are the TSLRIC costs of providing the service connecting those end-users efficiently? Excluding costs will result in an underestimate of the costs required to maintain the existing network footprint, contrary to the Commission's stated objective;

105.3 it is an improper extension of the HEO concept to move from asking "*what are the TSLRIC costs of providing the service connecting those end-users required to be supplied to*?" to ask "*what end-users would the HEO supply*?"; and

105.4 the Commission's approach is also inconsistent with its stated objective of a predictable application of TSLRIC. There is no objective criterion to analyse – and therefore predict – when a HEO might require a capital contribution independently from the monthly rental price, which is unknown.

106 The RSPs' position illustrates the difficulty of the Commission's use of the HEO concept to determine network footprint, when taken to its logical extreme. If capital contributions are not taken into account, RSPs argue that the Commission should only model the considerably smaller network that an HEO would rationally be prepared to build.[44] Some submissions appear to go so far as to suggest that the UCLL STD is only concerned with an efficient price for commercial areas/customers.[45]

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[43] Chorus "Submission in response to draft pricing review determinations for Chorus' unbundled copper local loop and unbundled bitstream access services" (20 February 2015) at [96] – [105].

[44] Spark New Zealand Limited "Submission on draft determination for UBA and UCLL Services" (20 February 2015) at [207]; Vodafone "Vodafone on process paper and draft pricing review determinations for Chorus' unbundled copper local loop and unbundled bitstream access services and comments on Analysys-Masons' TSLRIC models" (20 February 2015) at [J4].

[45] Vodafone "Vodafone on process paper and draft pricing review determinations for Chorus' unbundled copper local loop and unbundled bitstream access services and comments on Analysys-Masons' TSLRIC models" (20 February 2015) at [J4].

107 The UCLL STD contains no distinction between commercial areas and customers and non-commercial areas and customers. As noted in our submission, it requires the regulated service to be provided wherever an RSP is taking an MFP connected to an ETP at the premises at the time of the request. The Commission will not model a TSLRIC-based price of providing the regulated service if it assumes that the HEO would not build a network to enable the HEO to provide that service.

108 Equally, as noted in our submission, there is no means of determining what customers are commercially non-viable independent from the monthly rental charge. In the context of the Commission's previous TSO determinations, the existence of a fixed monthly line rental charge made the concept of a "commercially non-viable customer" meaningful.[46] But, in a context where the monthly price for the service is not fixed, it is impossible to determine whether any particular end-user is viable or not. The exercise proposed is entirely circular; taking hypothetical contributions into account is simply an arbitrary downwards adjustment of the true costs of providing the regulated service.

109 For these reasons, we support the Commission's objective that the costs of maintaining and extending the network required to supply the regulated service be recovered through the TSLRIC price for the service. The implication of this, however, is that no notional capital contributions from deemed commercially non-viable customers can be assumed.

110 There are additional issues with each of the particular capital contributions or "subsidies" that the RSPs identify for exclusion from the TSLRIC cost. These reasons mean that, even if the Commission concluded that TSLRIC costs can be reduced to account for hypothetical subsidies or contributions, there would be independent good reasons not to take specific account of each of the subsidies or contributions raised by other parties.

Commercially non-viable customers within TSO boundary areas

111 The Commission has assumed that an HEO would seek 100% contributions for connecting end-users outside the areas which Chorus is required to service under its TSO Deed for TSO Network Services (**TSO areas**). Within the TSO areas, no contribution is required. The Commission has observed that this is a proxy.[47]

112 Submitters have contended that the costs of serving commercially non-viable customers (**CNVCs**) within TSO boundaries should also be excluded, on the basis that the TSO provides a mechanism for funding those customers.[48]

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[46] Commerce Commission "Determination for TSO Instrument for Local Residential Service for period between 20 December 2001 and 30 June 2002" (17 December 2003) from [43].

[47] Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" (2 December 2014) at [820].

[48] Spark "UBA and UCLL FPP pricing review draft decision" (20 February 2015) at [203] – [204].

113 However, as Chorus does not in fact currently receive any funding for serving these end-users, the submitters' approach is inconsistent with the Commission's interpretation of limb (b) of the Act's definition of "*forward-looking common costs*".[49] That limb excludes from the definition "*any costs incurred by the service provider in relation to a TSO instrument*". The Commission has – correctly, in Chorus' view – interpreted that reference to be to costs for which Chorus receives a TSO payment under the Act. No other party appears to have challenged this interpretation. Yet accepting the RSPs' approach on capital contributions would mean that hypothetical TSO payments which Chorus does not in fact receive are excluded by another means. This would be contrary to the legislative and policy history of the Act identified by the Commission in support of its interpretation.[50]

114 Excluding costs within TSO areas will lead to an underestimate of the TSLRIC costs of providing the service that Chorus is required to provide, both by s 30S and its separate obligation under the TSO Deed for TSO Network Services.

UFB

115 Contrary to submissions' received,[51] Chorus' UFB arrangement is not a subsidy for the deployment of fibre. Instead, it is debt and equity funding to accelerate fibre deployment to 75 percent of New Zealanders over 10 years, in a context where demand was served from an existing copper network.[52] As the Commission has assumed, and must assume, that the HEO would deploy its MEA network to replace the Chorus copper network in a relatively short period of time, this funding cannot be required.

116 Nor is UFB funding a grant or subsidy. The funding is treated as a debt on Chorus' balance sheet.[53] The terms were negotiated on a commercial arms' length basis following a competitive procurement process.

117 Taking into account UFB funding would have perverse consequences. It would artificially lower the price for regulated copper services below the price for the UFB services mandated by CFH and therefore directly undermine the early migration to fibre that the funding was designed to achieve. This would harm the positive benefits of migration to fibre that Professor Vogelsang and the Commission have recognised.[54]

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[49] Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" (2 December 2014) at [97] – [101].

[50] Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" (2 December 2014) at [98].

[51] Spark "UBA and UCLL FPP pricing review draft decision" (20 February 2015) at [263].

[52] New Zealand Government "Ultra-Fast Broadband Initiative: Invitation to Participate in Partner Selection Process" (October 2009) cl 1.1(a).

[53] Chorus' auditors have ruled that the equity securities be accounted for as debt until 2020.

[54] Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" (2 December 2014) at [450] – [452].

RBI

118 We also disagree with submissions that RBI funding should be recognised in the Commission's model by removing capital costs.[55] RBI funding is provided to Chorus and Vodafone for specified broadband services in rural areas. RBI funding:

118.1 is for services that are not a substitute for the UCLL service;

118.2 cannot be assumed to be necessary for the HEO to deploy network in rural areas, given the different circumstances of the Commission's hypothetical network (i.e., a new FTTH network to meet all demand in an area) to the actual economic case that justified RBI funding (i.e., overlay of an existing network that was capable of providing voice and some data services);

118.3 is funded from the Telecommunications Development Levy, to which Chorus (and any HEO would contribute), meaning that an element of the funding is circular;

118.4 funds deployment of network that is at least partly outside TSO areas, and which already has its capital costs excluded by virtue of the Commission's use of the TSO area proxy.

119 Taking account of RBI subsidies previously received by Chorus and Vodafone for network deployment other than that used to provide the UCLL service is also inherently backwards looking. In the case of Vodafone funding, it is also perverse. Vodafone would receive the benefit of both the funding for its own network and a downwards adjustment to the TSLRIC costs of the UCLL and UBA service which it acquires to recognise that funding.

120 RBI was designed to overcome the technical and economic challenges facing rural broadband deployment. However, those challenges are not the same challenges the Commission's HEO would face. Simply put, a key challenge facing network deployment in rural areas is the existence of a network which already supports voice and dial-up services. This means that the economic case for additional deployment to support broadband must be based solely on marginal broadband revenue.

121 In contrast, the Commission has assumed that the HEO would deploy a network to serve all UCLL, UBA and UCLF demand on Chorus' copper and fibre networks (as well as the networks of third parties). In this hypothetical scenario, the economics of deployment in rural areas are very different from those giving rise to the need for the RBI initiative. The HEO would make deployment decisions based on revenue from the full range of services (voice and data) able to be supported by UCLL and UBA. No assumption that capital contributions akin to the RBI funding would be required by the HEO can be safely made given this fundamental difference in circumstances.

[55] Spark "UBA and UCLL FPP pricing review draft decision" (20 February 2015) at [258] – [262].

122 In any event, as noted above, there is a very significant overlap between areas to which RBI funding could be applied and the Commission's use of TSO areas as a proxy for capital contributions. Removing both RBI funding and TSO areas would result in a double counting of notional subsidies for rural network deployment. Again, if capital contributions are (contrary to our view) to be taken into account, there is no evidence to suggest that the TSO areas are not an adequate proxy for areas in which an HEO might seek capital contributions.

End-user contributions

123 Finally, it would be wrong for the Commission to assume that, in addition to receiving capital contributions for connecting premises outside TSO areas, the HEO would also require further capital contributions from end-users within the TSO areas (e.g., for lead-ins).

124 Lead-in contributions, by definition, can only be sought for a connection outside the s 30S obligation to supply. Such premises therefore do not form part of the obligation to supply and are not being costed in the TSLRIC price for the regulated service. Even where such contributions have been sought in the past, such contributions are "one-off", and the connection, once in place, must be maintained.

125 RSPs rely, as evidence that an HEO would require a contribution from end-users, on Chorus' recently introduced policy of seeking a contribution for new end-user premises wishing to connect to its network.[56] However, the description of the contribution policy in the RSPs' submissions is partial only:

125.1 Chorus does not seek any contribution for new ordinary[57] residential connections to its FTTH (UFB) network. To the extent that this network is the direct analogy with the HEO network, this demonstrates that the HEO would rationally choose to connect premises to its network without a capital contribution;

125.2 Chorus does not (and cannot) seek any contribution for its FTTN/Copper network for residential lines that were active as at 20 December 2001. Even if the Commission could be legitimately interested in backwards-looking contributions, there is therefore no issue of "double counting" between contributions received by Chorus and including costs in the TSLRIC costs of network deployment to those end-users. While Chorus may recover contributions within TSO areas for some new premises, this is reasonably accommodated in the Commission's acknowledgement that the TSO area proxy will both be both over- and under-inclusive to some extent. Of course, lead-in costs outside TSO areas are already excluded

[56] Vodafone "Vodafone on process paper and draft pricing review determinations for Chorus' unbundled copper local loop and unbundled bitstream access services and comments on Analysys-Masons' TSLRIC models" (20 February 2015) at [J6].

[57] Chorus seeks lead-in contributions for backbone wiring (the "Glue") in MDUs where the cost will exceed $1000 per tenancy. In 90% of cases, no contribution is sought.

as part of the Commission's broader assumption about capital contributions in those areas.

126 As noted in Chorus' submission, the Chorus capital contribution policy (including its policy for contributions for lead-ins) was introduced in response to the cash-flow issues created by the Commission's IPP determination. Chorus agrees with the Commission that, if an efficient FPP monthly rental price is set, this should provide for necessary network maintenance and expansion. If such a price is set, and backdating confirmed, Chorus will reverse all relevant capital contributions sought under its policy.

127 Such amounts actually received are, however, trivial in the context of the extensive costs that would be excluded from the Commission's model were the other parties submissions to be accepted. The irony of that acceptance would be that, in response to the IPP determination setting an inefficiently low price, Chorus has taken steps to seek to raise additional revenues from the now small number of annual requests for the connection of new end-user premises outside of its TSO obligations. Those steps are now used against it to argue for the exclusion of far greater connection costs from all premises both within and outside its TSO obligations, and for which Chorus has not received any revenue from its recent policy. In Chorus' position, such a result is wrong in principle and in policy.

Network build costs

Trench and duct sharing

128 Some submissions argue for greater sharing to be accounted for within the Commission's model. Chorus acknowledges that some degree of asset sharing should be allowed for network deployed underground but considers that this should be limited to 5% for the reasons explained below.

International benchmarking is not relevant

129 In particular, WIK advises that it is "state of the art" for regulators in other jurisdictions to include an allowance for asset sharing between the HEO and other utility providers – however, no evidence or citations are provided.[58] Nor does WIK give any evidence for its statements that the relevant range of trenching cost reductions due to proper sharing assumptions are in the range of 5% to 30% of trenching cost.[59]

[58] WIK Consult "Submission in response to the Commerce Commission's draft pricing review determination for Chorus' unbundled bitstream access service and draft pricing review determination for Chorus' unbundled copper local loop service including the cost model and its reference documents" (20 February 2015) at [389].

[59] WIK Consult "Submission in response to the Commerce Commission's draft pricing review determination for Chorus' unbundled Bitstream access service and draft pricing review determination for Chorus' unbundled copper local loop service including the cost model and its reference documents" (20 February 2015) at [390].

Practical constraints to duct sharing in New Zealand

130 There are New Zealand-specific reasons why accounting for the sharing of underground trenches and ducts is likely to be limited when modelling the HEO's forward looking costs.

131 First and foremost, New Zealand, unlike Europe,[60] has no legislated shared access regime to ducts or trenches.[61] In New Zealand any sharing (if possible in light of practical/engineering constraints) is on negotiated commercial terms. Adopting assumptions about duct sharing (which is simply one element of the EU regulatory landscape) risks distorting the Commission's task under the Act – which, again, requires an assessment of forward-looking costs.

132 Secondly, Chorus' ducts would not exist in the world in which the HEO deployed its network. So it is only access to other utility companies' ducts that is potentially in issue. Chorus' experience in the UFB build is that there are various practical and engineering constraints to accessing third parties' ducts:

132.1 existing duct networks are owned by Auckland Transport, some electricity lines companies, and (in some cases) city or regional councils. The scope of these networks is inconsistent, coverage is fairly limited and tends to be concentrated in older urban areas. A telecommunications operator cannot be sure that an existing duct is in place, particularly where asset records are patchy. There are therefore significant practical issues in coordinating duct sharing;[62]

132.2 those third party ducts are only potentially available for a telecommunications company if they are:

(a) located at an easily located depth (ducts that are buried at lower depths may be uneconomical to access);[63]

(b) will not be required in the future by the owner; and

[60] Many EU jurisdictions have implemented measures under a European Commission directive to require incumbents which have legislated rights to install facilities on, under or over private or public property (e.g. ducts) to share those facilities with rivals: European Parliament and the Council of the European Union "Directive 2002/21/EC on a common regulatory framework for electronic communications networks and services (framework directive)" (7 March 2002) at article 12 (page 11) available athttp://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32002L0021&from=en.

[61] We observe that the National Code of Practice for Utilities Operators' access to Transport Corridors (10 November 2011) requires the corridor manager to, where practicable. coordinate works in its transport corridors and provide information on schedules of planned works to other utility operators: at see [2.7.1(1)(a)]. The Code does not require utilities companies to share assets.

[62] A point also identified by Analysys Mason in its report accompanying this submission "Draft UCLL and UBA FPP draft determination cross-submission" (20 March 2015) at [2.6.5].

[63] Indeed, in its UFB deployment Chorus does not always use its own ducts if those ducts are located at uneconomical depths, and will instead directional drill a new trench at a lower cost.

(c) are not difficult to access, for example if ducts are located in abandoned water or gas mains, additional work may be required in order to get past valves;

132.3 some existing ducts may carry additional costs to access. For example, Chorus may still utilise pre-existing ducts where there is a risk of asbestos exposure, but will incur additional costs as a result of the more rigorous health and safety procedures and disposing of hazardous waste which may be required when disposing of fragments from the ducts following break-out. Similarly, hazards may be present in disused gas mains which may be costly to safely manage. Serious electrical hazards can occur where power cables or underground power service lines come into contact with remote earth or are damaged – again, additional costs may be involved in safety procedures and ensuring trained personnel are used;[64]

132.4 duct owners also require assurances around network safety (for example, work near electricity assets) and may require another user to meet the costs associated with installation. For example, standover personnel are mandatory where higher voltage cables are involved or when working near some water pipes to mitigate the risk of damage to the ducts or employee injury during installation, with increased costs associated with those staff. The cost of standover personnel is chargeable to the company seeking access or conducting the digging; and

132.5 standover may also be required if working near a strategic asset (for example, a cable which serves extensive areas of a large number of customers) or where an outage could potentially strand a community. Again, such standover would be payable by Chorus (or the HEO, as applicable). Damage to ducts was a key concern for Chorus during its (now ceased) practice of allowing parties access to its spare ducts (described below). **[RI:**

].

133 These practical and engineering constraints mean duct sharing is only possible in some discrete areas of New Zealand, and that costs are involved in ascertaining whether suitable pre-existing ducts exist in a particular location. Where sharing is potentially possible, it is on commercial terms and subject to the duct owners' safety and network protection requirements. For example:

133.1 duct owners typically require either purchase of the duct at a price between **[RI:** **]** per meter, or lease of a duct for a per annum charge. Chorus has declined to enter any lease arrangements

[64] See Chorus "Electrical Lines: Underground" (October 2009); and Analysys Mason "Draft UCLL and UBA FPP draft determination cross-submission" (20 March 2015) at [2.6.5].

which carry an ongoing payment obligation, electing instead to purchase ducts;

133.2 Chorus must pay the full build costs related to installing the cables including extending ducts to the boundary and full reinstatement costs (more information is contained about the work involved below);

133.3 commercial terms often involve extensive negotiations. **[RI:**

]

133.4 Chorus trialled allowing third parties access to our spare ducts[65] - again, on commercial terms. That product was recently withdrawn **[RI:**

]. At the time that the offering was discontinued Chorus had **[RI:** **]** leasing its duct space.

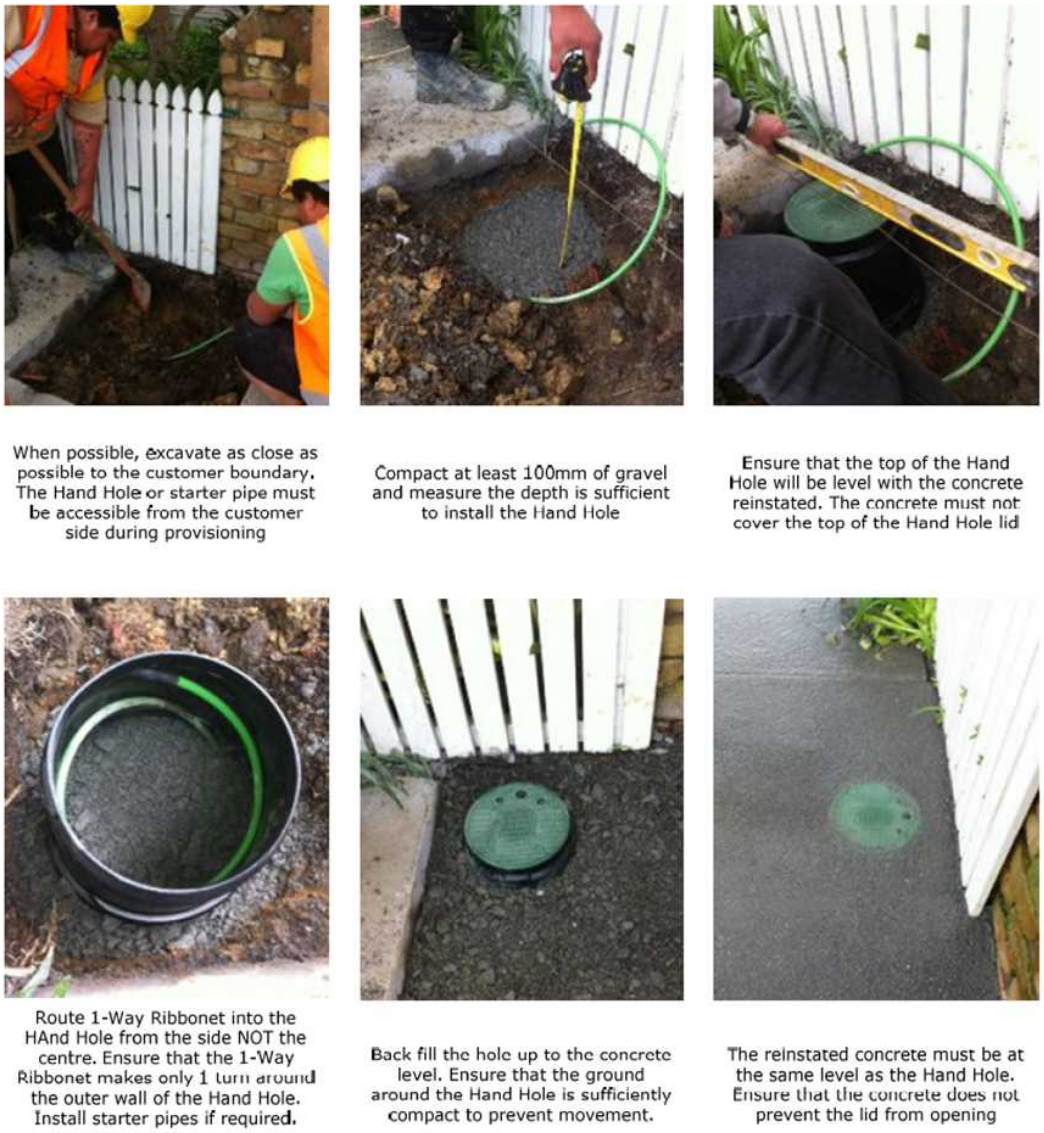
134 Chorus is continuously seeking to minimise its trenching costs, including by utilising shared ducts and coordinated trenching work (where available and possible). When considering whether to purchase access to or lease of a third party duct, Chorus assesses the likely costs of installation in that duct including break-outs to premises, reinstatement, traffic management etc. These costs are often at a level in line with, or higher than, *de novo* trenching, as many of the cost drivers are common to both activities.

135 The work required to install a lateral and microduct in a handhole is significant and requires a material amount of excavation and reinstatement work. Again, these costs would be incurred even where an existing third party duct was available and could be leased or purchased to run fibres down the road where the premises are located. The pictures in Figure 4 show the process:[66]

[65] Billed as the *Chorus Open Duct Service* and, until [**September 2014],** available to our wholesale customers.

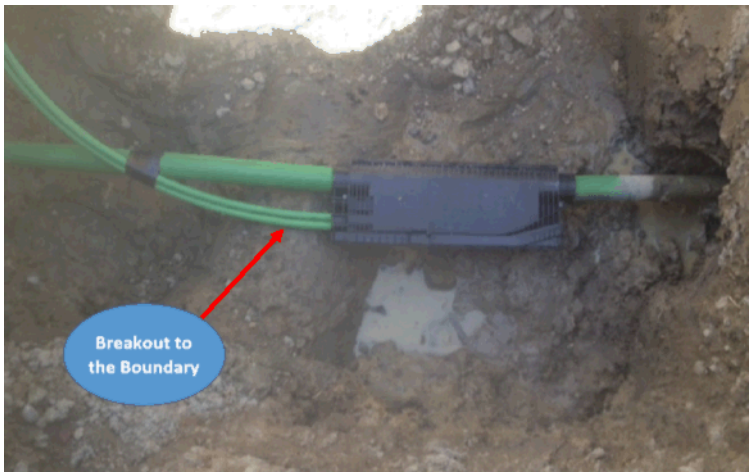
[66] Chorus "Optical Fibre – UFB premise boundary deployment standards Chorus network architecture" (16 August 2013).

Figure 4: Work required to install a lateral and microduct in handhole



136 Chorus estimates that even where an existing duct is available (and access has been purchased), it costs approximately an additional **[CI:]** for break out and reinstatement to a premises. An image of the break out process for use of an existing duct, and the hole which would need to be reinstated, is shown in Figure 5 below.

Figure 5: Break out process for existing ducts



137 The HEO would, in each case, assess whether it is more cost effective to pay a purchase price or per annum rental fee for an existing duct or install its own infrastructure alongside the existing duct.

138 Access on commercial terms aligns with recent Australian experience. Like New Zealand, Australia does not have legislated access to ducts and NBNCo recently paid AU$11.2b to access Telstra ducts under a finance lease. Those duct and pit leases are, in large part, responsible for NBNCo's recent reported increase in cost per premise for brownfields installations from AU$3,579 to AU$4,316.[67]

139 In Spark's submission it uses as an example of sharing the fact that it shares fibres within shared cables with Chorus. However, Chorus' sharing of fibres with Spark is not duct sharing, but a post-demerger arrangement that was a product of the particular circumstances of the Telecom demerger and does not reflect a workable commercial model. The Asset Allocation Plan[68] split most fibre cable strands between Chorus and Telecom evenly, on the basis that they were required by both firms – for access and/or regional transport for Chorus, and national transport for Spark, but allocated ownership of the fibre sheath to Chorus. Again, such a strand-by-strand approach carries network risks and would not ordinarily occur outside this specific context.[69]

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[67] NBN Co "Half-year report as at 31 December 2014" (26 February 2015) at page 15.

[68] Telecom "Overview of the Asset Allocation Plan" (6 September 2011) at page 32, available at . http://investor.telecom.co.nz/phoenix.zhtml?c=91956&p=irol-ufb.

[69] Where Chorus does "share" fibre lines (typically long haul ones), this is generally achieved by each party owning and being responsible for a particular segment of the line and obtaining usage rights over other parties' portions, rather than sharing strands along all segments of the line.

Co-ordination of trenching works

140 There are also practical and commercial constraints on the coordination of trenching works:

140.1 as there is no legislated regime in New Zealand, coordination of civil works depends on ad hoc or informal agreements, or on the corridor manager under the National Code of Practice for Utility Operators' Access to Transport Corridors (**Code**) coordinating the works. For example, Chorus is presently spending $4m on synergy work in its UFB build by coordinating trenching works with Auckland Transport's (**AT**) footpath replacement programme.[70] The only reason Chorus has elected to coordinate its works is to reduce future compliance/reinstatement costs. Chorus was still required to pay for the cost of trenching. The opportunity for coordination only arose because Chorus was prepared to accelerate some trenching works to meet AT's schedule;

140.2 slower pace and larger, deeper trenches are needed for lines company assets (each of which drives higher trenching costs and may restrict the working practices which can be used).[71] Lines companies often trench to a depth of 1m or more, whereas telecommunications lines are typically buried 450mm to 600mm sub-surface. Evidence of the cost increases associated with sharing is the electricity lines companies' report of an increase in trenching costs in their fixed asset registers of between 20% and 60% to reflect the larger size trenches associated with shared infrastructure;[72]

140.3 generally Chorus is not made aware of the trenching activity of other network operators – communication about such activity is ad hoc, and Chorus would not usually be notified at all where cable is being installed in shorter lengths of road (for example, road crossings or lead ins);

140.4 in practice, these factors together mean that shared trenching is typically only undertaken for major works and long-haul cables. For example:

(a) **[CI:**

[70] Chorus "Management commentary" (August 2014) at page 10, available at https://www.chorus.co.nz/file/52452/3.-Management-commentary.pdf .

[71] Analysys Mason "Draft UCLL and UBA FPP draft determination cross-submission" (20 March 2015) at [2.6.5].

[72] Powerco "Network Fixed Asset Valuation: Replacement Costs and Lives" (13 November 2003) at pages 22 and 25.

]

(b) Chorus shared civils costs with FX Networks (now Vocus) on a fibre route from near Mangakino to near Turangi – in total, about 100km. It also shared costs on a route from Waiouru to near Hunterville – an additional 75km. **[CI:**

]

(c) Chorus also recently shared costs with FX Networks on a 220km fibre route from Gisborne to Waihau Bay. **[CI:**

]

141 As for shared ducts, when considering whether to participate in coordinated trenching works being undertaken by a lines company or corridor manager, Chorus assesses the likely costs of shared civils relative to "going it alone" using a drilling deployment method or a shallower, smaller trench on a case by case basis. It often finds it is more cost effective to simply trench itself, because of the higher costs and slower work pace driven by lines company dimensioning requirements. The primary benefits of these arrangements are often not monetary but practical by avoiding re-trenching or reinstating the same portion of road more than once, particularly if significant disruption would be caused.

142 Trench sharing with utility companies is not as straightforward as simply reducing the applicable trenching rates because:

142.1 the cost shared is for a wider and deeper trench, with correspondingly higher costs;

142.2 it is more difficult and costly to reinstate wider and deeper trenches; and

142.3 Chorus is nevertheless required to meet the entire costs of all other aspects of the build, including extensions to the boundary and break-outs (and any trenching or civil works for those parts) on its own account.[73]

143 While an HEO would look to minimise its trenching costs during deployment by sharing ducts and trenches with other operators (where practicable), against all of the above constraints it is unlikely that a substantial proportion of its network would

[73] Analysys Mason "Draft UCLL and UBA FPP draft determination cross-submission" (20 March 2015) at [2.6.5] notes that duct-related labour costs will not be shareable.

utilise shared ducts. We accept that some adjustment to the forward-looking assessment of the HEO's costs is required to reflect the likely level of that sharing, but it is important that any adjustment reflects the New Zealand-specific legislative context and appropriately represents real-world levels of underground trench and duct sharing.

Regulatory precedent and our experience

144 Chorus observes that, in previous regulatory processes, valuation adjustments to reflect shared ducts and trenches have been applied, including:

144.1 in the context of Telecom operational separation, **[CI:]** to reflect the reality that sharing to a limited extent may be possible, usually with the electrical lines companies, and is often associated with the conversion of overhead plant to underground. In that context (which was effectively a replacement cost valuation rather than TSLRIC), **[CI:]** This estimate accounted for overhead to underground conversion (**OHUG**) activity and did not include any trench cost sharing due to road-works activity.

144.2 in the 2003-2004 TSO determination, the Commission adopted underground infrastructure sharing figures which varied by customer density in an area, applied as a cost reduction factor on the applicable trenching costs.[75] These figures were based on US experience. At the time Telecom submitted that the amount of infrastructure sharing in practice was less than 1%.[76]

145 The Commission could therefore consider it appropriate to make an adjustment to the TERA modelled costs to reflect shared ducts and coordinated civil works. It is important that any adjustment reflects the New Zealand context and does not indirectly import European assumptions around duct access. Chorus observes that when the Commission has previously considered duct sharing in New Zealand (although in very different regulatory contexts, which were not forward-looking TSLRIC) it has concluded that an adjustment in the range of 1% to 3% is appropriate, given the practical constraints to sharing and the two previous adjustments referred to above (which were each in that range).

[74] **[CI:]**

[75] Final Determination for TSO Instrument for Local Residential Service for period between 1 July 2003 and 30 June 2004 at page 95.

[76] Telecom "Letter to Douglas Webb responding to the Commission's report on the Telecom TSO model, and the available information on the Commission's HCPM model" (20 May 2003) at page 5.

Trenching costs

146 There appears to be general agreement between the parties that there are serious concerns with the use of the Beca analysis as the basis for the trench cost assumptions in the Commission's model, particularly in urban areas such as Auckland and Wellington. This is an area of the Commission's model that clearly requires revision.

147 As we identified in our submission, Beca's analysis is based on limited geological information in urban areas and based on quotes from a small number of contractors. Our experience of a nationwide deployment in the UFB build has generated current trenching costs data for many areas of New Zealand, including Auckland, Wellington and other cities. Chorus' data shows that Beca's average costs of trenching per metre used are materially too low (and in some cases, many times too low) when compared with the actual costs of trenching in many urban exchange areas.

Commission should use best available evidence

148 The actual costs incurred by Chorus in UFB and RBI deployment are better evidence of the costs that a real-world HEO[77] would face than the Beca analysis. These costs are utilised in the Analysys Mason hybrid model. In particular, the actual UFB costs data:

148.1 is recent, reflecting transactions in the last two years for UFB and RBI programme costings, which are based on prices reached in the open market in ESAs in which Chorus is present; and

148.2 was presented in the Analysys Mason hybrid model and has been available to all parties since 2 December last year. No other party has chosen to present costs based on actual experience.

149 Some parties have submitted that trenching costs utilised in the Commission's model should reflect a "large works" discount off list price from trenching contractors.[78] Again, Chorus' UFB build prices (as utilised in the AM hybrid model) are reflective of a large scale network rollout over a short time and the economies of scale, including bargaining power, inherent in a large build:

149.1 Chorus' data shows the costs achieved by a major operator (Chorus) which has utilised its bargaining power to achieve best in market rates (and Chorus' service companies in turn have substantial leverage with their contractors by dint of volume). Chorus' scale is analogous to that which the HEO would possess, and so the HEO would presumably achieve

[77] Chorus has adopted the Commission's use of the term "hypothetical efficient operator" in its draft determination in place of the term "hypothetical new entrant". Chorus understands the HEO concept to be essentially consistent with the HNE concept previously used by the Commission and orthodox TSLRIC, and uses it in that sense.

[78] Spark "UBA and UCLL FPP pricing review draft decision" (20 February 2015) at [296].

similar volume discounts on civil works and trenching costs to those obtained by Chorus and shown in the Analysys Mason model;

149.2 **[CI:**

];

149.3 Chorus recently struck fixed price arrangements with its service companies, namely Downer and Visionstream, for most UFB deployments. Those fixed rates have enabled Chorus to tighten its range of cost estimates to the end of the UFB build programme. The rates payable for communal UFB civil works by Chorus under those new deals are in line with its market projections,[79] and although not strictly comparable, the data in the Analysys Mason hybrid model. **[CI:**

]

150 Chorus' costs are also superior to Beca's indicative estimates insofar as our data includes actual and accurate information about current costs for:

150.1 consenting, reinstatement and traffic management costs as they relate to build in each CSA. Each of these cost drivers appears to be substantially underestimated in the Beca analysis (either because a very limited data set – e.g. Kapiti and Horowhenua – was extrapolated to nationwide, or because Beca made unrealistic assumptions about reinstatement requirements – e.g. assuming 30mm asphalt reinstatement is sufficient);

150.2 routes where Chorus has elected to use slot trenching or micro trenching deployment techniques. WIK has identified these deployment methods as state of the art.[80] Chorus utilises these deployment methods where possible if they will deliver cost savings (although reinstatement costs are still applicable even where micro or slot trenching is used, and may mean the cost savings from such methods are negligible).[81] These technologies

[79] For details of market projections, see slide 30 of Chorus Institutional Investor Briefing (21 May 2014), available at https://www.chorus.co.nz/file/48837/InvestordayFINALslides.pdf.

[80] WIK Consult "Submission in response to the Commerce Commission's draft pricing review determination for Chorus' unbundled Bitstream access service and draft pricing review determination for Chorus' unbundled copper local loop service including the cost model and its reference documents" (20 February 2015) at [318].

[81] Analysys Mason "Draft UCLL and UBA FPP draft determination cross-submission" (20 March 2015) at [2.6.6].

are, however, not feasible for all routes, because some councils' consenting conditions prohibit them where the fibre cable will be too close to the surface and may require future moving. For example, slot and micro trenching are presently permitted in the Auckland region on a trial basis only;

150.3 labour rates and service company overheads for civil works.

151 Against this backdrop, any reliance on international benchmarking is unnecessary and in fact would be inappropriate. It is extremely unlikely that Chorus' UFB deployment costs are materially less cost efficient than the roll-out costs which an HEO would experience. The Commission should be highly sceptical of assertions that benchmarking against international data will somehow deliver a more accurate picture of the HEO's forward-looking trenching costs. The Commission should also reject submissions that Chorus' build costs are at above-normal levels or are somehow not a good proxy for an HEO's deployment costs.

Lead-in assumptions

152 Some parties have submitted that aerial street crossings should be reduced in the TERA model.[82] As we have previously submitted, TERA appear to have assumed that a lead-in may be deployed in a straight line between the end-user building and pole. But, in the real-world, physical obstacles (buildings and trees) and legal requirements (including under Chorus' resource consents) mean that lead-ins are often not able to be built in straight lines.[83]

153 We agree that aerial street crossings should be reduced in the TERA model and should be assumed in a way that reflects New Zealand deployment practices and planning requirements. However, it is also necessary for the Commission to ensure that minor side poles exist at an appropriate length to accommodate lead-ins – which are, on average, two premises per lead-in pole.[84]

Equipment, duct and cable costs

154 Use of the Chorus data would also resolve many of the concerns of WIK and some parties that the Commission's model does not account for scale discounts and modern trenching techniques (such as micro-trenching) which may have lower costs. Chorus' UFB deployment is the largest fixed line telecommunications infrastructure project currently being undertaken in New Zealand, and uses the most cost efficient technologies available where possible.

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82 Vodafone "Submission on process paper and draft pricing review determinations for Chorus' unbundled copper local loop and unbundled bitstream access services and comments on Analysys-Mason's TSLRIC Models" (20 February 2015) at [D3.1(a)].

83 Chorus "Submission in response to draft pricing review determinations for Chorus' unbundled copper local loop and unbundled bitstream access services" (20 February 2015) at Appendix E; UFB Fixed Fibre Aerial design guide at page 19.

84 Chorus "Submission in response to draft pricing review determinations for Chorus' unbundled copper local loop and unbundled bitstream access services" (20 February 2015) at [152].

155 Cost data for those technologies is included in the civil cost build-ups in the Analysys Mason hybrid model. Reliance on Chorus data would give direct information about the scale discounts and technology efficiencies able to be achieved in New Zealand.[85] This is more meaningful and relevant than the international benchmarks referred to by WIK.

156 In addition, WIK concerns about equipment, duct and cable costs result from misunderstandings as to the data provided by Chorus and used by the Commission. Chorus has provided data on its negotiated equipment costs and duct and trenching as purchased in 2013 and 2014, which reflects the discounts that it is able to achieve as an operator of scale in New Zealand and through competitive tendering processes. This purchasing, trenching and duct cost data is contained in the Analysys Mason hybrid model.[86]

157 Chorus' equipment costs reflect the following commercial and practical features:

157.1 in 2012 Chorus put all of its layer 2 technology requirements in all domains (access, aggregation and transport) to tender. Then, as now, the leading providers in each domain were **[CI:**

]. Unit cost is only one of the criteria and cannot be looked at in isolation, particularly for equipment which may require significant maintenance over its lifetime – opting for equipment with the cheapest unit cost may have significant upstream integration and lifecycle costs, which must also be accounted for in any purchasing decision;

157.2 Chorus' commercial arrangements with its suppliers typically include **[CI:**

] Chorus believes that its competitive tendering and negotiated supply arrangements for network assets have enabled it to achieve best in market prices, including when compared to supplies of comparable assets to other network operators elsewhere in the world.

157.3 **[CI**:

[85] Analysys Mason "Draft UCLL and UBA FPP draft determination cross-submission" (20 March 2015) at [2.6.3].

[86] Analysys Mason "Draft UCLL and UBA FPP draft determination cross-submission" (20 March 2015) at [3.6].

]

158 Chorus' supplier arrangements all involve substantial discounts off list prices for telecommunications equipment. Chorus is confident that its supplier arrangements have enabled it to achieve equipment prices that are lowest over total cost of ownership and are best in market for an operator of its scale and which reflect the global nature of equipment markets these days. Indeed, Analysys Mason's benchmarking of unit capex for fibre cabling (based on Chorus' actual purchasing costs) shows the values utilised by the Commission are considerably lower than international benchmark values.[87]

159 A "supplier neutral" arrangement under which Chorus or the HEO obtained equipment from a range of different providers would carry substantial integration and onboarding costs to ensure all systems are inter-operable with one another (such as regression testing etc). Installation costs also increase with multiple vendors' assets. Such costs decrease with fewer vendors' equipment in the network – any arrangement in which multiple suppliers are used should account for such costs.

160 Some parties have submitted that the TERA modelling of certain assets has used incorrect or outdated technology. In particular, card assumptions in DSLAMs are identified as being inappropriate insofar as TERA has not distinguished between ADSL and VDSL cards.[88] In Chorus' view, no rational network operator would select cards with ADSL-only capability, where it is likely that an upgrade would be required in the near term. Indeed Chorus' own practice (reflected in the Analysys Mason hybrid model) is to dimension cards with both ADSL and VDSL functionality.

161 Again, the direct evidence of Chorus' costs in the Analysys Mason hybrid model is considerably better evidence of the forward-looking costs which would be encountered by an HEO than international benchmarks applied to rack or list prices from suppliers.

Aerial deployment

162 As set out in our submissions, we disagree with the Commission's proposed approach to aerial deployment. Its approach is based on a set of assumptions which would never occur in reality, and risks overstating the feasibility of aerial deployment and understating costs. Accordingly, we don't support submissions from other parties arguing for higher aerial deployment in the Commission's model. In particular, we do

[87] Analysys Mason "Draft UCLL and UBA FPP draft determination cross-submission" (20 March 2015) at [2.6.2].

[88] WIK Consult "Submission in response to the Commerce Commission's draft pricing review determination for Chorus' unbundled Bitstream access service and draft pricing review determination for Chorus' unbundled copper local loop service including the cost model and its reference documents" (20 February 2015) at [366].

not agree with the submission that the Commission should model aerial deployment based on the percentages achieved by electricity lines companies.[89] We have provided extensive evidence, including advice from expert planners, that aerial deployment in all locations where existing electricity lines companies' aerial networks exist is not possible in New Zealand. Such an assumption would therefore not be appropriate.

163 The Commission needs to ensure that the aerial deployment it models reflects the practical reality of the level of aerial deployment that can be reasonably achieved. For example, the poles may be not strong enough, not tall enough, not in the right location, unable to be consented, or the lines company may be unwilling to grant access.

164 Chorus disagrees that the percentage of aerial deployment that an HEO would achieve would necessarily be higher in rural areas than in urban areas. In some rural areas a mole plough can be used which may mean that aerial might be more costly than underground deployment.

165 We reiterate that the feeder and core network would not normally be put on poles. Chorus takes particular care to ensure that the robustness of its network (generally by undergrounding its feeder cables and core network) where more than 5,000 premises would be affected by a single event or a whole community isolated. An HEO would adopt similar best practice rules to maintain the integrity of the network in this way.

Overseas "benchmarks" of limited utility

166 Other parties have identified overseas assessment of aerial deployment of distribution lines and have said that this should inform modelling assumptions for New Zealand, including:[90]

166.1 65% to 80% aerial deployment of distribution modelled in an exercise for the Romanian regulator and 95% to 100% for drop wire: a market in which, at 2005, fixed lines had only around 20% penetration;[91]

166.2 0% to 40% aerial in urban areas, and 60% in rural areas in a WIK model for ECTA. Our review suggests this model was based on a hypothetical country representing a 'typical European country' and that the aerial deployment figures appear to have been a variable selected by the

[89] Vodafone "Submission on process paper and draft pricing review determinations for Chorus' unbundled copper local loop and unbundled bitstream access service and comments on Analysys-Mason's TSLRIC models" (20 February 2015) at [F2.11]; Spark "UBA and UCLL FPP pricing review draft decision" (20 February 2015) at [288] and [292].

[90] Network Strategies "Commerce Commission draft determination for UCLL and UBA: a review of key issues" (20 February 2015) at page 56 - 57.

[91] ANRC "Romania's regulatory approach in the fixed telecommunications sector" (25 May 2006), available at http://www.wik-consult.com/fileadmin/Konferenzbeitraege/2006/1st_Black_Sea_and_Caspian_Conference/hirtan.pdf.

modellers when assessing cluster viability,[92] rather than intended to reflect any real world geographical or regulatory context;

166.3 60% in a generic fixed LRIC model, originally developed by Cable & Wireless (incumbent provider), and prepared for use in ECTEL (Eastern Caribbean Telecommunications Authority) Member states.[93] The model, including all its assumptions, is a generic fixed LRIC model developed for each of the ECTEL Member states (Dominica, Grenada, St. Kitts and Nevis, Saint Lucia and St. Vincent and the Grenadines) and so it does not appear to reflect any single set of real-world network or geographical parameters.

167 Other than Romania, none of the overseas "benchmarks" identified by Network Strategies appear to be based on an actual jurisdiction or network operator. For its part, Romania appears to historically have had very limited coverage of fixed line networksand seems to tolerate aerial deployment that could not be achieved within New Zealand planning laws:[94] see, for example, the illustrative Google StreetViews in Figure 6.

168 None of the above figures is of any potential assistance in determining the likely proportion of aerial deployment that an HEO would achieve in the New Zealand context and given New Zealand constraints.[95] The Commission should instead rely on available evidence about New Zealand, and its constraints, to determine the appropriate level of aerial deployment an HEO would achieve.

169 Network Strategies also refers to Japan, where NTT East has 86% of its network deployed aerially and NTT West has 76% deployed aerially. As with Romania, it appears that Japanese planning laws permit aerial deployment in a manner that is inconsistent with New Zealand conditions: see Figure 7.

Pole specifications must reflect sharing scenario

170 Parties have submitted that cable parameters, including pole spacing, could be different for a fibre roll-out than for FTTN/Copper.[96] As previously submitted, Chorus'

[92] WIK Consult "Wholesale pricing, NGA take-up and competition" (7 April 2011) at table 5-2, available at http://www.ectaportal.com/en/upload/WIK/WIK%202011%20-%20Wholesale%20pricing%20NGA%20take-up%20and%20competition%20-%20Final_Report_2011_04_07.pdf.

[93] ECTEL "Fixed LRIC model", available at http://www.ectel.int/documents/interconnection/Fixed-LRIC-Model.xls.

[94] ANRC "Romania's regulatory approach in the fixed telecommunications sector" (25 May 2006), available at http://www.wik-consult.com/fileadmin/Konferenzbeitraege/2006/1st_Black_Sea_and_Caspian_Conference/hirtan.pdf.

[95] Analysys Mason "Draft UCLL and UBA FPP draft determination cross-submission" (20 March 2015) at [2.6.4]

[96] WIK Consult "Submission in response to the Commerce Commission's draft pricing review determination for Chorus' unbundled Bitstream access service and draft pricing review determination for Chorus' unbundled copper local loop service including the cost model and its reference documents" (20 February 2015) at [289] – [290]; Vodafone "Submission on process paper and draft pricing review determinations for Chorus' unbundled copper local loop and unbundled bitstream access services and comments on Analysys-Mason's TSLRIC Models" (20 February 2015) at [D3.(c)].

consent and planning conditions for UFB aerial deployment (which would be transferred to the HEO) are largely dependent on the existing lines companies' aerial network and would not permit new poles at an alternative spacing.[97] As Analysys Mason has identified, any pole spacing would also need to be appropriate for lines company use if the assets are to be shared.[98]

[97] Chorus "Submission in response to draft pricing review determinations for Chorus' unbundled copper local loop and unbundled bitstream access services" (20 February 2015) at [151] – [156].

[98] Analysys Mason "Draft UCLL and UBA FPP draft determination cross-submission" (20 March 2015) at [2.7].

Figure 6: Romania aerial deployment examples

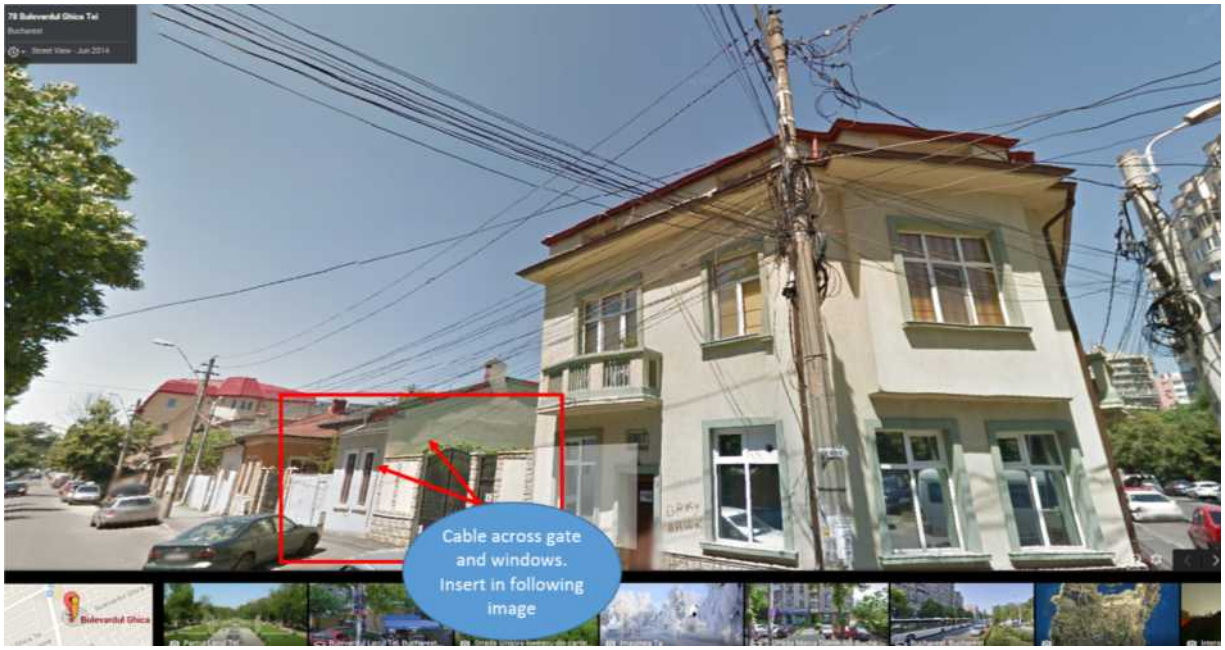
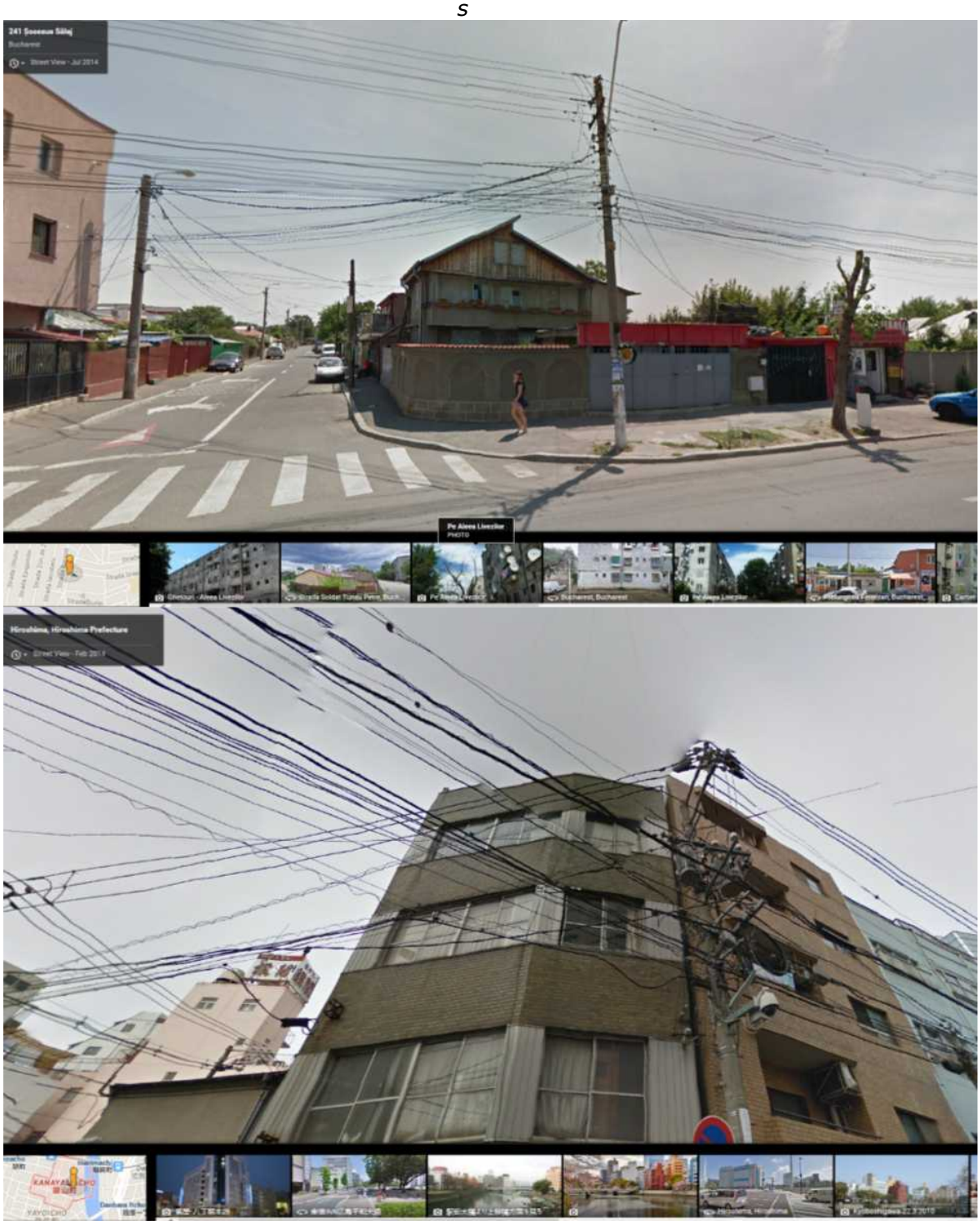


Figure 7: Hiroshima aerial deployment example
s




Hiroshima, Hiroshima Prefecture
富士電機

Fixed wireless deployment

Extent of FWA deployment, if FWA is included in MEA

171 As we have set out above, even if a "*core functionality*" approach to the selection of the MEA is adopted, FWA does not qualify for inclusion in the MEA because it is not capable of providing this "core functionality" of the UCLL and SLU service. Any MEA requires the ability for the service to be unbundled at Layer 1.[99]

172 If, contrary to our primary position, the Commission decides to deploy FWA as part of the MEA then, consistent with available regulatory precedent, the areas in which FWA is modelled must reflect real-world considerations and associated costs. Once these factors are correctly accounted for, the Commission is likely to conclude that FWA is only viable in a very small proportion of New Zealand. These areas will be at the fringes of the network where users are presently unable to obtain the benefits of UCLL because there is no existing copper from end user to exchange (although there may be SLU).

173 On such an approach, areas in which FWA is deployed as part of RBI represent the widest footprint that could be considered.

Regulatory precedent for FWA deployment

174 If FWA is to be deployed in the MEA, then it should be done in a manner consistent with the approach in other regulatory jurisdictions. Typically, other national regulators engaged in analogous TSLRIC modelling tasks have only utilised FWA in an MEA where:

174.1 the regulator has clearly defined the parameters which FWA must fulfil – including, in particular, the areas at the fringes of the network which do not have existing fixed line connections and/or are unable to be efficiently connected using fixed line; and

174.2 the real-world evidence shows operator deployment, or imminent deployment, of the modelled technology as a copper substitute.

175 In modelling fixed line network costs in Australia and Sweden, wireless was included in the MEA and adopted at the fringes of the network at remote premises which were:

175.1 typically already served by wireless or another alternative (non-fixed line) technology; and

[99] Analysys Mason "Paper on framework and modelling approach" (6 August 2014) from [1.4]; Analysys Mason "Response to submissions on Commission consultation on regulatory framework and modelling approach for UCLL and UBA" (15 August 2014) at [1.2]. See also Chorus "Submission on Commission's framework and modelling approach" (6 August 2014) from [317]. FWA is also incapable of reliably supporting aspects of the full functionality of the UCLL and SLU services, including support for fax, alarms and EFTPOS terminals: this is reflected in Vodafone's terms and conditions for its Wireless Broadband Service: cl 25 provides that "*The Wireless Broadband and Calling service is not suitable for fax; EFTPOS; monitored alarms; medic alarms; or SKY modems. If you use one of these services you will need to retain a fixed land line*." See Vodafone "Wireless broadband terms and conditions" (undated), available at http://www.vodafone.co.nz/legal/terms-conditions/wireless-broadband/.

175.2 not connected by copper.

176 In contrast to these orthodox approaches by other regulators, the Commission proposes to adopt FWA as an MEA in New Zealand for premises in many areas in which useable copper connections exist and where operator behaviour shows that fixed wireless is unlikely to be deployed.

177 In Sweden, for example, the national regulator identified 50,000 households at which the incumbent planned to deinstall copper and installed fixed wireless. The modelled use of wireless as MEA in that context was:

177.1 consistent in outline with the operator's own stated plans for the future ultra-rural network; and

177.2 to replace copper in low density areas where only voice or low capacity leased lines are provided and where high speed services are unlikely to be offered in the foreseeable future.[100]

178 In the result, the Swedish national regulator assumed in its modelling that around 2% of households would be served by FWA.

179 The ACCC model built by Analysys Mason (since superseded by the use of the building block model (**BBM**) in Australia) deployed FWA wireless connections for approximately 1% of sites (as may be expected, in highly rural areas); it also used satellite connections for a small number of isolated sites (0.3% of sites).[101]

The real world use of FWA in New Zealand

180 In New Zealand, while FWA generally exists in the market today, its use is limited to the edges of Chorus' network, and by other operators to provide competitive retail services to a subset of existing fixed line customers (generally in remote areas).

181 Operator behaviour shows that in New Zealand:

181.1 in Chorus' network, fixed wireless technologies are generally used to provide voice and data services to premises in remote areas which cannot be served by UCLL/UBA. Fixed wireless is not predominantly available to end-users in areas where high speed copper/fibre services are available;

181.2 the FWA networks which do exist in New Zealand are not subject to TSO requirements to provide and maintain voice services to all existing customer locations in 2001, and related service quality obligations.

[100] Analysys Mason "Response to Commission" (12 February 2014) at [1.4.2]. See also Analysys Mason "Draft UCLL and UBA FPP draft determination cross-submission" (20 March 2015) at [5.2].

[101] Analysys Mason "Response to Commission" (12 February 2014) at [1.4.2].

182 Further, if FWA costs are as suggested by other submitters (i.e. $30.86 mark for rural, and $20.63 for urban),[102] and if FWA provided a true substitute for fixed line services (i.e. consistently matching VDSL2-level performance with an average connection speed of 35Mbps) using LTE or LTE-A technology, then we would expect to see New Zealand FWA providers competing more vigorously with fixed line operators in the provision of voice and data services. This real-world marketplace evidence lends practical weight to the principled conclusion that FWA is not a valid MEA for UCLL.

The TERA model

183 The TERA approach to FWA deployment, if corrected in the ways proposed in our primary submission, is generally fit for of estimating the costs of serving customers by FWA within RBI areas. It is not, however, appropriate for modelling FWA deployment outside RBI areas.

The Network Strategies' model

184 Spark and Vodafone rely on a new FWA model developed by Network Strategies and provided with their submissions. The Network Strategies model was provided well after the date specified by the Commission for model submission in this process, 1 December 2014. In the event that the Commission determines that this model should be admitted as part of the record, we discuss below why it cannot be relied upon.

185 Analysys Mason has reviewed the Network Strategies FWA model. They note that the model does not include sufficient detail regarding the modelling of the radio network to enable it to confirm whether the model is appropriate.[103] Given as well that the model produces surprising results,[104] this absence of documentation means that the model cannot be robustly relied upon to model widespread deployment of FWA, or for that matter deployment of FWA within RBI areas.

186 Analysys Mason have also identified a number of serious deficiencies with the model which, in our view, mean that its outputs cannot be relied on by the Commission. Specifically, Analysys Mason has identified the following key problems with the Network Strategies' FWA model:

186.1 the modelled sites will not serve 100% of premises;

186.2 capacity is insufficient;

186.3 capacity and coverage are not transparently linked as they should be;

[102] Network Strategies "Modelling fixed wireless access: UCLL and UBA final pricing principle" (23 February 2015) at pages (iii).

[103] Analysys Mason "Draft UCLL and UBA FPP draft determination cross-submission" (20 March 2015) at section 5.3.

[104] Analysys Mason "Draft UCLL and UBA FPP draft determination cross-submission" (20 March 2015) at [5.10].

186.4 spectrum costs must be the full opportunity costs;

186.5 assuming a 13% share of the mobile market is unrealistic;

186.6 it does not include backhaul for colocation upgrade sites;

186.7 use of microwave backhaul may need multiple hops; and

186.8 it does not include CPE/antenna costs.

187 We address below specific areas of concern in relation to dimensioning for throughput growth and coverage assumptions.

Throughput

188 The Network Strategies model makes no provision for throughput growth over the 5 year period. Vodafone conservatively estimates growth at 20%-50% which is less than one year's observed throughput growth for the average fixed broadband customer. Analysys Mason's investigations show that Network Strategies' model is incapable of assessing the cost impact of a higher required throughput without further assumptions.

189 Without additional spectrum, growth in throughput requires additional cell sites. We therefore expect that the impact of such a change to the modelled unit costs would be very significant, in particular because a large number of additional "capacity" base stations would have to be added.

Coverage assumptions

190 The FWA network as modelled by Network Strategies is extremely unlikely to cover 100% of sites. A fraction of the premises notionally served in the Network Strategies model will in fact remain unserved due to:

190.1 the probabilistic nature of radio propagation (radio planning is a probability calculation based on the lognormal distribution); and

190.2 localised clutter effects not included within the propagation model such as shelter belts.

191 Such coverage difficulties are commonplace with wireless networks and generally arise from localised geography or obstructions. Commercial wireless networks do not attempt to serve all premises, as they would be very costly to build if this were the objective. For example:

191.1 NBNCo warns that its "*Fixed wireless services are dependent on a clear line of sight from your home to the fixed wireless facility. If the signal is not*

strong enough we will not be able to continue with a fixed wireless installation."[105]

191.2 A New Zealand operator, Inspire, states in its terms that "*Please note that Inspire Wireless is not available in all areas, and trees and buildings may also block line of sight. While all new connection requests are based on being a standard installation, all applications are subject to a feasibility study at the time you apply to ensure suitability. There may be additional charges for more complex installations and we cannot be completely sure of availability until the feasibility study has been completed and the connection has been tested on site and to our standards*."[106]

191.3 Vodafone, in its terms and conditions, records that "*While we will do our best to provide quality Services, because of the nature of mobile telecommunications, it is impossible to provide a fault-free service … Coverage and Services can be adversely affected by radio interference, atmospheric conditions, geographic factors, network congestion, maintenance, outages on other networks and provider sites, the configuration or limitations of your, or your intended recipient's, Mobile Device or other operational or technical difficulties which means that you may not receive some or all of the Services in certain areas or at certain times."*[107]

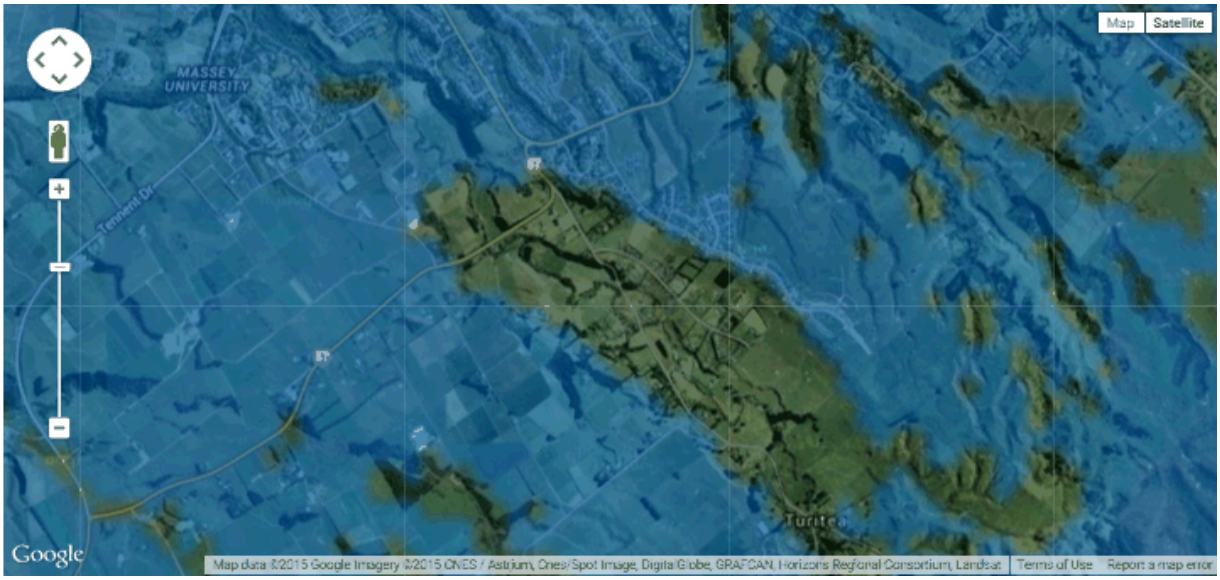
192 Potential coverage issues can also be seen in operators' maps of service availability. FWA coverage reflects local terrain and line of sight obstacles – for example, in areas near Palmerston North, Inspire's service is likely to be available to some households on a particular street but not others – presumably reflecting the hilly terrain between the site and each premise. Even with these detailed coverage maps, Inspire note, in their terms and conditions cited above, potential difficulties in providing service within their expected coverage areas arise from the effect of buildings and trees etc. For example, localised coverage variations near Palmerston North can be seen in Figure 8, with houses in the blue areas expected to have Inspire wireless coverage, and those houses outside those areas unable to enjoy wireless coverage.

[105] NBNCo "Fixed wireless" (undated), available at http://www.nbnco.com.au/connect-home-or-business/information-for-business/fixed-wireless.html.

[106] Inspire "Products" (undated), available at https://www.inspire.net.nz/products/wireless-res-signup.html at (3).

[107] Vodafone "On account customer: terms and conditions", available at https://www.vodafone.co.nz/legal/terms-conditions/mobile-on-account/.

Figure 8: Likely Inspire wireless coverage near Palmerston North



193 Unless a fix (such as a larger antenna, radio units to bounce a signal, or an additional antenna outside a shelter belt) can provide coverage, typically such premises remain unserved by wireless and must either be connected via fixed line or be served by satellite. For example, Inspire has a standard installation fee of $150, but makes clear to customers that additional radio units or trenching may be needed:[108]

> It is possible to have a complex installation too though, depending on many factors such as where you live, if there are any hills, trees or buildings in the way of the line of sight to the access tower. Where we would need more than one radio unit to 'bounce' the signal from one to the other to get sight of the access tower, there is an additional cost of $150 per radio unit. Sometimes laying cable is a better option to installing a number of radio units. If that's the case, Inspire Net will supply the cable for you so all you need to do is dig a trench and lay it. Don't worry, our installers have likely completed a site survey for you if you need this option, and they will talk you through what needs to be done and leave the cable with you. Once the cable has been trenched, we'll come back and hook up your internet. There is no additional charge for the cable and the installation charge would be the standard price of $150.

194 There is, however, no provision in the Network Strategies model to remedy coverage issues, and the costs of the remedial facilities (e.g. additional antennae and/or fixed line connections) needed to serve these premises have not been included.

195 The Commission has not provided for satellite service in its draft determination – so therefore the premises with unresolved coverage difficulties should be modelled as served by FTTH (which Network Strategies' model does not do).

Further comments in relation to other parties' submissions

196 Various technological overstatements and incorrect assumptions have been made in relation to FWA generally and in Network Strategies' FWA model:

196.1 overstated potential for use of digital microwave radio (**DMR**) for backhaul, and understated costs of doing so. In practice, DMR has limited use due to its capacity limit, and vulnerability to weather, and availability of licensed spectrum in many geographic areas. In more remote areas, multiple DMR hops are often required, with high costs for acquisition of and access to repeater sites;

196.2 use of Vodafone base unit price – Vodafone, being one of the largest mobile operator group in the world, enjoys discounts that the HEO would not be able to access.

Operating expenses

Chorus' accounts are correct starting point

197 We support the Commission's use of Chorus' operating costs as a starting point for assessing the HEO's operating expenses. Chorus' actual operating costs are the best

[108] Inspire "Products" (undated), available at https://www.inspire.net.nz/products/wireless-res-signup.html at (3).

available evidence of the operating costs of a nationwide fixed line network operator in New Zealand, regardless of the type of MEA being modelled.

198 Use of actual operator accounts is in line with an orthodox TSLRIC approach, a point on which there appears to be substantial agreement between all parties:

198.1 TERA assessed several methods of operating cost assessment, and concluded that opex costs based on the operators' actual costs and obtained directly from the operator's accounting records, with adjustment for network efficiency (if required), is an appropriate approach. Mark-up on capex is not precise and benchmarking is not country-specific and may lead to under- or over-estimated opex;[109]

198.2 as Analysys Mason advised in its August 2014 report, "*the modelled operating costs must be consistent with the assumed network layout (cabinetisation, aerial deployment) and with the conditions applying in New Zealand (weather, contractor costs, etc). The best way to ensure that the operating costs are achievable will be to compare to the actual costs incurred by existing wireline operators in New Zealand*";[110]

198.3 Vodafone and its expert advisor Network Strategies accept as a modelling criterion that the correct starting point for the calculation of operating costs is the operator's accounts, allowing for some efficiency adjustments and a bottom-up assessment of energy and property costs.[111]

199 Other submitters have not provided any evidence that using a mark-up on capex will deliver a better model of the HEO's operating expenses than using Chorus' data as the starting point with efficiency adjustments. Indeed, as Analysys Mason has identified, using a mark-up on capex to model opex may have cost allocation issues if crudely implemented.[112] For this reason, many jurisdictions, including Belgium, Italy, Spain and Denmark,[113] have moved beyond using a simple capex mark-up of the sort recommended by WIK.[114]

[109] TERA Consultants "TSLRIC price review determination for the unbundled copper local loop and unbundled bitstream access services: model reference paper" (November 2014) at [4.3.6].

[110] Analysys Mason "Response to submissions on Commission consultation on regulatory framework and modelling approach for UCLL and UBA" (15 August 2014) at [1.13].

[111] Network Strategies "Commerce Commission draft determination for UCLL and UBA: a review of key issues" (20 February 2015) at Exhibit 8.1.

[112] Analysys Mason "Draft UCLL and UBA FPP draft determination cross-submission" (20 March 2015) at [4.1].

[113] Analysys Mason "Draft UCLL and UBA FPP draft determination cross-submission" (20 March 2015) at [4.1].

[114] WIK Consult "Submission in response to the Commerce Commission's draft pricing review determination for Chorus' unbundled bitstream access service and draft pricing review determination for Chorus' unbundled copper local loop service including the cost model and its reference documents" (20 February 2015) at [137].

Efficiency adjustments

200 We endorse WIK's view that a fibre efficiency reduction of a factor of 50% is "extremely rough and questionable", and is not based on best available evidence. Such a broad brush reduction is not supported by evidence and is not analytically sound, particularly as it also captures costs which will not be affected by the transition to fibre.

201 Even though we disagree with WIK on the use of the LFI, we share the same concerns with the Commission using a single-sourced benchmark approach to calculate the LFI.[115]

Overheads on maintenance costs

202 Some parties have suggested that overhead payments in Chorus' service company and maintenance contracts do not represent Chorus' costs of dealing with contractors, and that these costs may be double-counted (or otherwise inefficient).[116]

203 This is incorrect. Chorus has elected to strike commercial arrangements with its service companies which separately identify variable costs and service company overhead charges:

203.1 **[CI:**

203.2

]

204 From Chorus' perspective, both variable and overhead payments to service companies are external direct costs of field related activities, but they are calculated and paid in different ways to the service companies. **[CI:**

]

[115] See also Analysys Mason "Draft UCLL and UBA FPP draft determination cross-submission" (20 March 2015) at [4.2]: "… *the adjustments are arbitrary and not supported by strong evidence*".

[116] WIK Consult "Submission in response to the Commerce Commission's draft pricing review determination for Chorus' unbundled Bitstream access service and draft pricing review determination for Chorus' unbundled copper local loop service including the cost model and its reference documents" (20 February 2015) at [146]-[148].

205 Where appropriate, payments to service companies have been appropriately allocated between maintenance and provisioning, so there is very unlikely to be double counting concerns with the Commission's approach to these operating costs.[117]

Transaction charges

206 Some submitters have registered concerns that the TERA model may double-count some operating expenses which are also recovered in transaction charges. The risk of such double-counting is low, because:

206.1 costs related to maintenance and provisioning transaction charges are separately identifiable in both the Chorus general ledger and the payment code regime with the service companies;

206.2 information on fault costs in Chorus' accounts and in its s 98 responses is coded by fault type which in the most significant areas was able to be directly identified to product.

LCI productivity gains

207 WIK suggests that while it is appropriate for the Commission to rely on the labour cost index (**LCI**) to inflate labour-related opex, it should also model productivity efficiencies during the 5 year regulatory period. WIK submits this is appropriately achieved by correcting the LCI index with an efficiency adjustment factor with reflects productivity gains over time, to reflect, *inter alia*, modernised workforce management systems and improvements in process related costs.

208 WIK submit efficiency and productivity improvements should not be lower than 5% per annum based on practice of Ofcom.[118]

209 The scope for efficiency gains for the HEO would likely be limited to process efficiencies such as further automation. Any productivity gains (which would be on top of the degree of efficiency already assumed in an HEO) would inevitably involve capital expenditure during the regulatory period.

210 It is also relevant that wages will increase (broadly in line with inflation) during the regulatory period, thus neutralising some productivity gains. Again, substantial investment in automation and process improvement will be required to achieve efficiency gains over and above inflation – suggesting that no adjustment to LCI is appropriate or required. Indeed, as Analysys Mason has identified,[119] the adoption of a 5% real price trend would be aggressive. Many other regulators' models, including

[117] Analysys Mason "Draft UCLL and UBA FPP draft determination cross-submission" (20 March 2015) at [4.3].

[118] WIK Consult "Submission in response to the Commerce Commission's draft pricing review determination for Chorus' unbundled Bitstream access service and draft pricing review determination for Chorus' unbundled copper local loop service including the cost model and its reference documents" (20 February 2015) at [151].

[119] Analysys Mason "Draft UCLL and UBA FPP draft determination cross-submission" (20 March 2015) at [4.4].

those utilised in Norway, the Netherlands, Mexico and Portugal assume 0% real price trends for opex.[120]

Other differences in approach

211 As foreshadowed in our submission,[121] we have continued to investigate the detailed methodology and interpretation in the Commission's assessment of the HEO's likely operating costs, and to test that assessment against Analysys Mason's modelling of Chorus' opex. Other submitters have identified TERA's treatment of accommodation ("square metre"), power and cooling costs as not appropriate.[122] We therefore asked our expert advisers, Analysys Mason, to consider these topics further. Analysys Mason has identified some specific inaccuracies and potential concerns with the Commission's analysis of power and accommodation costs, which are detailed in its report.[123]

[120] Analysys Mason "Draft UCLL and UBA FPP draft determination cross-submission" (20 March 2015) at [4.4].

[121] Chorus "Submission in response to draft pricing review determinations for Chorus' unbundled copper local loop and unbundled bitstream access services" (20 February 2015) at [169].

[122] WIK Consult "Submission in response to the Commerce Commission's draft pricing review determination for Chorus' unbundled Bitstream access service and draft pricing review determination for Chorus' unbundled copper local loop service including the cost model and its reference documents" (20 February 2015) at [5.8.13].

[123] Analysys Mason "Draft UCLL and UBA FPP draft determination cross-submission" (20 March 2015) at Annex A.

PART TWO: UBA SERVICE

The service to be modelled

212 Chorus agrees with the Commission that the service description in the Act presupposes that the MEA for UBA will be DSL technology deployed using Chorus' existing copper network.[124] Using the copper network, the Commission is required to model the additional costs incurred to offer UBA over and above the UCLL copper inputs.

213 A copper based MEA for UBA:

213.1 is consistent with the rational actions of an HEO, which would purchase existing Layer 1 services;[125]

213.2 sends the correct build/buy incentives for each service. The use of a copper network MEA is necessary to create meaningful build/buy signals; otherwise, the calculation cannot reflect the reality that the unbundler faces;[126]

213.3 best gives effect to the s 18 relativity consideration, which requires the Commission to consider the ladder of investment and incentives to unbundle;[127] and

213.4 meets the core functionality requirements of the UBA service, including the capability to interconnect with Chorus' copper local loop.[128]

214 For these reasons, Chorus disagrees with Vodafone's submission that the Commission is required, as a matter of law, to model the same MEA for UBA as it does for UCLL.[129]

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[124] Chorus "Submission in response to the Commerce Commission's consultation paper outlining its proposed view on the regulatory framework and modelling approach for UBA and UCLL services (9 July 2014)" (6 August 2014) at [263]. See also James Every-Palmer "Further consultation on issues relating to determining a price for Chorus's UCLL and UBA services under the final pricing principle – supplementary paper" (14 March 2014) at page 9.

[125] Chorus "Submission in response to the Commerce Commission's further consultation on issues relating to determining a price for Chorus' UCLL and UBA services under the final principle – consultation paper and supplementary paper" (11 April 2014) at [117].

[126] Chorus "Cross-submission in response to the Commerce Commission's consultation paper outlining its proposed view on the regulatory framework and modelling approach for UBA and UCLL services" (20 August 2014) at [90].

[127] Chorus "Submission in response to the Commerce Commission's further consultation on issues relating to determining a price for Chorus' UCLL and UBA services under the final principle – consultation paper and supplementary paper" (11 April 2014) at [124].

[128] Chorus "Submission in response to the Commerce Commission's further consultation on issues relating to determining a price for Chorus' UCLL and UBA services under the final principle – consultation paper and supplementary paper" (11 April 2014) at [66.3]; James Every-Palmer "Further consultation on issues relating to determining a price for Chorus's UCLL and UBA services under the final pricing principle" (14 March 2014).

[129] Vodafone "Submission on process paper and draft pricing review determinations for Chorus' unbundled copper local loop and unbundled bitstream access service and comments on Analysys-Mason's TSLRIC

The Commission's conclusion is consistent with the advice received by Chorus, and provided to the Commission, on this point from Chapman Tripp.[130]

215 The Commission is tasked with setting the TSLRIC costs of each service independently, which requires it to undertake standalone assessments of the MEA.[131] The UBA and UCLL processes are separate and should not affect one another.[132] That is also the view of the Commission's legal advisor,[133] who correctly observes that the Act envisages that some of the designated access services may be subject to FPP prices and others to IPP prices. This suggests that the MEA should not be affected by the time at which the application was made or what other FPP applications were live at that same time.

216 The advice received by Vodafone in support of its submission:

216.1 appears to misunderstand basic elements of the FPP process under the Act. For example, the advice appears to assume that where the price for the UCLL service is set in accordance with the IPP there will be a "model" which can be used to inform the UBA FPP component.[134] This is not the case. However, as noted by the Commission's advice, the UBA FPP must be interpreted in a way that means it is capable of determination irrespective of whether the UCLL price is determined in accordance with the FPP or IPP for that service. The Vodafone interpretation would make the UBA FPP meaningless in circumstances where the UCLL price is determined in accordance with the IPP;

216.2 conflates, without reasons, the price element of the UBA price with what the costs of the UBA service are "additional" to. There is no dispute, given the Commission's approach to aggregation, what the UCLL price element of the UBA price is. However, the advice does not explain why it follows that the "additional costs" of the service are costs additional to the model used to set the price for the UCLL, as opposed to the UCLL itself;

models" (20 February 2015) at [C1] – [C6]; Paul Radich QC "The use by the Commission of different MEAs when calculating TSLRICs for UCLL and UBA" (11 February 2015).

130 Chapman Tripp "Unbundled copper local loop (UCLL) and unbundled bitstream (UBA) access services – pricing review determination (PRDs) – legal framework".

131 Chorus "Submission in response to the Commerce Commission's further consultation on issues relating to determining a price for Chorus' UCLL and UBA services under the final principle – consultation paper and supplementary paper" (11 April 2014) at [134].

132 Chorus "Cross-submission in response to the Commerce Commission's consultation paper outlining its proposed view on the regulatory framework and modelling approach for UBA and UCLL services" (20 August 2014) at [91]; Chorus "Submission in response to the Commerce Commission's further consultation on issues relating to determining a price for Chorus' UCLL and UBA services under the final principle – consultation paper and supplementary paper" (11 April 2014) at [137].

133 James Every-Palmer "Further consultation on issues relating to determining a price for Chorus's UCLL and UBA services under the final pricing principle" (14 March 2014) at [38].

134 Paul Radich QC "The use by the Commission of different MEAs when calculating TSLRICs for UCLL and UBA" (11 February 2015) at [8] – [9].

216.3 ignores the definition of the term "local loop network" in clause 1 of Schedule 1 by reference to Chorus' actual copper network; and

216.4 to the extent it relies on purely pragmatic reasons for aligning the UBA and UCLL models (e.g., avoiding double recovery of costs),[135] does not identify any matters that have not previously been identified by the Commission's legal advisors and addressed in the Commission's draft determination.

217 The FPP for the UBA service has a simple structure which divides the elements required to supply Chorus' Unbundled Bitstream Access Service into two physical elements:

217.1 the Chorus copper local loop network; and

217.2 the additional equipment required to provide the UBA service over the Chorus copper local loop network (e.g., active electronics, larger cabinets, backhaul from the cabinet to the exchange etc.).

218 The UBA price component for the first physical element of how the service is actually delivered is by the regulated price for that network element – under the Commission's aggregation approach, the TSLRIC of the UCLL service. The FPP price for the second physical element of how the service is actually delivered is set by TSLRIC of those additional costs. The statutory enquiry is therefore "*what are the efficient costs of providing a UBA service over the first physical element (i.e., Chorus' actual copper network)*?"

219 This interpretation is consistent with the purpose of TSLRIC as promoting efficient build/buy choices, as noted above. That choice would be distorted for unbundlers if the UBA price was not set by reference to the efficient additional costs of a service derived over Chorus' network, but rather by the costs of deriving a service over a completely different hypothetical network.

Optimisation

Throughput

220 It appears to be common ground that the Commission's UBA model should be capable of allowing for traffic growth during the regulatory period.[136] UBA traffic per user will grow strongly during the regulatory period.[137]

[135] Paul Radich QC "The use by the Commission of different MEAs when calculating TSLRICs for UCLL and UBA" (11 February 2015) at [11].

[136] See also WIK Consult "Submission in response to the Commerce Commission's draft pricing review determination for Chorus' unbundled Bitstream access service and draft pricing review determination for Chorus' unbundled copper local loop service including the cost model and its reference documents" (20 February 2015) at [95] and [97].

[137] Analysys Mason "Draft UCLL and UBA FPP draft determination cross-submission" (20 March 2015) at [3.3].

221 We have suggested how this can be done, in relatively straightforward ways, in our submission. This approach is supported by Analysys Mason, which has produced a UBA model that takes a fully bottom up approach for electronics and a backhaul approach consistent with an HEO acquiring UCLL and SLU.[138]

Dimensioning

222 The Commission's model must be dimensioned so that it is capable of providing the regulated service. The modelled network cannot be optimised in such a way that the modelled network is not capable of providing the regulated service.

223 WIK is critical of aspects of the Commission's model in relation to dimensioning of DSLAMs, cabinets, and cabinet to FDS, and optimisation of FDS. We address each of these in turn

Active equipment

224 The Commission's model has dimensioned chassis sizes, FDSs and other active equipment based on the full range of equipment available to Chorus from its supplier, Alcatel Lucent. To select equipment with other dimensions, as WIK contends, an HEO would have to purchase active electronics from multiple suppliers. This would add significant complexity to operating the network (for example, by preventing a single end-to-end network management solution). For these reason, Chorus' experience is that telecommunications companies of Chorus' size rarely use multiple equipment suppliers and it was reasonable for TERA to assume that the HEO would not.

225 WIK is critical that the Commission's model does not incorporate the smallest DSLAM available from Chorus' pricing list in cabinets where current end-user demand does not exceed 192 UBA customers. However, such DSLAMS have a higher cost per port than larger DSLAMS **[CI:]** and the chassis cost is not significantly lower (to provision 192 UBA customers, a chassis cost for the **[CI:]** compared with **[CI:]**). Given the high cost of retrofitting DSLAMs, an efficient but prudent HEO would be prepared to pay the slightly higher marginal cost of the larger DSLAMs to allow for growth and uncertainty in demand.

Backhaul from DSLAM to FDS

226 TERA has modelled additional fibre between the cabinet and FDS to allow for unbundling, future growth and spares, whereas WIK contends only a single fibre is required per DSLAM. This does not reflect efficient practice and is inconsistent with WIK's view that backhaul should be provided by DWDM rings (which we discuss below).

227 Any efficient but prudent operator would provide additional fibres for service restoration, network upgrades and future growth – which may not occur within the

[138] Analysys Mason "Draft UCLL and UBA FPP draft determination cross-submission" (20 March 2015) at [3.5].

regulatory period but which would be nonetheless prudent to provide for (e.g. second and subsequent DSLAM backhaul links to support exponential bandwidth growth).

228 With regard to DWDM rings, TERA has reasonably concluded that it is not necessary to model DWDM rings for backhaul transportation between the cabinets and FDS. Chorus does not use DWDM technology for greenfield network deployment on its fibre access network. In Chorus' experience in New Zealand, DWDM rings are almost inevitably more expensive given the high costs of the equipment compared with the marginal cost of adding additional fibre to a trench being dug. The nature of New Zealand's topography is also a challenge for ring deployment. (New Zealand often has end-user demand situated along gullys and valleys which would need to be crossed in order to deploy rings.)

229 Chorus notes that, if WIK's submission is that DWDM rings are required to provide redundancy to DSLAMs serving, at most, approximately 400 customers, material parts of the access network would require substantial redesign to provide a consistent level of redundancy. As noted in our submission, over 5,000 end-users are subject to a single element failure on the Commission's current model. While we think that greater redundancy is required, we are not suggesting that the Commission must model a network in which failure of any one element cannot affect more than 400 customers.

230 If DWDM rings were to be implemented, they would not require one fibre per DSLAM but two fibres connecting to adjacent DSLAMs on the ring – a total of four fibres per DSLAM. Installation of DWDM equipment in cabinets would also increase power, air conditioning and space requirements in each cabinet.

FDS

231 The Commission cannot optimise the location of the FDS.[139] The UBA STD service describes a service that allows RSPs to connect at the FDS. Backhaul to the FDS is part of the additional costs of the UBA STD service. If the FDS is in a different location in the model, the Commission would be modelling a service which delivers something different to the UBA STD service.

232 Therefore, all FDSs which Chorus is required to provide must be included. If the FDSs which Chorus provides are excluded, the required costs to transport the bitstream between the end-user and an RSPs equipment will fall into a gap between the UBA service and the UBA backhaul service.

Network build costs

Equipment costs

233 As noted in Part Two of this submission, WIK's concerns about equipment costs result from misunderstandings as to the data provided by Chorus and used by the Commission. Chorus has provided data on its negotiated equipment costs as purchased in 2013 and 2014, which reflects the discounts that it is able to achieve as

[139] Analysys Mason "Draft UCLL and UBA FPP draft determination cross-submission" (20 March 2015) at [2.4.1].

an operator of scale in New Zealand and through competitive tendering processes. This purchasing data is contained in the Analysys Mason hybrid model.

Cost allocation between services

234 We support the Commission's approach to cost allocation for network costs based on capacity rather than the Shapley-Shubik approach. However, in the case of the areas in which the Commission has identified that data is not available to allocate cost based on capacity, we consider that allocation based on revenue (a modified EPMU approach) is to be preferred to the Commission's reliance on TERA's expertise and will give a better and more realistic allocation of cost based on known cost drivers.

235 Using allocation proportional to revenue is consistent with what is known about traffic drivers and cost drivers of network dimensioning. In particular, the proportion of cost between the DSLAM and the exchange, and from the first exchange to the FDS should be weighted much more heavily toward UBA than in either the Commission's model or proposed by WIK.

236 Network traffic is dynamic, with peaks and troughs over the course of the day. One of the main objectives of network design is to dimension the network to accommodate peak hour traffic. An HEO building the network today would design the network on this basis. Otherwise, congestion slows download and upload speeds experienced and leads to customer dissatisfaction. Dimensioning for peak traffic drives the cost of the core network.

237 In the case of the copper network, the primary contributor to peak hour traffic is the UBA service. The majority of the traffic at that time is driven by residential customers, particularly since the rise of streaming and downloading HD video.

238 While Chorus does not record national traffic data broken down by service, it has for the purpose of this submission undertaken an investigation of the Palmerston North exchange FDS, which is actually a cluster of six physical sub-racks. Palmerston North is a large urban exchange with a substantial rural hinterland which we believe is likely to be representative of traffic trends in the country. A diagram illustrating the consolidated traffic across all the links onto the switches located at the Palmerston North exchange buildings are shown in Figure 9, below.

239 We have analysed traffic at the Palmerston North exchange by service in an illustrative period of between 22 February 2014 and 25 February 2015. The results are show in Figure 10, below. The graph differentiates UBA traffic from other traffic, including mobile backhaul and HSNS access.

240 The vast majority of the traffic is best efforts UBA traffic. At the 9.00 pm busy hour, over **[RI:]** of the traffic is best efforts UBA traffic.

241 Other sense checks support the view that a higher allocation of costs to UBA is appropriate. Of all working lines on DSLAMs connected to Chorus' network, **[RI:]** are ADSL/VDSL (UBA) and only **[RI:]** are SHDSL or Ethernet (i.e.

other services). In terms of sites (both cabinets and exchanges), only **[RI:]** of sites have SHDSL and only **[RI:]** have Ethernet (and, of these, some sites have both). This means that more than **[RI:]** of sites do not have any service other than ADSL/VDSL, so the whole cost of feeder or inter-exchange costs for those sites is attributable to UBA.

242 Equally, it follows that sharing of capacity is only applicable to a maximum of **[RI:]**. Accordingly, even if WIK or TERA's assessment of cost allocation is applied to those sites (and, for reasons given above, it should not be), the UBA service should be allocated a substantially higher percentage of cost on a national basis.

Figure 9: Diagram of access link connections to switches located in the Palmerston North Exchange

[RI:

]

Figure 10: Traffic at Palmerston North FDS

[RI:

]

EUBA variants

243 Finally, WIK is critical of the Commission's proposal to use benchmarking to differentiate prices of EUBA variants.[140] This is a rare occasion on which we favour benchmarking and WIK opposes it: our reason here is that there is no New Zealand specific cost-based evidence that can be used to differentiate the services.

244 The Commission's proposed approach is consistent with the approach taken to similar issues in Denmark and Sweden.[141] While WIK correctly observes a theoretical risk of over-recovery in the event that changes in service mix occur in the regulatory period, any material change from expected demand can be addressed (if necessary) by a s 30R review.

Aggregation

245 We observe that no party appears to take serious issue with the Commission's proposed approach to aggregation. However, at least one submission identifies that it may wish to do so in future.

246 Chorus has engaged with the Commission's draft determinations and the cross-submissions on the basis that the Commission's proposed aggregation approach is adopted. In the event that the Commission departs from this approach, it will be necessary to consider a number of issues which are not presently material (such as the approach to the price for the UCLFS, and recovery of the cost of the fibre feeder).

[140] WIK Consult "Submission in response to the Commerce Commission's draft pricing review determination for Chorus' unbundled Bitstream access service and draft pricing review determination for Chorus' unbundled copper local loop service including the cost model and its reference documents" (20 February 2015) from [86].

[141] Analysys Mason "Draft UCLL and UBA FPP draft determination cross-submission" (20 March 2015) at [3.12].

PART THREE: COMMON ISSUES ON UCLL AND UBA DRAFT DETERMINATION

Orthodox TSLRIC

247 All parties appear to agree that the Commission should adopt an orthodox approach to TSLRIC, within the statutory framework prescribed by the Act.

248 Conforming to orthodox understandings of forward-looking TSLRIC enhances regulatory predictability. This is a legitimate objective for the Commission to pursue and it aligns with its s 18 objectives. To the extent submitters disagree with the Commission's "*regulatory predictability*" justification for orthodox TSLRIC, they misunderstand the Commission's analytical framework.

249 The Commission has rightly recognised that, in forming a view as to what will best meet the s 18 purpose, it must exercise its expert judgement.[142] The Commission is entitled to elaborate on what it believes will meet that purpose in any particular context. Indeed it should, to enable parties to make effective submissions.

250 As part of that elaboration, the Commission will inevitably use language and concepts that are not directly taken from s 18. There can be no objection to doing so. The Commission is not substituting different purposes for the express statutory purpose, but rather elaborating how, in its expert judgement, the s 18 purpose statement (including s 18(2A)) is best given effect to in the context of a particular process.

251 We understand "*regulatory predictability*" to fall within this category. It is therefore wrong to criticise the Commission for substituting an alternative concept for the s 18 purpose statement. The Commission is entitled, as an important element of achieving the s 18 purpose statement, to consider whether its approach results in a predictable application of the regulatory framework, including TSLRIC.

252 Promoting a predictable outcome is an obvious approach to promoting competition for the long-term benefit of end users and efficient investment incentives:

252.1 effective competition requires a stable regulatory platform against which entry and innovation can be assessed; and

252.2 investment requires predictable regulation to avoid regulatory risk dampening investment incentives which would not be to the long term benefit of end users.[143]

253 In Chorus' view, the Commission's analysis is entirely unsurprising. To the contrary, it would be surprising if the Commission concluded that unpredictable regulatory outcomes were beneficial to either investment or promoting effective competition.

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[142] *Chorus v Commerce Commission* [2014] NZCA 440 at [152].

[143] IT Investors Panel Discussion. A similar sentiment lead to the amendments to Part 4 of the Commerce Act 1986 to introduce "input methodologies" determinations: see Commerce Amendment Bill 2008 No 1608, Explanatory Note.

254 There is also nothing new in the Commission's emphasis on predictability. Contrary to the suggestion that the recognition of the value of predictability represents a material shift in the Commission's approach to s 18,[144] it is consistent with statements made by the Commission throughout the FPP process and its earlier application of the IPP to the UCLL service.[145]

255 Further, we do not read anything in the Commission's draft determinations that indicates that the Commission has considered "*regulatory predictability*" as the exclusive or predominant consideration to be taken into account under s 18,[146] let alone a separate test. The Commission's decision is instead replete with account being taken of other matters as relevant to the s 18 assessment, including promoting dynamic efficiency, asymmetric risks of error, and migration to fibre.[147]

256 We also do not consider that it can be reasonably said that no predictable application of TSLRIC is possible because the Commission has not undertaken a TSLRIC analysis previously. For a start, the premise of this argument is wrong. The Commission has previously considered the application of TSLRIC over multiple rounds of consultation, including a draft determination, for designated interconnection services.[148]

257 Even ignoring this prior application of TSLRIC in New Zealand, the Commission undertakes its TSLRIC analysis in the context of extensive international regulatory decisions involving TSLRIC, including multiple international TSLRIC and ORC exercises. Conforming to orthodox understandings of forward-looking TSLRIC is a legitimate policy choice for contributing to predicable regulatory outcomes and is a rational means of implementing s 18.

WACC

Percentiles

258 We agree with other submitters that the Commission should have regard to the variability of the WACC estimate over the regulatory period. CEG have carried out an analysis to establish a percentile range around the mid-point estimate.

[144] Spark "UBA and UCLL FPP pricing review draft decision" (20 February 2015) at [157].

[145] See, for example, "Final determination on the benchmarking review for the unbundled copper local loop service" [2012] NZCC 37 at [139].

[146] Spark "UBA and UCLL FPP pricing review draft decision" (20 February 2015) from [140]; Vodafone "Submission on process paper and draft pricing review determinations for Chorus' unbundled copper local loop and unbundled bitstream access service and comments on Analysys-Mason's TSLRIC models" (20 February 2015) at [B2].

[148] See, for example, Commerce Commission "Draft determination on the application for pricing review for designated interconnection services by Telstraclear Limited and Telecom New Zealand Limited" (11 April 2005); Telecom "Report to the Commission on modelling of the TSLRIC toll-bypass interconnect cost" (31 August 2004); Commerce Commission "Detailed CostQuest comments in regard to Telecom New Zealand's report to the Commission on modelling of the TSLRIC toll-bypass interconnect cost" (31 August 2004).

259 We also consider that the asymmetric costs associated with uncertainty in estimating the WACC parameters could be accounted for in an uplift to the WACC from a mid-point.

Beta

260 Contrary to the submissions from Vodafone and Spark, in estimating the asset beta it is appropriate to place less, rather than more, emphasis on the period of 2009-2014. As set out in detail in our submission, the effect of the global financial crises and the sovereign debt crisis during this period (Vodafone appears to be under the misapprehension that these crises affected only the earlier period ending 2009) means that a longer timeframe for comparison is required.[149] This approach is consistent with that taken in the electricity and gas input methodology process. Further, as CEG note, Network Strategies' submission that pre-2009 asset betas were artificially raised by the global financial crisis is incorrect; rather, the global financial crisis caused a fall in asset betas (which has since been reversed).[150]

261 We do agree with other submitters on the more general proposition that weight should be given to the *most* recent data. The Commission should update the comparator set to the latest available monthly data, and it should give more weight to the most recent two-year average values to consider what is likely to occur over the regulatory period. A cross-check of recent regulatory decisions relating to the relevant WACC calculations for fixed access seekers should also be carried out.[151]

262 We do not accept Vodafone's argument for exclusion of Deutsche Telekom from the comparator sample. Instead we have proposed in our submission two methods for testing the reasonableness of Oxera's refined comparator sample,[152] in particular the calculation of the difference between book debt to capital and market debt to capital ratios of the companies selected in Oxera's refined comparator sample.

263 Nor do we agree with Network Strategies that it is appropriate to take the median average, rather than the mean, from the sample set. CEG illustrate that it is the mean of the sample provides the best estimate of the mean of the population.[153]

264 Finally, Spark's view that regulated firms are insulated from windfall gains and losses in such a way that this should be taken into account in the level of the asset beta might be appropriate for other forms of regulation, such as that applied under Part 4, but it does not apply to TSLRIC regulation. As CEG observes,[154] TSLRIC regulation

[149] CEG "WACC parameters in the UCLL and UBA draft decision" (20 February 2015); CEG "Response to Commerce Commission UCLL/UBA WACC consultation paper" (March 2014) at [88] – [91].

[150] CEG "Issues from submissions" (March 2015) at [90].

[151] Chorus "Submission in response to draft pricing review determinations for Chorus' unbundled copper local loop and unbundled bitstream access services" (20 February 2015) at Appendix H.

[152] Chorus "Submission in response to draft pricing review determinations for Chorus' unbundled copper local loop and unbundled bitstream access services" (20 February 2015) at [588] - [595].

[153] CEG "Issues from submissions" (March 2015) at [93] – [96].

[154] CEG "Issues from submissions" (March 2015) at [100].

exposes Chorus to materially more risk that its prices/revenues will not match its costs.

Cost of Debt

265 A number of submitters argue that the Commission should select a debt premium term for the regulated UCLL and UBA services equivalent to the regulatory period, rather than two years longer. The argument appears to be that the HEO would align debt as closely as possible with the regulatory term, and to use a longer term could lead to windfall gains.

266 However, as CEG states, it is impossible (or, at the least, highly inefficient) for a business to do this.[155] CEG explains that there is no reason for the business to align its debt maturity to the length of the regulatory period and that the appropriate maturity to assume is the maturity of debt that businesses can be observed actually managing.

267 It is an additional error to use a short term estimate of the risk free rate with a long term estimate of the market risk premium, since this can result in an abnormally low estimate of the risk free rate to be paired with an average estimate of the MRP and therefore underestimate the WACC. This risk is particularly severe at present, since the market is in a period of high risk aversion (caused by fears about Greece potentially exiting the Euro), which is driving down the yield on safe assets globally.[156] This concern suggests that the risk free rate should be estimated based on long term averages, not taken at a single point in time. The current state of the financial markets may also be relevant to the consideration of the date at which to calculate WACC.

Date at which to calculate WACC

268 If the Commission does decide to set the WACC (and in particular the risk free rate) at a single point in time, it should determine that point to be immediately before the first date at which the new regulated price is to apply. If the FPP price is to be backdated, then the relevant time is the date to which the price will be backdated (e.g., if Commission's preliminary views on backdating are adopted, 1 December 2014).

269 As CEG observe, it is well accepted regulatory practice that the cost of equity should be set at the beginning of the regulatory period over which the price is set.[157] For these purposes, the pricing period should be understood to be the period over which prices are regulated. That is, the period to which backdating applies should be considered to be within the pricing period for the purposes of calculating the WACC. To set the risk free rate based on rates applying immediately before the final determination would be a departure from regulatory precedent – and would also be to

[155] CEG "Issues from submissions" (March 2015) at [105] – [106].

[156] CEG "Issues from submissions" (March 2015) at [72].

[157] CEG "Issues from submissions" (March 2015) at [75].

adopt an abnormally low estimate of the risk free rate, as explained in the CEG paper. [158]

Recognising asymmetries in estimating WACC and TSLRIC

Investment Incentives for the long term benefit of end users

270 A number of submitters argue that an uplift to the price (including the WACC component of the price) is not required as it is not to the long term benefit of end users and there is no quantitative analysis to support an uplift.[159] These submitters argue that the modelling assumptions adopted by the Commission to reach a TSLRIC price are "overly generous" and therefore no uplift is required. Indeed WIK suggest a 20% reduction should be made based on the remaining accounting lives.

271 We have already set out our position on why an uplift to the estimate of the UCLL and UBA price set out in the draft FPP is appropriate in our submission. However, we respond to the particular points raised by submitters below. We have also received expert advice from CEG on this topic, which we provide with this cross-submission. HoustonKemp's analysis of Spark's Attachment D to its submission is also instructive in considering the long term impact of pricing on end-users.

Greater investment in new and improved products

272 Any underestimation of the TSLRIC price (including the WACC component of the price) will create investment disincentives which will harm the long term interests of end users. There is considerable academic research as to the very large consumer welfare gains to consumers and business end-users from new and improved technology.[160]

273 A lack of investment in access services through underestimation of the TSLRIC price risks delays to the introduction of new products. This includes products resulting from better quality broadband products (both in terms of speed and coverage). It also includes new fibre products with the advent of UFB.

274 Our experts have advised that the price of the UCLL/UBA has the potential to anchor the price (and therefore the investment incentive) in new services, including those to be developed with the deployment of UFB.[161] HoustonKemp have also identified

[158] CEG "Issues from submissions" (March 2015) at [79].

[159] See for example Vodafone "Submission on process paper and draft pricing review determinations for Chorus' unbundled copper local loop and unbundled bitstream access services and comments on Analysys-Mason's TSLRIC Models" (20 February 2015) at [K1.7]; Spark "UBA and UCLL FPP pricing review draft decision" (20 February 2015) at [346];

[160] Refer to Professor Hausman "Response to the Commerce Commission's draft determination on uplift" (20 February 2015) at [7] to [11], [16], [44] and [47].

[161] Professor Hausman "Response to the Commerce Commission's draft determination on uplift" (20 February 2015) at [21]; CEG "Uplift asymmetries in the TSLRIC Price" (20 February 2015) at [35].

substantial academic literature finding material benefits to transition to fibre based broadband products.[162]

275 CEG have carried out quantitative analysis to reflect the effects of uncertainty in the estimate of WACC and TSLRIC on incentives to invest, using the Frontier-Dobbs model. They calculate that an uplift at least equivalent to the 75th percentile above the mid-point WACC is optimal in order to incentivise investment in existing and new services. Such services are likely to yield significant welfare benefits to end users (an estimated $5 billion).

276 CEG also advises that lower UCLL/UBA prices would impede migration to fibre services. This would result in a negative effect on the development of new applications. CEG advises that while the welfare benefits of new fibre services is difficult to determine given new applications remain in the future, nevertheless reports indicate substantial consumer surplus from application in healthcare, education, business and farming sectors. A recent study predicts $32.8 billion in consumer welfare gains over 20 years in high-speed broadband. CEG estimate the delay in accruing these benefits would be in the order of $757 million and $1.4 billion.

277 Similarly, HoustonKemp notes that while estimating welfare gains of UFB is currently limited by the fact most countries are yet to implement large-scale UFB, there is significant qualitative literature to explain the productivity benefits of the functionality improvements UFB will deliver (namely faster file transfers, video streaming applications, high quality real-time communication and multiple, simultaneous use applications). This will lead to identified benefits in the development of education and health information, improved business collaboration and improved storage and remote access options. There are also likely to be numerous unforeseen benefits as technology and uptake improve.[163]

278 The Commission has correctly recognised that too low a copper price can affect migration to UFB. In the same way, a price that is below that which would allow a normal return (that is, it will not allow for NPV neutrality) for fixed services can impact on other platforms, such as mobile. The impact may be from a delay in the introduction of new products or the total failure for those products to materialise. Investment in innovative competing platforms can lead to gains in consumer welfare from greater product differentiation, offsetting any losses from duplication of fixed costs.[164]

279 CEG have previously advised that the cost of setting prices "too low" may also reduce the incentives for new firms to enter the market, resulting in diminished

[162] HoustonKemp Economists "Response to Spark New Zealand's attachment D: illustrative estimate of social cost of high price" (12 March 2015) at [2.3].

[163] HoustonKemp Economists "Response to Spark New Zealand's attachment D: illustrative estimate of social cost of high price" (12 March 2015) at [2.3].

[164] Refer to Professor Hausman "Response to the Commerce Commission's draft determination on uplift" (20 February 2015) at [8]-[9].

competition.[165] For this reason, regulators may provide some "headroom" when setting regulated prices.[166] Spark appears to acknowledge this. It recognises it may be necessary to invest ahead of the demand curve in innovative services in order to provide competitive outcomes for the benefit of end users.[167] This is particularly important when investment in new telecommunication services involves significant capital investment in products which offer capability not available from established services.

280 Such investment considerations must be taken into account by the Commission in the current context. This is particularly important in telecommunications regulation, where technological change can have a significant impact and can occur (subject to the speed infrastructure investment) rapidly. Investment in sunk and irreversible investments is particularly sensitive.[168]

Welfare loss from higher prices

281 The consequences of regulated prices being set too low are asymmetrically negative for consumer welfare. Consumer gains from new and improved quality services are typically higher than potential losses from too high prices.[169]

282 HoustonKemp have reported on Spark's own analysis of welfare losses arising from higher prices. They have concluded that each step of Spark's analysis is fundamentally flawed in the direction of overstatement. In short, HoustonKemp conclude that no reliable conclusions that welfare losses exist from lower penetration rates of broadband as a result of higher wholesale prices can be taken from Spark's analysis, given the absence of credible assumptions on pass-through and price-elasticity of demand.[170]

Welfare benefit from fewer outages

283 We have already submitted that outages in the telecommunication services can have significant impacts on consumers and the wider economy. In particular, Internet outages can be costly to consumers and economic activity.[171]

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[165] In other words, the build/buy balance to be set through the TSLRIC prices is not achieved.

[166] CEG "Uplift asymmetries in the TSLRIC Price" (20 February 2015) at [42].

[167] Spark New Zealand Limited "Submission on Draft Determination for UBA and UCLL Services" (20 February 2015) at [129].

[168] Professor Hausman "Response to the Commerce Commission's draft determination on uplift" (20 February 2015) at [24]-[26].

[169] Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" (2 December 2014) at [415] and Professor Hausman "Response to the Commerce Commission's draft determination on uplift" (20 February 2015) at [51].

[170] HoustonKemp "Response to Spark New Zealand's attachment D: illustrative estimate of social cost of high price" (12 March 2015) at [3.2], [3.3].

[171] We referred to the example in Australia of the Warrnambool exchange which was considered to have cost the local economy for the entire region at AU$28.3 million. Chorus "Submission in response to draft pricing review determinations for Chorus' unbundled copper local loop and unbundled bitstream access services" (20 February 2015) at [662]. CEG "Uplift asymmetries in the TSLRIC Price" (20 February 2015) at [39];

Valuation methodology

284 Some submissions consider the modelling assumptions adopted by the Commission are generous, in particular the Commission's use of an ORC valuation approach to all assets.[172] A number of submissions disagree altogether with the Commission's adoption of ORC for all assets. The argument appears to be that by deciding not to model the re-use of some assets (in other words by adopting a "greenfields" or ORC valuation approach), there is generosity in the model, potentially leading to windfall gains to Chorus. As a result, there should be no uplift to either the WACC percentile or the TSLRIC price.

ORC methodology

285 We consider the use of an ORC methodology for all assets which make up the MEA is required under the Act.[173] The forward-looking TSLRIC pricing principle by definition excludes historical network considerations. As our expert advisors have stated, an annualised cost of non-replicable assets should be modelled based on the ORC of those assets over their full economic life using economic deprecation (i.e. tilted annuity). This is because the Commission is required to set prices based on forward looking costs.[174] The use of ORC is also consistent with past decisions of the Commission and other jurisdictions on TSLRIC,[175] and incentivises efficient entry.[176]

286 Some submitters rely on the Supreme Court's decision in *Vodafone New Zealand v Telecom New Zealand*[177] to argue that adoption of ORC is wrong, or amounts to an error of law. Such reliance is misplaced. That decision was concerned with a specific set of statutory provisions under Part 3 of the Act to value legacy assets where there was no new or enhanced technology. The issues arose from the specific definition of "*net cost*", which is not relevant to the current exercise. Blanchard J for the plurality

Professor Hausman "Response to the Commerce Commission's draft determination on uplift" (20 February 2015) at [34].

[172] WIK Consult "Submission in response to the Commerce Commission's draft pricing review determination for Chorus' unbundled Bitstream access service and draft pricing review determination for Chorus' unbundled copper local loop service including the cost model and its reference documents" (20 February 2015) at [34].

[173] Chorus "Submission on UCLL FPP process and issues paper for determining a TSLRIC price for Chorus' unbundled copper local loop service in accordance with the Final Pricing Principle" (14 February 2014) at [65]; Chorus "Cross-submission in response to submissions on the Commerce Commission's Process and Issues paper for determining a TSLRIC price for Chorus' unbundled local loop (UCLL) service in accordance with the Final Pricing Principle" (28 February 2014) at [29].

[174] CEG "Non-replicable assets and forward looking cost" (August 2014) at [4] and [8]-[12].

[175] Commerce Commission "Application of a TSLRIC Pricing Methodology – Discussion Paper" (2 July 2002) at page 44 and Commerce Commission "Implementation of TSLRIC Pricing Methodology for Access Determinations under the Telecommunications Act 2001" (20 February 2004) at [142]. Commerce Commission "Implementation of TSLRIC Pricing Methodology for Access Determinations under the Telecommunications Act 2001" (20 February 2004) at [138].

[176] CEG "Non-replicable assets and forward looking cost" (August 2014) at [8].

[177] *Vodafone New Zealand v Telecom New Zealand* [2001] NZSC 138.

judgment expressly confirmed the limited precedent value of the decision because of the unique nature of the Part 3 regime and the 2011 amendments to the Act.[178]

287 The Supreme Court did not consider the valuation exercise required for TSLRIC, nor the specific definition of "forward-looking costs" specified in the Act. It was therefore not concerned with the same statutory context in which the Commission is now undertaking its assessment, which requires a valuation method necessary to undertake a forward-looking, long-run cost analysis through establishing a new MEA.

288 We agree with the Commission that using ORC is consistent with its previous approach and the TSLRIC objectives of predictability and efficient investment.[179] It is also supported in overseas practice for TSLRIC pricing, even where the regulator has discretion as to what is required under the TSLRIC exercise.

ORC methodology for re-useable assets

289 We also support the Commission's rejection of the suggestion that it value re-usable assets at historic cost.[180] Such an approach would be a departure from an orthodox and forward-looking TSLRIC, [181] and there is no sound basis for an assumption that ORC would lead to a windfall gain.[182]

290 The WIK submission that ORC should not be used for re-useable assets argues for an essentially inconsistent position. At times WIK argues that an efficient network design should be based on what would be the most efficient assuming that investments will be made afresh – an essentially greenfields approach. For example, WIK suggests that an HEO would efficiently optimise exchange boundaries, and therefore the connecting ducts, to modern cost considerations. In other parts of its submission, WIK argues that the Commission must consider what is efficient given the existing network (such as the re-use of existing ducts). By following WIK's submission, the Commission would effectively flip between a greenfields and a brownfields valuation for different assets.

291 Overall, WIK argue that either a brownfields valuation (i.e. ORDC) should occur or, a general deduction of 20% should be applied, to similar effect.

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[178] *Vodafone New Zealand v Telecom New Zealand* [2001] NZSC 138 at [64].

[179] Commerce Commission "Consultation paper outlining our proposed view on regulatory framework and modelling approach for UBA and UCLL services" (9 July 2014) at [138].

[180] Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" (2 December 2014) at [621].

[181] CEG "Non-replicable assets and forward looking cost" (August 2014) at [4] and [8]-[12].

[182] Refer to Jeff Balchin "TSLRIC for UCLL service – asset valuation issues" (28 February 2014). He states that where infrastructure services are efficiently priced, capital is almost certainly returned to investors at a slower rate than assumed by accounting measures of depreciation, and it is also not unexpected that capital may have been returned at a slower rate than assumed by a hypothetical new entrant asset valuation. The implication is that it may equally be the case that an optimised valuation understates the RAB required to earn an NPV=0 over the relevant asset's life.

292 Following the WIK argument would lead to the Commission failing to set a forward-looking TSLRIC price which sets the right build/buy balance. The Commission has already acknowledged that ORC is consistent with the forward-looking requirement of the Act to set the correct level of cost for bypassing elements of the network and set the price to incentivise the build/buy choice.[183] Introducing re-useable assets would be a departure from forward-looking TSLRIC where the relevant service is provided by an HEO using an MEA.

293 In any event, our experts have previously advised that, if an ODRC valuation is done correctly, the resulting price will be identical to the price obtained from an ORC valuation because the whole purpose of "depreciation" in an ODRC valuation is to derive the value for an old asset that will create the same total cost structure as that of a new asset. [184] As CEG advise:[185]

> …using a forward looking depreciated asset value (ie DORC) or undepreciated asset value (ie ORC) will give the same result when economic depreciation (such as a tilted annuity formula) is used to determine the capital component of prices/compensation. The level of annuity compensation depends on the value of the asset to be recovered. As an asset approaches the end of its useful lift, its value falls however, this is offset by the reduction in the remaining life. Therefore, the annuity compensation is independent of the age of the asset.

294 Similarly, CEG advise:

294.1 use of ORC does not result in a windfall to the operator as they only receive the compensation over the remaining life of the existing assets;[186]

294.2 forward looking TSLRIC assumes that the past is in the past;[187]

294.3 this may also mean that the incumbent (in this case Chorus) may have prudently incurred costs in the past that are simply written-off.[188] Further, unlike Part 4 regulation, revaluation gains and losses are not treated as income;[189] and

294.4 specifically in relation to the approach suggested by WIK, its suggested approach to use something other than forward looking costs for re-used assets by definition will mean prices will be set below forward-looking

[183] That is, the price which is necessary to signal that entry is only efficient if the entrant has a lower cost which can match the ORC price and CEG "Non -replicable assets and forward looking costs" (August 2014)

[184] Jeff Balchin "TSLRIC for UCLL service – asset valuation issues" (28 February 2014; CEG "Uplift asymmetries in the TSLRIC Price" (20 February 2015) at [117].

[185] CEG "Issues from submissions" (March 2015) at [20] and see also [21].

[186] CEG "Issues from submissions" (March 2015) at [22].

[187] CEG "Issues from submissions" (March 2015) at [18].

[188] CEG "Issues from submissions" (March 2015) at [17].

[189] CEG "Issues from submissions" (March 2015) at [16].

costs because the HEO will receive no compensation for the stranding effect of new technologies being adopted when the HEO uses the previously determined technology.[190]

295 Our submission also sets out why we consider Professor Vogelsang (and therefore the advice the Commission relies on) is misguided in considering the current modelling to be generous. Forward-looking TSLRIC assumes that a price will be set which will either lead to a new entrant building its own network or buying-out the existing operator. It assumes there is either a completely new network or that an operator buys all of the existing network, which it may then modify (but the cost of which must also be taken into account).

296 We note that, as the re-negotiation of the NBN Co/Telstra AU$11.2 billion deal in Australia highlights, re-use of existing fixed line networks is not a cheap (or easy) option.[191]

297 However, the short point is that the Act requires the use of a forward-looking TSLRIC approach. That requires a replacement cost approach – ORC. Using a backward-looking depreciation approach would not meet the requirements of the Act. This is not an area of discretion. The argument in support of re-useable assets involves an internally inconsistent HEO construct whereby the HEO replaces Chorus for all of its network with an efficient new design and yet the assets which have been effectively replaced can be used in their current state.

Asymmetric risk from technological change

298 WIK submits that use of Chorus' asset lives effectively allows for asymmetric risk. We have previously set out why this argument is incorrect.[192]

299 WIK goes on to argue that the risk of technological change (and consequential asset stranding) represents *systematic* risk for the telecommunications market, not *asymmetric* risk, as all telecommunications operators face the same or similar risk of technological change. As a result, WIK submits that technological change is properly reflected and measured in the asset beta of the WACC formula. (WIK also states that it is surprised the Commission is looking to deviate from the common understanding of regulatory authorities in the telecommunication sector.)

[190] CEG "Issues from submissions" (March 2015) at [25] to [26].

[191] ZDNet (Josh Taylor) "NBN Co to take over Telstra, Optus networks in new deals" (14 December 2014) available at www.zdnet.com/article/nbn-co-and-telstra-sign-amended-11-billion-deal/.

[192] CEG have explained why the adoption of Chorus' asset lives will not provide adequate consideration of the risk of asset stranding due to technological (CEG "Uplift asymmetries in the TSLRIC Price" (20 February 2015) at section 4.3.1). The exercise which must be undertaken to consider the asset lives for audited financial accounts is very different to the exercise the Commission must carry out to consider the probability of asset stranding in the future. Further, Chorus' asset lives cannot (and the asset beta cannot) take account of the risk that arises from the re-calculation of an MEA which will need to occur under recurrent TSLRIC pricing.

300 The premise of WIK's argument is incorrect. Technological change is not, and certainly not in the Commission's current WACC calculation, reflected in the asset beta.

301 First, it is unsafe to assume that all telecommunications operators face the same or similar risk of technological change. The Oxera refined comparator set of telecommunications businesses illustrates the point. The businesses included comprise new entrants (such as Iliad), incumbents (such as BT Group), and operators with international business activities such as Deutsche Telekom.[193] Such diverse operators necessarily have differing levels of exposure to technological change and so different levels of risk of asset stranding.

302 Second, the current asset beta calculation cannot properly account for the risk of asset stranding that any HEO would face entering the New Zealand fixed line market today. Any comparator set has limitations as to the extent to which it can properly provide a comparison with a wholesale fixed line operator operating in New Zealand conditions. The effect of this is potentially amplified when considering a hypothetical new operator under the TSLRIC MEA modelling exercise where the Commission has not (and does not consider it has to) take account of real world limitations.

303 Third, Beta is meant to compensate for systematic risk which accounts for the investment's volatility compared with that of the market as a whole. Beta does not compensate for the truncation of returns caused by technological change. Indeed CEG advises that the Beta calculation does not (and nor should it seek to) account for the asymmetric risk of asset stranding due to technological obsolescence. Seeking to compensate for such risk by calculating a higher beta (which is not the case with the Commission's proposed WACC calculation) is inconsistent with the principle of the capital asset pricing model which underpins the calculation.[194]

304 We agree with Network Strategies that asset stranding risk is an inherent risk of infrastructure investment in a dynamic market. But given that risk, investors in competitive markets expect to earn a commensurate return in order for them to make the investment to start with.

305 This is a risk that should be recognised. Expected future changes to lower cost technologies are an essential element of forward looking costs using the current efficient technology but if this is not reflected in the price trend analysis (and this is very difficult to do given assumptions about the MEA are made on knowledge

[193] Vodafone "Submission on process paper and draft pricing review determinations for Chorus' unbundled copper local loop and unbundled bitstream access service and comments on Analysys-Mason's TSLRIC models" (20 February 2015) at [K1.5].

[194] CEG "Issues from submissions" (March 2015) at [43]. The insight CAPM provides is that uncertainty in the returns of an asset does not necessarily imply that the asset is high risk, rather it seeks to measure the contribution of an asset to overall uncertainty of an investor's portfolio that determines its risk. The asset beta captures the sensitivity to cash-flow generated by the firm's assets to fluctuations to the economy in general and therefore reflects systematic, non-diversifiable risk (refer [41]-[42]).

available today), a write down will occur whenever technology changes.[195] The risk this generates can be recognised by providing an uplift, either to the WACC or an uplift to the TSLRIC price.[196]

Asymmetric risk from competitive stranding and regulatory re-optimisation

306 Finally, contrary to WIK's submission, asset stranding due to competition and regulatory re-optimisation may be compensated for by way of an *ex ante* allowance for asymmetric risk.

307 WIK's theory is that re-optimisation and competition are usually induced by technological changes and therefore represent no additional risk. This is incorrect. CEG explain in their February 2015 Asymmetries Paper that the risk of competitive stranding due to new entry and changes to the demand base will not be taken into account in consideration of the asymmetric risk arising from technological change.[197] These further risks should be accounted for.

Demand

308 We consider that the Commission's model should use the best available forecast of the volume of products that Chorus will provide over the regulatory period. Demand migrating to other LFCs' networks should be excluded from modelled demand.

Demand on competing networks

309 We remain of the view that demand on competing networks should be excluded from the Commission's model. This includes demand for Vodafone's HFC network and demand for the other LFCs' networks. The HEO replaces Chorus, and must operate in the circumstances of the NZ market, which implies it will face the same competitors that Chorus faces.

310 Spark argues that the Commission's model should include HFC connections as efficient costs are those derived from meeting all market demand. But Chorus does not serve all market demand, and no New Zealand operator currently does. The cost that would result from this assumption is not achievably efficient; it is an unrealistically low cost.[198]

311 Vodafone and Network Strategies agree it is reasonable to exclude existing demand on the HFC network. Network Strategies also states that the Commission is wrong to

[195] CEG "Issues from submissions" (March 2015) at [56] - [57]. See also Analysys Mason "Draft UCLL and UBA FPP draft determination cross-submission" (20 March 2015) at [2.9.2].

[196] Professor Hausman "Response to the Commerce Commission's draft determination on uplift" (20 February 2015) at section IV; CEG "Uplift asymmetries in the TSLRIC Price" (20 February 2015) at section 4.3.

[197] CEG "Uplift asymmetries in the TSLRIC Price" (20 February 2015) at section 4.3.

[198] Analysys Mason "Draft UCLL and UBA FPP draft determination cross-submission" (20 March 2015) at [2.5]: "*Demand for UCLL will decrease as UFB is taken up. Chorus total demand for UFB and UCLL will decline as customers move onto non-Chorus UFB and onto other networks such as mobile. In this way no NZ operator will have the scale modelled by TERA*."

not recognise migration to alternative providers, such as HFC and other LFCs. Vodafone also argues that it is not reasonable to exclude HFC connections after 2001.

312 We disagree with Vodafone's contention that the treatment of the HFC network should change after 2001. The HFC network continued to be a competitor to Chorus' network after 2001 and will continue to be a competitor in the future (and would be a competitor to the HEO). As such, we agree with Network Strategies' submission that demand on both the HFC network and the non-Chorus LFCs' networks should be excluded. Network Strategies quote from their earlier submission as follows:[199]

> … The second type of demand required for modelling is required for the allocation of the total costs of the hypothetical network operator to the services that utilise its network assets. In simple terms, total costs must be divided by the number of [active] services to obtain a cost per unit demand.
>
> Clearly, these services will include some proportion of the hypothetical efficient operator's addressable market for access services – **it will not be 100% as there are alternative network providers in some areas (HFC and non-Chorus LFCs).** [emphasis added]

313 To repeat, both the HFC network and non-Chorus LFCs are competing networks which are competitors to Chorus' network and will continue to be competitors in the future (and would be competitors to the HEO). Demand on these networks should be excluded from modelled demand. If the Commission chooses to model demand dynamically (including accounting for population growth), then it must logically also model migration away from the HEO's network to these competing networks.

Population growth

314 We agree in principle with submissions from some RSPs that the model should be dynamic and take account of population growth. The best available forecasts of demand over the regulatory period (which Chorus supplied to the Commission in its response to s 98 notices in 2014) do take account of population growth.

315 If the Commission does decide to allow for population growth, then it must do so accurately and take account of all other relevant factors. The best way of doing so would be to use the forecasts supplied by Chorus. But, if the Commission decides to use another methodology, any forecast of demand that takes account of population growth must also properly model migration to LFCs' networks (as well as HFC and mobile networks), which will reduce demand over time. It would be inappropriate for the Commission to allow for population growth but fail to recognise that a substantial volume of demand will migrate to other LFCs' networks.

316 Network Strategies estimate a 9.3% increase in lines from 2014-2020 based on population growth forecasts, which they say should be reflected in the Commission's model.

[199] Network Strategies "Commerce Commission draft determination for UCLL and UBA: a review of key issues" (20 February 2015) at [2.2] quoting the earlier Network Strategies "Cross-submission for consultation on UCLL and UBA FPP regulatory framework" (20 August 2014) at section 3.1.

317 There are a number of problems with this analysis which mean that it cannot be used as a robust estimate of growth. Those problems include:

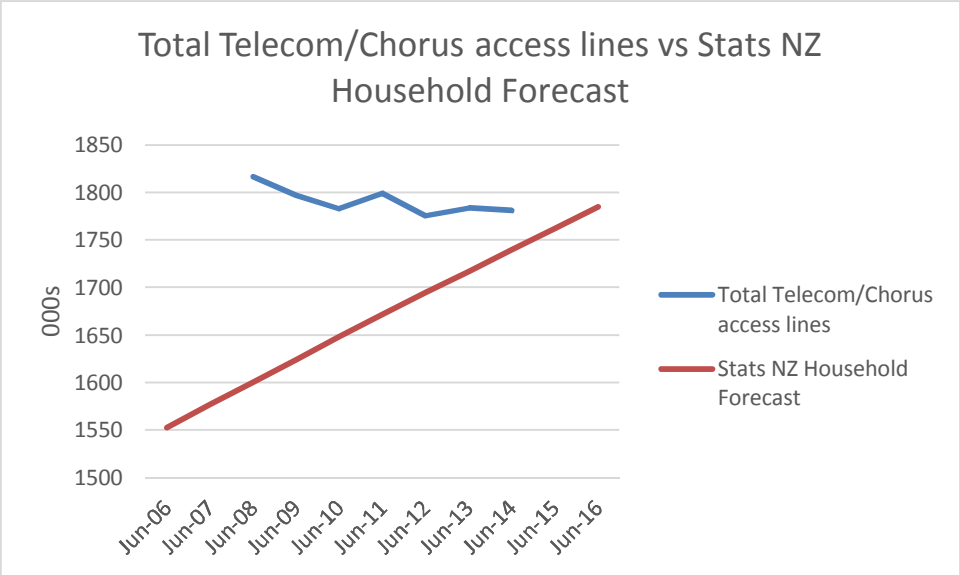
317.1 it does not explain why household growth will produce line growth when it has not in the past;

317.2 it fails to take into account offsetting line consolidation; and

317.3 it does not take into account any increase in the cost of the network to support that demand growth.

318 Growth in the number of households is not a new phenomenon. As shown in Figure 11 below, the number of households strongly increased over the last 10 years. Despite this growth, Chorus' fixed lines generally declined over the same period and fixed volumes continue to show flat growth despite high numbers of new dwellings.[200]

Figure 11: Telecom/Chorus access lines v Household Forecast



Source: Telecom/Chorus numbers sourced from public reporting (total lines, copper and fibre). Stats NZ households forecast is the National Family and Household Projection 2006(base) - 2031 update, series 5B (projected households by household type). Data points for Jun-06, Jun-11 and Jun-16 taken from Statistics New Zealand, with straight lines drawn between these data points.[201]

[200] Chorus "Half year result, FY15: for six months ending 31 December 2014" (23 February 2015) at pages 6 to 8.

[201] Statistics New Zealand "National family and household projections: 2006 (base) - 2031 update" (19 July 2010), available at http://www.stats.govt.nz/browse_for_stats/population/estimates_and_projections/NationalFamilyAndHouseholdProjections_HOTP2006-2031update.aspx.

319 Network Strategies has provided no evidence or robust analysis to justify why this pattern will not continue. Instead Network Strategies has suggested that the deployment of fibre and increasing popularity of high bandwidth applications might stimulate demand for fixed lines. In Chorus' experience, this has not been the case. These factors may drive demand for *broadband* (higher broadband penetration), and higher speed broadband, but we have not seen evidence that it is driving demand for *fixed connections*. As Analysys Mason has noted, UBA demand can and will vary even if demand for fixed connections is constant.[202]

320 Even if fixed connections were to grow, any growth in household demand for fixed lines would likely be offset by not only migration to other networks, but also line consolidation, a factor which Network Strategies has not taken into account.

321 Line consolidation is the decline in the number of secondary connections (cases where an end user has more than one access line connection). There are a number of reasons for the existence of secondary connections:

321.1 second residential lines (primarily a hang-over from fax & dial up services);

321.2 second lines for small businesses;

321.3 legacy business services that required multiple copper inputs; and

321.4 backup/redundancy for larger business.

322 While there will always be demand for some secondary lines in the market (particularly for redundancy), new technology has lessened the need for secondary services (e.g. migration from dial-up to broadband).

323 The temporary retention of copper lines by Spark to deliver voice to its fibre broadband customers has seen short-term growth in secondary lines in recent months, artificially sustaining fixed line volumes. However these lines are expected to migrate over the next 12 months, reducing Chorus' access lines base by at least 20,000 connections from this source of secondary lines alone.[203]

324 We note that customers served by fibre do not require multiple lines to support multiple services, since fibre-based services can be split virtually. If the Commission continues to approach the question of demand using a hypothetical HEO, logically it should eliminate secondary lines, as the result of its use of a fibre MEA.

[202] Analysys Mason "Draft UCLL and UBA FPP draft determination cross-submission" (20 March 2015) at [3.2].

[203] Stuff "Spark aims for internet phone service soon, ups Lightbox investment" (19 February 2015), available at http://www.stuff.co.nz/business/industries/66379666/spark-aims-for-internet-phone-service-soon-ups-lightbox-investment.

325 Finally, we note that the Network Strategies submission assumes growth in demand without assuming any increase in the cost of the network to support that demand. If additional fixed lines are required, then the cost of those lines must be factored into the network design and so into the TSLRIC estimate.

326 The additional costs may be material. Urban densification carries with it the costs and challenges of consenting for use of rights of way, civil works requiring RMA consents and which are more likely to encounter underground congestion in urban areas, the cost of ensuring existing infrastructure can support the additional lines (for example, exchange capacity) and more costly traffic management and reinstatement during build. Further, as demonstrated in the CEG report provided with this submission, data from Statistics NZ shows that whilst the largest population growth by volume in New Zealand has largely been in urban areas, the *growth rate* of population in rural areas has outstripped growth in urban areas. CEG points to evidence that rural areas contribute a relatively greater proportion of costs in telecommunications networks than urban areas.[204] This indicates Network Strategies has overstated the magnitude of any impact of population growth.

Depreciation

Price trends

327 The tilted annuity formula requires a long term forecast of price trends for the technology being modelled, in order to provide for NPV neutrality (as explained in CEG's February 2015 report on price trends).[205] It is also important that price trends are based on reliable information which can provide a reliable proxy for the modelled asset categories, including robust forecasts where these are available.

328 Contrary to Network Strategies' view that forecasts for the regulatory period should be used, we support the use of a long-term forecast and that history is also relevant as an indicator of the long-term. As CEG states in its response to other parties' submissions[206] (and in their earlier paper), the price trends must be based on expected changes beyond the regulatory period.

Fibre optic cabling

329 Network Strategies submits that the series TERA has used for fibre optic cabling is not appropriate, noting that it is likely to have been influenced by copper prices. Network Strategies argues that other models (such as the Danish, Norwegian and Swedish models) have a decreasing price trend for fibre optic cables and that benchmark data should be used. [207]

[204] CEG "Issues from submissions" (March 2015) at [64].

[205] CEG "Evidence on Price Trends" (20 February 2015) at section 2.

[206] CEG "Issues from submissions" (March 2015) at [67].

[207] Network Strategies "Commerce Commission draft determination for UCLL and UBA: a review of key issues" (20 February 2015) at page 58.

330 We agree that the series TERA has used is unlikely to provide an accurate estimate of the price trend for fibre cables. The Commission should have regard to alternative price trend information for fibre cables, such as that presented in CEG's February 2015 report on price trends.[208] The CEG information suggests that a reasonable price trend for fibre may lie in the range of -15% to 0%.

Ducts and trenches

331 Network Strategies questions Beca's forecast of 3% for ducts and trenches, noting that:

331.1 the much lower growth for transport ways and pipelines should have a greater influence than is given by Beca;

331.2 Beca has relied on a recent upward trend in the CGPI, and not taken into account the preceding three years of relatively modest growth; and

331.3 the Christchurch re-build has had an inflationary effect on the CGPI.

332 WIK also questions Beca's forecast of 3% for ducts and trenches, and recommends a price trend of 1% instead of 3%.

333 We agree that Beca's recommended price trends for ducting and trenching are not reliable, as they are based on a one year (or less) movement in particular (and some less relevant) indices from Statistics New Zealand for the year to June 2014. Price trends need to be considered over a longer period than the regulatory period.[209] This is particularly the case given that the period Beca has selected is a period of strong growth compared to the long term average.

Asset lives

334 We have already addressed WIK's submission that by adopting Chorus' asset lives the Commission will adequately account for the risk of asset stranding.

335 Separately, WIK argue that the Commission should not adopt Chorus' asset lives as this involves consideration of the incumbent, not an HEO. This argument is overly simplistic. It would be prudent (and efficient) for any HEO to consider the incumbent's experience. In addition, Chorus' asset lives are developed following thorough analysis by subject matter experts which takes account of the experience of New Zealand conditions. Asset life review occurs annually, including a detailed review by the subject matter experts, in conjunction with audit advice on accounting standards. There is no reason that a prudent and efficient HEO would not undertake an equivalent analysis, and reach equivalent conclusions.

336 WIK's specific criticisms of the asset lives proposed by the Commission include that:

[208] CEG "Evidence on Price Trends" (20 February 2015) at section 3.2.2.

[209] CEG "Evidence on Price Trends" (20 February 2015) at section 2.

336.1 adopting 20 years for fibre cable is too short. WIK states that some other regulators assume 30-40 years, but as duct and trench lives are 50 years, you would expect the HEO to harmonise so that it only replaces cable once within the duct/trench life. This leads to WIK's assertion of 25 years as the appropriate asset life;

336.2 it is inappropriate to treat overhead copper cable and pole lives differently and it would be appropriate to adopt 20 years for both (rather than 14 years for overhead copper cable); and

336.3 it is inconsistent to assume street cabinet lifetime to be 14 years while assuming copper cables have a 20 year lifetime.

337 WIK's criticisms are misplaced:

337.1 fibre is a new and largely untested technology. Our experience is that our older generation of fibre is only lasting for about 20 years (and some has failed a lot earlier). Consideration also needs to be given to New Zealand conditions, particularly to address issues with seismic movement and the rocky terrain. Also, where there is a cut or damage to a fibre cable often the whole section of cable will need to be replaced.

337.2 it is not possible to make a comparison between overhead copper cable life and pole lifetimes. The copper lines are subject to more movement (such as from wind and trees) which means that the lines require more frequent replacement than poles. Twenty years is the same asset life as other utility companies use for poles.

337.3 street cabinets are heavily influenced by technological change as well as local climate influences. In the context of the FTTN rollout, Chorus has had to change or replace many of its active cabinets during the implementation. For example, early generation cabinets proved not fit for the technical requirements of newer technology. Street cabinets are also subject to additional hazards such as cars crashing into them and flood damage which can shorten the average lifespan. Similarly, zoning changes or private road changes can mean that cabinets need to be replaced before the end of their useful life.

337.4 further, technological change can happen very rapidly in unanticipated ways which means that current components or entire units need to be changed well before any safely predictable asset lives determined for accounting purposes. There are numerous examples of what seem at the time to be radical assumptions about technological uptake and developments which prove grossly conservative or wrong in the event as new technology emerges. Even in relation to fibre, the network and fibre components are very different to those rolled out 10 or even 4 years ago.

338 WIK suggests that the Commission consider what international regulators do, by referring to fibre cable asset lives specified by the regulator in Denmark, which are longer than those proposed by the Commission. That example is selective. In comparison, the Swedish regulator adopts fibre cable asset lives which are the same as Chorus has adopted in New Zealand. Asset lives for underground infrastructure and main distribution frame/optical distribution frame in both Denmark and Sweden are also significantly shorter than the asset lives that the Commission is proposing to adopt.[210]

Figure 12: Comparison of asset lives used by Chorus, Denmark and Sweden[211]

Asset Lives	NZ	Denmark	Sweden
Fibre cables, joints and distribution points	20	30/35	20
Underground infrastructure	50	30/35	40
MDF/ODF	20	15	15
FWA base stations and MW sites	14	20	10
Power	15	15	10
Cooling	15	15	10

339 In short, there is nothing in the international benchmarking to suggest that Chorus' New Zealand specific estimates of asset lives are inappropriate. However, even if there was, it would still be appropriate for the Commission to prefer the specific direct evidence of asset life analysis in New Zealand conditions.

[210] See also Analysys Mason "Draft UCLL and UBA FPP draft determination cross-submission" (20 March 2015) at [2.9.1].

[211] Data obtained from TERA Consultants "Modification and development of the LRAIC model for fixed networks 2012-2014 in Denmark: specification document" (August 2014) at page 101, figure 90, available at https://erhvervsstyrelsen.dk/sites/default/files/media/endelig-modeldokumentation.pdf; PTS "Dokumentation av hybridmodell v.10.1 (16 December 2013) at pages 11-12, figure 5, available at http://www.pts.se/upload/Ovrigt/Tele/Bransch/Kalkylarbete%20fasta%20n%C3%A4tet/Hybridmodell%202013/hy-model-10_1-dokumentation.pdf.

PART FOUR: REPLACEMENT OF INITIAL PRICE (BACKDATING)

340 A number of parties have submitted that backdating is discretionary and the Commission should not backdate either the UCLL or UBA prices.[212] One submitter goes further and suggests that the Commission lacks the power to backdate the prices set in the pricing review determination.[213]

341 These arguments appear to be the same as those addressed and rejected by the Court of Appeal in 2006.[214] While a number of submitters refer to an English authority,[215] this does not have the same weight as a New Zealand Court of Appeal judgment directly on point.

342 Aside from the clear legal precedent that backdating of the UCLL, SLU and UBA services is required,[216] the case for backdating in these circumstances is clear:

342.1 the final FPP price corrects the "proxy" IPP price, and it is right that the more accurate FPP price should replace it on both a forwards and backwards looking basis;

342.2 backdating, and the industry expectation that backdating will occur:

(a) enables Chorus to recover its efficient costs of providing the service, and thereby incentivises efficient investment by Chorus;

(b) incentivises efficient entry and pricing decisions by RSPs prior to the FPP decision being known, as the industry can factor expectations in relation to the FPP price into their decision-making; and

(c) ensures that all parties are incentivised to engage in the FPP process in a timely manner, as windfall gains cannot be obtained through delay where parties do not expect the pricing outcome to be in their favour.

342.3 the two-step pricing process has been in place since 2001, and parties have known even during the benchmarking process that a TSLRIC

[212] Vodafone "Submission on process paper and draft pricing review determinations for Chorus' unbundled copper local loop and unbundled bitstream access services and comments on Analysys-Mason's TSLRIC Models" (20 February 2015) at [P1.1] – [P1.11]; Spark "UBA and UCLL FPP pricing review draft decision"(20 February 2015) at [86]; CallPlus "Submission on the Commerce Commission's draft determinations for UBA and UCLL services" (20 February 2015) at [54].

[213] Wigley "Submission on backdating in relation to draft UCLL and UBA pricing review determinations" (20 February 2015) at [2.24].

[214] *Telecom New Zealand Ltd v Commerce Commission* CA75/05, 25 May 2006.

[215] *Vodafone Limited v British Telecommunications plc* [2010] EWCA Civ 391 at [45].

[216] *Chorus v Commerce Commission & Ors* [2014] NZCA 440 at n46.

process, which would calculate a more accurate price based on New Zealand circumstances, was a possibility. In other words, the potential for a more accurate price to replace the IPP proxy price is well known;

342.4 based on the draft determinations, the backdated amounts are only expected to be a very small proportion of industry revenues. Any backdating payments would also be proportionate to the size of the retail service providers – with the largest payers also being the companies with the greatest ability to pay; and

342.5 Chorus has offered to implement a debt repayment option. If it is correct that price decreases have already been implemented (which a number of analysts have cast doubt over), and RSPs choose to pass the backdated amounts through to end-users, the monthly repayments under the debt repayment option would mean that any price increases would be immaterial.

343 The Commission has all of the tools necessary to implement backdating of the efficient FPP prices for each of the UCLL, SLU, UCLF and UBA services. These include:

343.1 flow through of the backdated UCLL price to the services which expressly adopt or incorporate it as a component the UCLL price: the UCLF and UBA services (for the UBA service, this will be the case for services taken prior to 1 December 2014 for Naked UBA,[217] and from 1 December 2014 in respect of all UBA services). The backdated UCLL price will apply to those services from the date it is effective; and

343.2 the ability to require Chorus to implement the debt repayment scheme that has been volunteered commercially or set other terms and conditions for backdating.[218]

344 Backdating of the prices for these services is consistent with the policy justification for backdating generally: i.e., replacing a less efficient price based on the IPP with a more efficient price based on the FPP. The Commission should ensure the current price coherence between these services in relation to the UCLL price component remains in place to ensure that the principle of having the most efficient price carries through.

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217 The Naked UBA price applies where a person is purchasing UBA but not purchasing a local access and calling service from Telecom [Spark] in relation to the relevant subscriber line: see UBA IPP, Schedule 1 of the Act. This includes where UCLF and UBA are purchased by the same access seeker on the same subscriber line: UCLF Price List, UCLFS MPF Service Recurring Charges, UCLF STD Determination at [54]-[69] and [104].

218 The Commission could undertake a simple s30R review to, if necessary, align all backdating terms and conditions for the UCLF and UBA services with those for the UCLL service. Any s30R review would deal with issues which have already been widely consulted upon as part of this submission process, and can proceed in parallel with the remaining steps of the Commission's FPP consultation process without any additional steps or delay.

345 Three further general points emerge from RSP submissions.

Debt repayment options and the ability to pay

346 As discussed in our submission, Chorus will work with customers and the Commission to deliver appropriate repayment plans that take account of the credit and financial strength of the customer. This is consistent with existing customer credit policies which recognise that some customers have investment grade credit ratings and some do not.

347 Given Spark and Vodafone's investment grade credit ratings[219] and with appropriate payment plans for smaller customers without such credit ratings, in our view, the need for passing backdating onto end users is minimal. This is particularly the case now that retail price changes have already been made.

The correction of the IPP price

348 Second, RSPs appear to have misunderstood the reference in the Update Paper to the FPP price being a "*correction*" of the IPP price.[220] It is not disputed that the IPP price is legally valid, and remains so until the FPP price. But in a very real sense, the FPP price is a correction to the IPP price in that it replaces an inherently limited benchmarked understanding of New Zealand costs with a more precise estimate of efficient costs. It is primarily for this reason that the Court of Appeal held that the FPP price replaced the IPP price, as a matter of statutory interpretation.[221]

Empirical evidence

349 Third, a number of the submissions emphasise the need for empiricism in the Commission's consideration of the backdating issue, drawing an analogy with the comments of the High Court in the input methodology appeals under Part 4 of the Commerce Act. This emphasis and that analogy are misplaced. As an expert body, the Commission is entitled to make a qualitative assessment of whether backdating is appropriate, drawing on its experience and expertise. No quantitative assessment is necessary, or indeed may be possible.

350 The context is different from the context of an adjustment of an estimate to account for asymmetric errors and risks, where the issue was the degree of adjustment required to account for errors and risks. Here, even if the Commission has a discretion not to backdate, the issue is what circumstances justify not backdating what Parliament has specified is the more precise and therefore more efficient cost-based price for the regulated service.

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219 Conservative views of customer revenues such as qualifying TDL revenues do not capture all revenues (e.g. mobile, ICT and other fixed line revenue). At 31 March 2014 Spark had $208 million cash on hand and Vodafone had $36.5 million cash on hand.

220 Vodafone "Submission on process paper and draft pricing review determinations for Chorus' unbundled copper local loop and unbundled bitstream access services and comments on Analysys-Mason's TSLRIC Models" (20 February 2015) at [P1.7(b)]; Spark "UBA and UCLL FPP pricing review draft decision" (20 February 2015) at [407].

221 *Chorus v Commerce Commission* [2014] NZCA 440.

351 In this context, the various submissions opposed to backdating ignore the critical issue of the incentives created by the expectation of backdating. For example, Spark's submission appears to assume that all build/buy decisions and pricing decisions will be made solely by reference to the IPP price without any regard to the potential for backdating.[222] However, this is the very benefit of backdating – that it requires market participants to consider critically the efficiency of IPP prices.

352 Consider the situation where an IPP price is set by reference to a single benchmark, which is acknowledged to be likely to be materially higher than the true TSLRIC cost of the service in New Zealand. It would be manifestly inefficient, and imprudent, for the access provider to make investment decisions based on the expectation of preserving a period of over-recovery even once the FPP price was set. But similarly, if the single benchmark is acknowledged to be too low, it would clearly not be in the long-term interests of end-users to require the access provider to under-invest for a period of 2½ years while the FPP determination is made, with no expectation of potential recovery of an efficient price in that period.

353 As noted in our submission, it is not plausible to say that market participants cannot make educated assumptions about the likely direction and magnitude of FPP prices and plan accordingly. Such information has been available in the market for a long time. And, once the Commission's draft determinations are issued, indicative guidance is available. Further, the backdated amounts we have assessed based on the draft determinations are a relatively small proportion of reported annual telecommunications development levy revenues of all industry participants.

354 Spark accepts that investment incentives will be harmed by uncertainty associated with FPPs,[223] but says that this cannot be remedied by backdating. This is incorrect. The expectation of backdating, combined with the significant market information about likely prices, provides a meaningful contribution towards certainty.

355 Contrary to Spark's submission,[224] end-users can expect tangible benefits if backdating is confirmed and extended:

355.1 first, efficient investment and participant behaviour will be incentivised in the future (in the expectation of backdating of future regulatory decisions); and

355.2 second, where cash flows are constrained by IPP pricing – as here – backdating promotes "catch up" over-time and reversal of inefficient decisions made during the period during which cash flows have been constrained due to application of the IPP pricing. As noted in our

[222] Spark "UBA and UCLL FPP pricing review draft decision" (20 February 2015) at [408].

[223] Spark "UBA and UCLL FPP pricing review draft decision" (20 February 2015) at [414].

[224] Spark "UBA and UCLL FPP pricing review draft decision" (20 February 2015) at [415].

submission, Chorus will undertake to repay capital contributions received if an efficient FPP price is set and backdating confirmed.

356 In contrast, the benefit of not backdating submitted by Spark and other RSPs appears to lie exclusively in an undertaking by one RSP (but no others) that its contribution to what appears to have been a simultaneous uniform price increase by the two largest RSPs in the market for broadband services (an increase that, in the case of one of those RSPs, was applied to all its broadband services including those using its own network which do not require a UCLL or UBA input) will be repaid to its end-users.

357 Such a claim requires critical consideration, not least in relation to the implicit claim that retail prices prior to the price increase reflected expected lower prices from 1 December 2014. Chorus has seen no reliable evidence that the expected reduction in prices was passed onto end-users, and the RSPs have not offered any in their submissions. The Commission should therefore be cautious about claims to pass-through of benefits to end-users.

PART FIVE: TRANSACTION CHARGES

358 A number of the submissions received focus on transaction charges. We do not intend to submit in any detail in transaction charges at this stage of the process – prior to the Commission's preliminary views. However, we do make the following, preliminary observations.

Increases in new connection charges since 1 December 2014

359 Snap submits that there is evidence based on current and historic billing data to suggest that post-1 December 2014 Chorus has unnecessarily employed a more extensive method than required and points to the new connection charges that came into effect from 1 December 2014. Snap notes that, compared with data from May-November 2014, since 1 December its average install costs have doubled per connection. CallPlus also notes that the cost of connections has increased.

360 We agree that Snap's and CallPlus' average install costs may well have increased since 1 December 2014. This is a consequence of the changes to UBA and UCLL transaction charges in the IPP decisions. In particular, in terms of UBA pricing, this is not surprising because prior to 1 December 2014 Chorus' new "connection-only" charges reflected the retail-minus nature of the pricing that applied at that time. In respect of the UBA pricing, changes to the pricing approach in the Act were driven in part to reflect that as Chorus was demerged from Spark it was no longer appropriate for Chorus' pricing to be based on Spark's (an independent RSP's) retail prices.

361 As we said in our cross-submissions on transaction charges dated 16 October 2014, the mix of new connection charges at any time depends on the circumstances. For example, these include how the RSP orders the service (new connection or transfer), what other services are ordered (if a UCLF service is also ordered a jumpering at the cabinet or exchange will be required), and what services were previously provided to the premises. These factors will determine whether the service companies need to roll a truck to the exchange, cabinet or the end user premises to carry out work.

362 CallPlus submits that the percentage of UBA no site visit required for new connections should be higher than in fact achieved by Chorus. We are looking at whether there any operational reasons as to why these percentages were more than they were expecting and the level of transaction charges they say should be applied following the implementation of the IPP. However, at this stage we believe that the charges are correct, based on what has been requested and the work that is required.

Appendices

APPENDIX A: SUMMARY OF CHORUS' SUBMISSION

UCLL and SLU

Issue / Input	***Chorus position***
UCLL MEA	Select the MEA with the lowest cost to end-users that is capable of providing the same functionality as the existing UCLL and SLU services, i.e.: • FTTN/Copper; or • FTTH (P2P). Even if the Commission adopts a "core functionality" approach, the core functionality of the Unbundled Copper Local Loop service must include the ability of the service to be unbundled at Layer 1. FWA therefore cannot be in the MEA.
Asset valuation	Select ORC, consistent with the Act's direction to model forward-looking costs and orthodox TSLRIC.
Performance adjustments	No adjustments based on technological performance or consumer preference.
Network footprint	Model a network capable of providing the UCLL and SLU services to all end-users to whom Chorus may be obliged to provide the service under the Act and STD.
Optimisation	Use a scorched node assuming no re-use of Chorus assets and: • ensure that no single element failure can affect more than 5,000 end-users; and • account for equivalent spare capacity in the FTTH network as is assumed in the FTTN/Copper network (11%).
Capital contributions	Include the capital costs of all assets required to provide the UCLL and SLU services to all end-users to whom Chorus may be obliged to provide the services under the Act and the STD. If capital costs are excluded outside areas in which Chorus is obliged to maintain network used to serve end-users in December 2001 (the **TSO areas**): • the TSO areas should be corrected to include all end-users'

Issue / Input	***Chorus position***
	locations existing in December 2001; • include all capital costs of assets required to connect end-users within TSO areas to the core network via an exchange; and • the assumed capital contribution should be implemented as a "one off" payment.
Trenching costs	Adopt the Analysys Mason UCLL model trenching cost data, which are based on a careful assessment of Chorus' actual trenching costs from its UFB and RBI deployment. The Beca analysis is not the best available evidence. If capital costs of servicing end-user premises outside TSO areas are excluded, use an appropriate average cost of trenching for routes included in the model, rather than a national average.
Omitted costs	Include: • installation labour costs for copper cable units included in Chorus' price lists; • overheads charged by service companies for network build in the assumed unit costs; • overhead costs, handling fees and cable hanging/mounting fees for fibre cable costs included in Chorus' price lists; and • missing costs for jointing assets and installation costs for cabinets.
Modelling issues	Revisit calculation of the values of horizontal length in the model to ensure connection with the street cabinet or MDF location. Revisit the mapping of buildings to road sections to ensure buildings are allocated to the closest road section.
Aerial deployment • *Extent*	Real world experience of aerial deployment for the network delivering the services today is 2% of Chorus' actual communal network (excluding drops). A target of 20% for UFB was assumed nationally in the Analysys Mason model. The same constraints that Chorus faces (e.g. access to poles, pole conditions, Council constraints) with UFB/RBI rollout would apply

Issue / Input	***Chorus position***
	to an HEO. A joint telecommunications/electricity lines company deployment is not realistic. Irrespective of the approach taken to modelling aerial distribution, the Commission should: • apply limits to the number and size of fibre cables deployed aerially that reflect realistic resource consent constraints and ensure that critical infrastructure is protected by underground deployment; and • lower the proportion of aerial deployment in urban areas to reflect the greater consenting constraints in those areas compared with rural areas, rather than assuming a uniform deployment of aerial infrastructure.
Aerial deployment • *Costs*	If the proposed joint telecommunications/electricity lines scenario is adopted,: • use the unit costs of poles required to support both telecommunications and electricity infrastructure (not the unit costs of Chorus' lead-in poles); and • reduce the cost reduction for shared aerial network to less than 100% to account for costs associated with network sharing not directly related to deployment (e.g. pole survey fees and assessment fees) that would be charged to an HEO.
Aerial deployment • *Pole numbers*	Modify the calculation of CCT/FAT and poles on the major side of the road by correcting: • the number of CCT/FAT deployed to account for demand on both major and minor side of the road; and • an issue with the TERA algorithm which calculates the lesser of the number of poles required for distance and to provide CCT/FAT demand, rather than the sum of these. Include poles to enable lead-ins on the minor side of road sections where the served premise is not tall enough to ensure a 5.5m road clearance can be maintained or where there are two or more end-users on that side of the road served by a CCT/FAT.

Issue / Input	***Chorus position***
Lead-ins	Correct modelled distance of lead-ins to account for: • the distance between end-user premises' property boundaries and the metallic surface of the road (i.e., footpath, berm and other road reserve width); and • real-world limitations on deployments of the assumed straight-line deployment of lead-ins. An uplift of 15% as used by the Danish regulator (and supported by TERA) is appropriate. Include the costs of ETP, and all wiring to the ETP. The ETP forms part of the UCLL service.
Fixed Wireless Access modelling	FWA should not be included in the MEA, as it is not capable of meeting either the full or core functionality of the UCLL service. If FWA is to be included in the MEA, then: • adopt a throughput level consistent with at least the expected demand for the UBA service in the regulatory period - 250 kbps is not sufficient to meet current demand; • account for coverage limitations of FWA; • correct the assumed cost of spectrum to account for the final price at auction; and • include the costs of providing voice and data services over FWA (including core network functions and aerial equipment deployed at end-user premises).
Operating costs	Use Chorus' actual operating costs as the starting point for its analysis. In addition: • do not apply an LFI adjustment between Chorus' LFI and a new copper network as well as an adjustment for cost differences between legacy copper and new build fibre networks - this double counts efficiency adjustments; • a fibre efficiency adjustment of 50% is not appropriate and is applied to costs which are not technology dependent. Evidence indicates an adjustment of between 15% and 30%. This is consistent with TERA's analysis for the Danish regulator; and

Issue / Input	***Chorus position***
	• account for the higher opex for aerially deployed network, given that 36% aerial deployment rather than Chorus' actual 2% deployment is assumed.

UBA

Issue / Input	**Chorus position**
UBA "Additional costs" MEA	MEA for the "additional costs" of providing the UBA service based on Chorus' existing FTTN/Copper network.
Asset valuation	See the UCLL and SLU service comments.
Throughput	Model the "additional costs" so that it is sensitive to throughput. The model should be capable of supporting expected throughput in the regulatory period and the assumptions in the Commission's model are likely to prove inadequate to serve growth through to 2020. The Commission has provided no commentary on what it is seeking to model or achieve. Our submission outlines what we understand is in the modelling for average bandwidth growth. If throughput grows more than is estimated more reviews will be required.
Omitted costs	Include the following omitted costs: • indirect capital costs of commissioning equipment used to provide the UBA service (including design and testing, installation, commissioning, and connection to the network); • incremental costs of larger cabinets to house UBA equipment; and • the costs of a second SFP for each 1 GigE or 10 GigE port connected from each DSLAM.
Capital contributions	Do not exclude costs because of an assumed hypothetical recovery of those costs by the HEO otherwise than through the monthly service charge.

Issue / Input	Chorus position
	If costs excluded based on an assumption that the RBI initiative is a proxy for the deployment strategy of an HEO, no capital costs of DSLAMs should be excluded. These costs were not funded by the RBI initiative.
Cost allocation (bitstream and other services)	Allocate costs using a capacity based approach where sufficient data is available. Where insufficient data on capacity exists (the costs of fibre between DSLAM and cabinet, and cabinet and FDS), allocate costs based on EPMU, using revenue as a proxy for cost.
Cost allocation (regulated and unregulated bitstream services)	Account for any growth in demand for unregulated bitstream services during the regulatory period by undertaking a review of the cost allocation between regulated and unregulated services if and when required.
EUBA variants	Specify differentiated pricing for the EUBA variants using IPP benchmarking.

Common issues

Issue / Input	Chorus position
WACC	Estimate a WACC using the following parameters: • asset beta of 0.50, reflecting the best available evidence of average asset beta for relevant firms over the past 20 years, using the methodology in its Input Methodologies determinations and endorsed by the High Court; • leverage of 0.50, giving greater weight to the gearing of fixed line businesses rather than integrated firms; • risk free rate calculated by reference either to 10-year Government bond yields or longer periods of averaging rather than the one-month average proposed; • a credit rating of BBB- and a debt risk premium which takes account of the premium on bonds issued by Genesis, Mighty River Power and Meridian, to reflect regulatory risk; • compensation for the costs of entering into swap contracts of

Issue / Input	Chorus position
	between 10 and 13 basis points if the debt can be raised domestically and more if some debt is raised overseas; • a term for the cost of debt of 10 years; and • debt issuance costs of at least 0.35% per annum. Have regard to WACC used by other regulators as a reasonableness check. The draft WACC is the lowest in a comparator group of eleven European jurisdictions, the United States and Australia.
Allowance for asymmetries	Address estimation error in setting the WACC through selection of a higher percentile than the mid-point WACC. Include an uplift to the estimate of the TSLRIC price to address residual asymmetric consequences of estimating the TSLRIC price too low that are not accounted for by addressing estimation error in the WACC and adopting the best evidence for other model parameters.
Demand	Use the best available forecast of the HEO's or Chorus' demand, reflecting the existence of competing networks and do not: • include demand that will be served by non-Chorus Local Fibre Companies (**LFCs**) in the regulatory period; or • assume a stable demand during the regulatory period that does not account for growth in demand served by LFCs .
Depreciation	Improve the depreciation profile by using the best evidence of price trends that reflect the expected change in the ORC of each asset, including: • using the labour index for technicians and associates from Statistics New Zealand; • considering more reliable indications for fibre cable forecasts; and • taking the long term trends in CGPI including forecasts as an appropriate reference for estimating future trends in ducting and trenching costs, with particular reference to CGPI "civil construction group."

Issue / Input	Chorus position
	Assume a 6 month build period for the assets.
Tax	Include realistic assumptions as to the tax position of the HEO.
Regulatory period	Adopt a regulatory period of at least seven years.
Backdating	Backdate to the date of the relevant IPP determination, to best promote efficient investment. The cost of backdating is proportional to the RSP. Chorus will offer a repayment scheme based on the creditworthiness of the RSP. The repayment scheme will be at a fixed rate of interest and the repayment term will be agreed with each RSP.