WIK-Consult • Report

Study for Vodafone New Zealand and Spark New Zealand

# Cross-Submission
# In response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents

**Non-Confidential version**

WIK-Consult GmbH
Rhöndorfer Str. 68
53604 Bad Honnef
Germany

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WIK CONSULT

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## Executive Summary

*Modelling UCLL*

1. Chorus and its advisor Analysys Mason claim there are missing trench lengths in the Commission's model. We show that all arguments are either unsubstantiated, incorrect and/or would represent inefficient network deployment techniques. Similar to other submissions we show that some proposals are not consistent with actual deployment standards in New Zealand. The lead-in related trench length arguments are misleading, incorrect and in the end, irrelevant because the lead-in is self-provided by end-users and as such is not part of the HEO's cost base.

2. Although Chorus and Analysys Mason are claiming missing lateral length when considering the lead-ins to the end-customer homes, we have reviewed their argument and find conclusively that these lengths already have been considered. The cost of these elements is already overestimated. This is because they form part of the costs of street crossings instead of being distinguished by the analysis into the more precise detail of street crossing, pavement and berm, the latter components being less expensive than the first. Furthermore, it is clearly most efficient to deploy the horizontal parts of the distribution lines as close as possible to the property boundaries, as stated in the New Zealand Road deployment Standards and confirmed by Downer. This approach to deployment, when correctly implemented reduces the lateral length claimed by Chorus and Analysys Mason almost to zero.

3. With reference to Chorus' actual UFB fibre deployment costs they argue strongly that the Commission should effectively double the trenching cost used in the TERA model. We strongly oppose this proposition. We still regard the trenching costs used in the model as too high for the following reasons. Firstly, Chorus' UFB fibre deployment cost indicates a variety of inefficiencies, with the result that they do not represent appropriate trenching costs for the HEO. Also Downer supports our view that trenching costs could be significantly reduced if new trenching methods would have been considered. Furthermore, Analysys Mason's regression analysis to derive nationwide representative trenching costs from Chorus' UFB project costs does not produce a reliable result, for the reasons set out below, and accordingly leads to an overestimation of trenching costs.

4. Chorus also claims that certain itemized cost elements are not considered in the Commission's cost model. According to our understanding of their argument, the costs Chorus claims as being omitted are not in fact omitted. In fact they are already included in the average trenching cost data used by TERA. BECA has provided all-inclusive trenching costs which, for instance, already include arborist and traffic management cost. Therefore it is wrong to add such costs a second time on an itemized basis.

5. This same point also holds for the level of cable costs. These have been significantly inflated by TERA in the July 2015 version of the model. Fibre cable cost in the New Zealand model now exceed those in the Swedish cost model by a factor of five without any compelling evidence to justify this increase. We think a difference of this magnitude is not justified.

6. The trenching costs calculated by BECA are, in our view not too low but in reality too high. This is because BECA has not considered new and more cost-efficient trenching methods. Again, Downer confirms this point. The evidence is that hydro trenching and new trenching machines currently in use in other countries can bring down costs to as little as 8 €/meter, which is only a fraction of the costs currently used in the model. Some indirect factors lead to further overestimation to trenching cost.

7. Chorus welcomes the reduction of the share of aerial deployment due to sharing restrictions with the EDB infrastructure. In our experience, and according to the network deployment practice in New Zealand and in other jurisdictions, aerial cabling in telecommunications network is not limited to areas where this can be shared with other infrastructures. Besides aerial sharing there is a case for stand-alone aerial deployment in telecommunications where it is cost-effective. Therefore, we argue strongly that the share of aerial cabling in the Commission's model should not be reduced but increased.

8. The Commission's approach of determining the homes being served by FWA is conceptually wrong. In a fibre MEA there is no 5.3 km bandwidth limit of the access network. Thus, we strongly recommend that the Commission returns to the previous approach of replacing the most expensive access lines by FWA. Furthermore, we once again repeat our recommendation to also use FWA as a replacement for the copper MEA for UBA, in those areas where it is not replaced by fibre. We consider this to be the most correct and consistent approach. FWA areas should not be fragmented or patchworked because of the contiguous characteristic of radio coverage. In any case the radio modelling approach should implement the current characteristics of 700 MHz radio bandwidth (coverage radius) and LTE advanced (end-customer bandwidth). All these factors will dramatically reduce the FWA und thus the UCLL cost, consistent with the deployment decisions that a cost-minimising HEO would make.

9. Chorus still insists that end-user contributions for lead-ins and subdivisions should be included in the Commission's TSLRIC cost calculation. Chorus has formulated the cost responsibilities most precisely in its own instructions for contractors in March 2015: *"Our network is typically built up to the boundary of the property… The lead-in is the property's owner responsibility and can be installed by an electrician or builder."* That statement defines clear rules of responsibilities and identifies clearly the parties bearing the cost. This should guide the Commission in

modelling the lead-in costs. They should not be part of the recurring monthly UCLL changes because those costs are in the responsibility of customers and they have to bear them directly. The user should not pay twice for such costs and Chorus should receive no payment for costs which to do not occur for the company.

10. The Commission should include the re-use of relevant assets into its final UCLL cost calculation. Chorus has announced publicly that it has been targeting 40% of its UFB deployment using existing ducts. The Commission has not made clear why that should not be an achievable target for all areas where the model currently uses ducts or poles. If we take this degree of re-use as a relevant parameter for the investment savings of the relevant network elements we end up with a UCLL cost saving of about 13.8% in 2016 increasing to 14.3% in 2020 instead of 9% as TERA calculates.

*Modelling UBA*

11. The Commission states that it has calculated both, an FTTH MEA and an underlying copper MEA as before, only resulting in *"minimal"* differences. We show that there would in fact be significant cost differences between the FTTH MEA and the copper MEA. All relevant components of the FTTH MEA are less expensive than the comparable components of the copper MEA.

12. Choosing a different MEA for UCLL and UBA (Option 2) would result in extremely different bandwidth capability which could be supported by each of these access technologies. Option 1 (FTTH) is very flexible as to the bandwidth supported per end-customer, and is nearly unlimited regarding bandwidth and quality of service. Option 2 only supports copper DSL speeds, and supports a lower bandwidth, itself varying depending on the length of the copper access line. Given the performance disparity, the appropriate make or buy decision could only be made with reference to the same underlying physical infrastructure. We repeat our previous submission on the choice of MEA for UBA

13. Chorus and Analysys Mason claim that the Commission includes additional costs for a variety of network elements of the UBA network. We show that most of them have already been considered by TERA, like design and testing costs or do not represent efficient behaviour like VDSL splitters. Furthermore, we show that an HEO will not install redundant (sub-)rack capacity as Chorus claims.

*OPEX*

14. There are clear indications that the OPEX in the cost model is not underestimated as Chorus argues but in fact is overestimated. In detail we show below:

- That the LFI adjustment conducted by TERA is appropriate and is consistent with LFI values in other countries than Ireland.
- That the efficiency adjustment for fibre network OPEX should not be less than 40% but at least 50%.
- That the OPEX benchmark presented by L1 Capital is unrelated to modelling numbers and inappropriate.
- That benchmarking the resulting OPEX share of the Commission's cost model with other cost models indicates that it is too high by several percentage points.

*Non-recurring charges*

15. We state again our view that under a TSLRIC approach the Commission cannot simply derive the cost of the efficient provision of transaction services by adopting Chorus' cost. There are numerous indications that the current processes are not efficient and therefore cannot lead to efficient cost. Therefore, major adjustments have to be made if the starting point of the cost determination are Chorus' cost.

16. In detail we derive the conclusions set out in this paragraph and make a number of proposals to improve accuracy and efficiency in the estimation of non-recurring charges:

- Chorus' Submission ignores the potential for efficiency improvements achievable by an HEO approach and its own public statements in relation to efficiency improvements.
- Chorus' critique, which attempts to rebut TERA's international benchmark approach to determining the costs of an efficient HEO, is neither conclusive or compelling. TERA's international benchmark in principle represents an appropriate approach. Nevertheless, we do consider that some further adjustments should be added to the results of TERA's international benchmark, and should be made to other cost positions which have not fully considered the options for increasing efficiency.
- TERA's current approach, which weights service costs per CSA by volume of lines per CSA, is adequate, and fairly allocates the risk of changing

costs per CSA between Chorus and RSPs. In contrast, as we show below, in our view, Chorus' percentile approach fails.

- Chorus has not adequately substantiated its assertion that its real overhead costs actually reflect efficient overhead costs. In its submission Chorus continues not to consider the evidence WIK has presented for potential efficiency improvement in overhead costs.

- It is not conceptually correct, or an adequate method of adjustment to inflate NRC related costs by using benchmark values sourced from LFCs. Fibre transaction processes differ significantly from copper transaction processes and cause higher costs in comparison to copper transaction processes. Such higher costs do not represent efficient costs for copper transaction services.

- Several transaction services, for example 'manual prequalification order', 'manual line testing' or communicated results like 'no fault found' are caused by a range of Chorus issues including inefficient processes, the age of network components and the approach to network renewal and maintenance. Therefore, we consider it clear that such charges have to be set to zero, because the corresponding costs do not reflect an efficient HEO. In fact Chorus should be incentivised to establish more efficient processes, so that RSPs do not bear the additional impact of these otherwise avoidable internal costs which are outside their control.

- A moderate price reduction factor of -3% to -5% p.a should be applied to NRC based transaction services in order to reflect reasonably anticipated changes of labour costs and further efficiency potential likely over the course of the regulatory period.

*Backdating*

17. The FPP process is a source of regulatory risk. Risk and uncertainties are related to the duration of the process and the final wholesale prices. These risks are inevitable but can be managed and minimised by the Commission carrying out a process involving iterative exposure of preliminary thinking and decisions coupled with thorough consultation. Backdating would not contribute to reducing the regulatory risk. Moreover, it is a source of additional regulatory risk. This additional regulatory risk can only be mitigated or even avoided if the Commission were able to make a (binding) decision not to backdate at an early stage of the process.

18. We agree that time consistency is an important regulatory principle in the case of price regulation to maintain efficient investment incentives in the sector. The

Commission would not be violating this principle if it were not to backdate the FPP prices. The Commission has made no commitments towards backdating. Therefore the efficiency assessments related to backdating must determine whether backdating should occur or not. Sapere wrongly assumes that the Commission relates its decision on backdating to Chorus' investment cycle. This is misleading and factually incorrect.

19. Sapere proposes that the FPP has an 'assurance function'. To the extent that the 'assurance function' exists, it simply provides certainty to access seekers and the access provider that the FPP prices will substitute the IPP prices, whenever they are determined as a result of a sound process. Not more and not less. If Parliament had expected the Commission to ignore the efficiency implications of backdating, it would have determined the time points at which the FPP prices would come into force within the Telecommunications Act itself.

20. Backdating by lump-sum payments does not have the same negative impact on allocative efficiency as the claw-back approach. Lump-sum transfers, however, are detrimental to competition in the retail market by reducing downstream investment incentives and potentially inducing market exit. Furthermore, lump-sum payments have negative impacts on investment if operators have to make provisions for them.

21. Due to retail market competition, a claw-back mechanism would increase retail prices. Economic distortions caused by "wrong" IPP prices cannot be corrected by distorting (future) FPP prices. The opposite holds. Additional distortions and welfare losses occur.

22. It is not true that the final FPP price is the "correct" wholesale price for the time period before the Commission reaches its final decision on the FPP price. This is not the case because market participants cannot efficiently base their business decisions on their business model, investment and retail prices on wholesale prices which are not known to them. Regulated wholesale prices which induce efficiency in decision making are in the market when they are known to all market players. Backdating does not bring forward the ability of market participants to base business decisions on final FPP prices any earlier.

# 1 Introduction and acknowledgements

## 1.1 Introduction

23. WIK-Consult has been appointed by Spark New Zealand ("Spark") and Vodafone New Zealand ("Vodafone") to support both companies in the course of the cost modelling and FPP process of the Commission. Nevertheless, this Cross-Submission is brought to the attention of the Commission as an independent expert report.

24. This Cross-Submission mainly makes comments on and provides analysis of matters raised in the submissions provided by Chorus and its advisors in August 2015. Selectively we also refer to other submissions.

25. This Cross-Submission makes substantial reference to our August 2015 Submission which dealt with and analysed extensively the July 2015 cost model of the Commission. Therefore, in order to avoid repetition, major parts of the analysis set out in this Cross-Submission must be read in combination with our previous August 2015 Submission. To assist in this process, we have extensively cross-referenced in order to make clear which parts of our previous submission should be read and used to follow our arguments and views as expressed in this Cross-Submission.

26. There is a confidential and a non-confidential version of this Cross-Submission.

## 1.2 Citation

27. To make citation a bit easier we use a few abbreviations. We refer to the Commission's further draft determination in the following way:

    a) **Commission, UCLL July** stands for: Commerce Commission, Further draft pricing review determination for Chorus' unbundled copper local loop service, Further draft determination, 2 July 2015.

    b) **Commission, UBA July** stands for: Commerce Commission, Further draft pricing review determination for Chorus' unbundled bitstream access service, Further draft determination, 2 July 2015.

28. The TERA consultants documents related to the cost model and its changes are cited as:

    a) **TERA, Modelling Changes** stands for: TERA Consultants, TSLRIC price review determination for the Unbundled Copper Local Loop and

Unbundled Bitstream Access services, Implemented modelling changes, June 2015.

b) **TERA, Model Documentation June** stands for: TERA Consultants, TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services, Model documentation, June 2015.

c) **TERA, Model Specification June** stands for: TERA Consultants, TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services, Model Specification, Confidential Version, June 2015.

d) **TERA, Non-recurring charges** stands for: TERA Consultants, TSLRIC price review determination for the UCLL and UBA services non-recurring charges, Methodology document, Confidential Version, April 2015.

29. We refer to our own submissions and cross-submissions from previous consultations of the FPP process in the following way:

a) **WIK-Consult, Submission of 12 August 2015** stands for: Submission in response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents, 12 August 2015.

b) **WIK-Consult, Submission of 8 May 2015** stands for: Submission on the Commerce Commission's analytical frameworks for considering an uplift to the TSLRIC price and/or WACC, 8 May 2015.

c) **WIK-Consult, Submission of 20 February 2015** stands for: 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.

d) **WIK-Consult, Cross-Submission of 19 March 2015** stands for: WIK-Consult, Cross-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, 19 March 2015.

e) **WIK-Consult, Submission of 8 October 2014** stands for: WIK-Consult, Submission in response to the Commerce Commission's Consultation on setting prices for service transaction charges for UBA and UCLL services (25 September 2014), 8 October 2014.

f) **WIK-Consult, Cross-Submission of 15 October 2014** stands for: WIK-Consult, Cross-Submission in response to the Commerce Commission's Consultation on setting prices for service transaction charges for UBA and UCLL services (25 September 2014), 15 October 2014.

30. We refer to Submissions and Cross-Submissions of market participants and their advisors in the following way:

a) **Chorus, Submission of 13 August 2015** stands for: Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled copper Local Loop and Unbundled Bitstream Access Services (2 July 2015), Confidential version, 13 August 2015.

b) **Analysys Mason, Submission of 11 August 2015** stands for: Report for Chorus, UCLL and UBA FPP further draft determination submission – CI, Ref: 38598-292, 11 August 2015.

c) **Analysys Mason, Submission of 20 February 2015** stands for: Analysys Mason Submission on behalf of Chorus for UBA and UCLL services draft determinations – 20 February 2015, Confidential version, REF: 2002396-81

d) **Spark, Submission of 13 August 2015** stands for: Submission to the Commerce Commission, Further draft pricing review determination for Chorus' UBA and UCLL services, 13 August 2015.

e) **Sapere** stands for: Stuart Shepherd, Kieran Murray, & Tony van Zijl, Report for Chorus Limited, Economic comment on UCLL and UBA Pricing Issues, 11 August 2015.

31. All other documents which we cite are fully documented wherever we refer to them.

32. If we reference within the text to a "para. #" it means a paragraph in this Cross-Submission.

## 1.3 Structure of this report

33. This report is structured in six sections. The introductory section is followed by two sections which focus on key modelling aspects, Section 2 with modelling UCLL and Section 3 with modelling UBA.

34. Section 4 responds to comments related to OPEX. Our comments to non-recurring charges are presented in Section 5. The final Section 6 highlights our further arguments on backdating.

# 2 Modelling UCLL

## 2.1 Trench length/network boundary

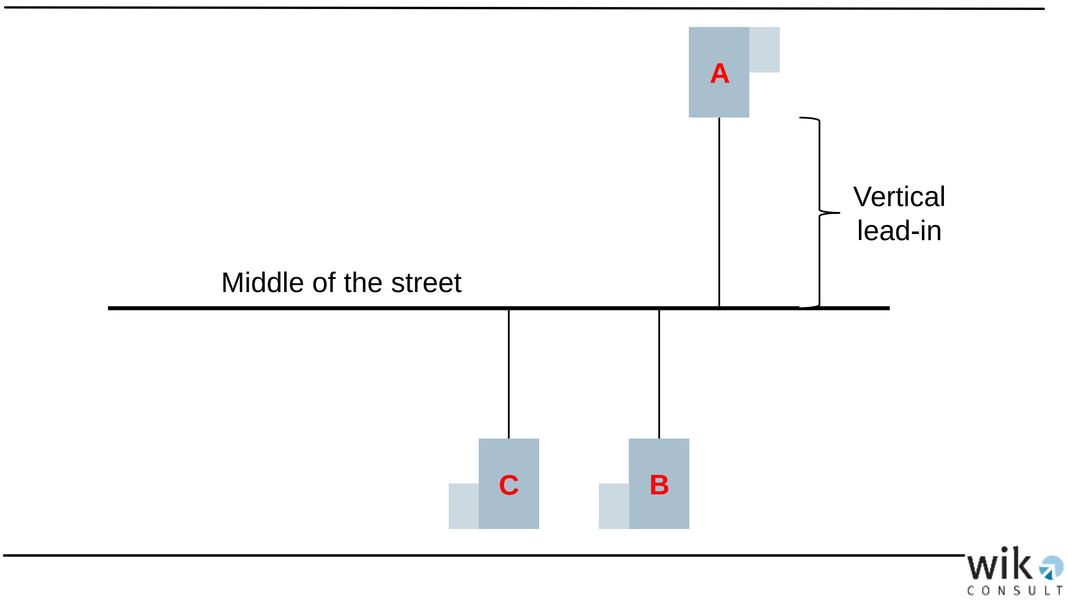
### 2.1.1 Network laterals

35. Geo-data based access network models typically operate with street representations as a line, representing the middle of the street, and with a geo-coordinate representing the ETP location at the building. The building vertical is formed by determining the base point of the vertical line connecting the ETP with the street. It is the shortest distance between the street and the building. The distance is determined by the difference in the geo-coordinates of the ETP and the base point in question (see Figure 2-1). This distance includes all segments of the vertical access line between the middle of the street and the ETP. Thus, it covers half of the metalled surface, the pavement, if existing, and the berm up to the private property boundary, sometimes called lateral in the New Zealand context, and also the distance between the private property boundary and the building's edge with the ETP. Thus we have to state that all distances, also those of the laterals, are included in TERA's model configuration already by principle. This typical modelling contradicts Analysys Mason's and Chorus' statement that the laterals are excluded[1]: In point of fact the contrary is correct, the laterals are included!

36. If one now moves the trench from the middle of the road towards the major side by subtracting or adding half of the street width from/to the vertical line (the building's distance), depending on whether the building is located on the major or on the minor side, nothing changes substantially (see Figure 2-2). Following this logic, TERA started its configuration by locating the first trench at the major side of the street and considered the full road width for the narrower side building distance. So the verticals are modified accordingly. Thus, in any case the complete distance between the building and the trench (CCT/FTP) has been considered. It is clear that no lateral length got lost in TERA's model.

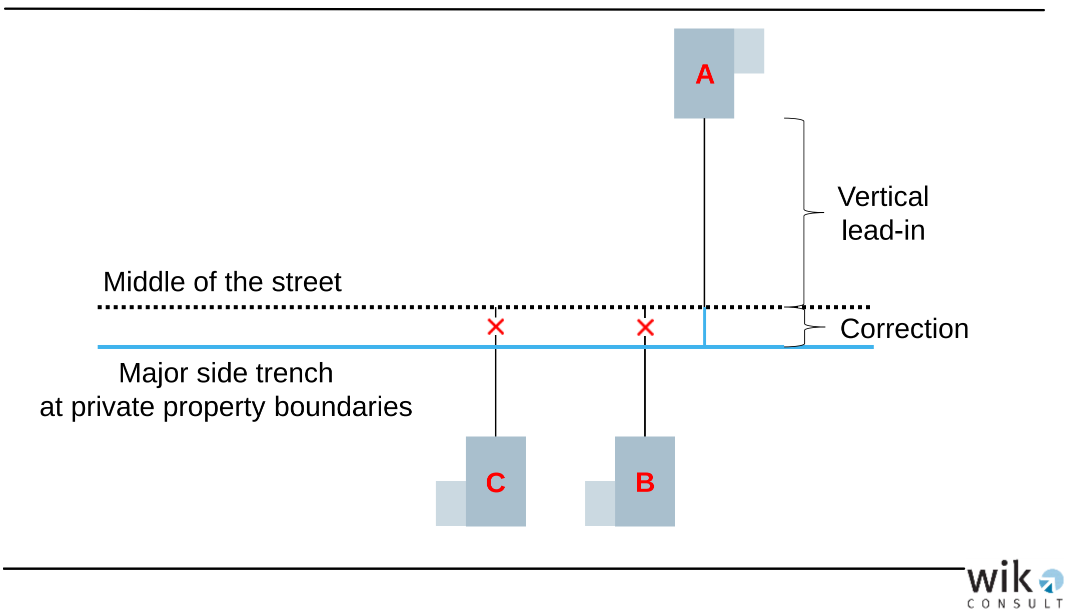
1 Analysys Mason Submission of 11 August 2015, Section 2.1, Chorus Submission of 13 August 2015, paras 8.7, 86.1 and 112.

Figure 2-1: Road representation and trench assumption in the middle of the road




Source: WIK

Figure 2-2: Trenching on one side (major side) of the road

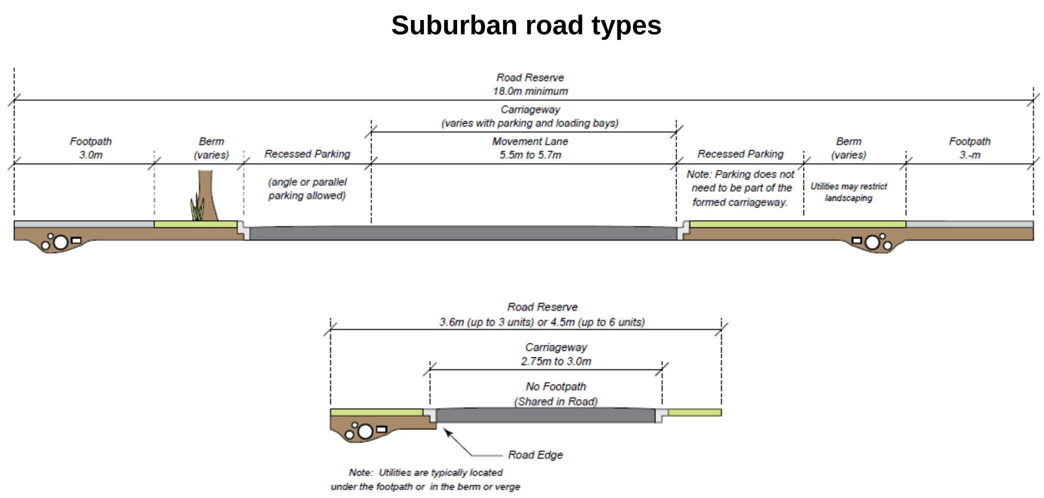



Source: WIK

37. It is most efficient to locate the trenches at the border lines of the private property, and not at the edge of the metalled surface of the road. This we already stated

and argued for in our recent Cross-Submission.[2] The street is crossed much less often under this approach and accordingly fewer long lead-ins would be required (per single building or, even more efficient, per building pair[3]). Such deployment close to the boundaries is also recommended in New Zealand's standard for new subdivisions infrastructure (NZS 4404:2010)[4]. This is recently confirmed by Chorus when stating that the network terminal is located at the private property boundary[5]. Also Downer confirms that the connection points for each customer are located at the property boundaries[6] and that trenching should occur as close to the boundaries as possible[7]. Thus we conclude that proper modelling has to consider the trenches to be as close to the boundaries as possible and not at the road's edge or somewhere in the middle.

Figure 2-3: NZS 4404:2010 Road deployment standard, location of utilities' ducts




Source: http://content.asce.org/files/pdf/Hall.pdf, p. 54 ff

38. In case of aerial deployment there is of course no influence on the trenching cost for road crossing cables. In case of underground construction we distinguish: a) one major trench per road: there is a street crossing for any 2 customers on the minor side of the road. One can consider in detail which part of the vertical line is allocated to the street crossing, and which to the lead-in (private property

2 WIK-Consult, Cross-Submission of 19 March 2015, Section 4.5, para. 130.
3 See also Downer, August 2015 Submission, para. 7.g., 16.b.
4 See http://content.asce.org/files/pdf/Hall.pdf.
5 See Chorus, Contractors, Wiring homes for broadband, www.chorus.co.nz/contractors, printed 03 March 2015.
6 Downer, August 2015 Submission, para. 1.e.
7 Downer, August 2015 Submission, para. 2.c.iv, 7.g.

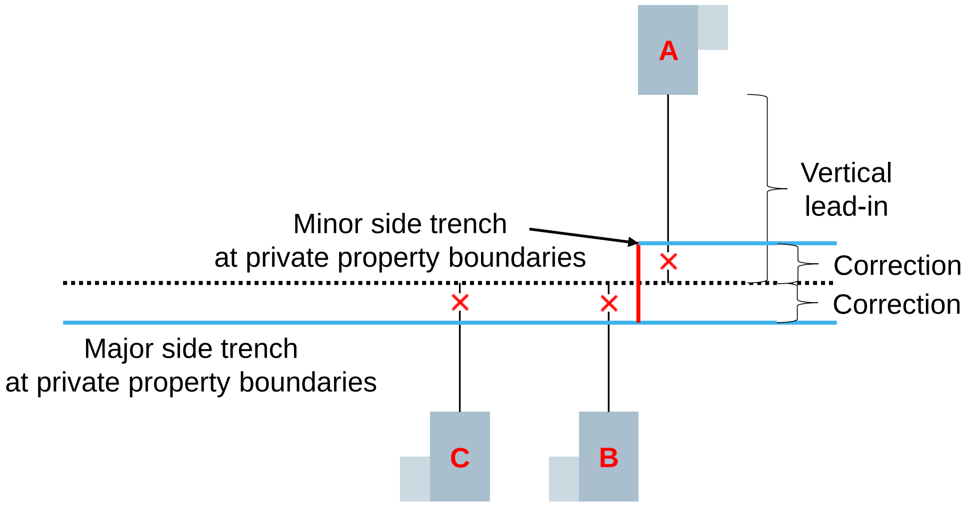
boundary to building), which may be taken out of consideration because that is already paid by the end-customer; b) in case of trenches on both sides of the road a street crossing has to be considered connecting the two trenches. The length of the street crossing is determined by the distance between the private property boundaries of the opposite road sides. This we can call the road width (see also the red line in Figure 2-4).

39. The roads have to be crossed, either for connecting the minor side trench or some houses on the opposite side of the major trench or for connecting the minor side trench. These crossings are composed of crossing the (metalled) surface of the road, pavement(s), if existing, and berms.

40. For calculating the cost for crossing the road, one can adopt a very detailed approach, and subdivide the street crossing into the part crossing the metalled surface and the part crossing a pavement and the berms, as Analysys Mason and Chorus recommend. Since in this case, the distance between trench and boundary is already completely taken into account, an additional lateral would result in a double counting of length and a significant cost overestimation.

41. We believe it to be more practical and to represent current state-of-the-art modelling to simplify this process by using an average trenching cost for street crossings per meter instead. We assume that TERA up to now also did not distinguish these detailed cost components but has instead chosen to use the most expensive cost estimates for crossing the metalled road surface, with the effect that their model overestimates the real cost to some extent. The detailed cost components should actually be incorporated and reflected in the average cost of road crossings. Keeping in mind that the relevant length of the laterals are included in the road crossings, the different costs for pavements and berms then will reduce the average cost of road crossings to some extent. In order to provide the most correct cost estimate, this is the approach we consider TERA should have implemented in the model. In any case they should certainly not follow Chorus' recommended approach due to of the double counting.

Figure 2-4: Trenching on both sides of a road




Source: WIK

42. In our experience no approach to regulatory geo-modelling actually considers the edges of the metalled surfaces of the roads and its distances from the private property boundaries in this level of detail and based on exact geo-coordinate representations of the border lines. It is far more common for regulatory modelling of this type to utilise average values for the width of the metalled surface of the roads, pavements, berms and other land up to the private property boundary. More granularity would increase computation complexity and time dramatically with limited additional accuracy.

43. Since the geo-modelling is not completely transparent, it has not been possible to check whether the point representing the building really is at the ETP, at the building's edge towards the street or somewhere in the middle of it, or, at worst, at the rear of the building. In any case, the ETP may be located at the end-customer's most convenient point for entering the building, e.g. close to the star point of the inhouse cabling. Thus, in any given instance there will be a vertical length uncertainty of some 20 m, and as a result the cost estimate will typically include an overestimation of the vertical distance and the lead-in length with an impact on the relevant cost estimate. This estimation error has no relevance if the lead-in costs, which are actually being paid by the end-customer, are not included in the total modelled investment cost.

44. As Chorus states "*the lead-in is the property owner's responsibility*" and covers the distance between the network terminal at the boundary and the ETP[8]. This includes any lateral components between the property boundary and the network terminal point, which might exist. Thus, if they were to be considered in detail, these lateral elements would also have to be excluded from the UCLL cost consideration. Further, under this approach, any horizontal lead-in elements would also have to be excluded (if they had in fact been taken into account).

### 2.1.2 Optimization of exchange areas not optimal

45. Following WIK's recommendation, TERA carried out some further optimisation of the exchange areas in which they used a straight line approach for allocating the street segments to the local exchanges. This approach can however lead to neglecting geographical constraints, as noted by Analysys Mason[9]. This is the reason that WIK[10] proposed to allocate the street segments, or even more precisely, the buildings, according to the shortest street distances to the local exchanges. Only this approach to optimisation allows the model to delineate the local exchange access areas in the most efficient manner and to take into account all relevant geographic constraints. This approach is more consistent with the efficiency objective than Analysys Mason's proposal to simply take the existing access areas together with any historic inefficiencies that may exist.

### 2.1.3 Lead-in assets in case of second row buildings require correction of shared assets

46. The approach to calculating the cost of lead-ins is now significantly more efficient than in TERA's 2014 model. However, as noted, lead-ins are in fact paid by the end-customer already[11]. Thus these costs should not be included in the UCLL cost consideration at all, since otherwise, in effect, the customer pays twice.

47. Taking this into account, if the Commission reconsiders its view, and decides to accept this position in its final determination, we think it would be correct to make a further adjustment. We agree in principle with TERA's suggested approach to considering sharing the lead-in infrastructure in case of buildings in a second or even third row from the roads. Unfortunately their approach includes a total

8 See Chorus, Contractors, Wiring homes for broadband, www.chorus.co.nz/contractors, printed 03. March 2015.

9 Analysys Mason, Submission of 11 August 2015, Section 2.2.

10 WIK-Consult, Submission of 12 August 2015, para. 278, also referring to http://www.cmt.es/c/document_library/get_file?uuid=0de86a85-ba72-4294-a9b0-e397cd77a7d6&groupId=10138, Bottom-up cost model for the fixed access network in Spain – reference document, IK-Consult, 15. March 2012, Section 5.1.

11 See Chorus, Contractors, Wiring homes for broadband, www.chorus.co.nz/contractors, printed 03. March 2015: "The lead-in is the property owner's responsibility and can be installed by an electrician or builder."

(shared) trench length underestimation. As a consequence of that, the cable length is also underestimated (see Analysys Mason, Submission of 11 August 2015, Section 2.3). In contrast to the position set out by Analysys Mason, the cable length (Vertical_Length) would be significantly shorter if one cable is used splicing out each building access instead of using separate individual cables per building.

### 2.1.4 Mapping of buildings to road segments efficient

48. In Figure 2.5 of Analysys Mason's August 2015 Submission, Section 2.4, it is clear that the model has implemented an efficient approach to accessing the end point of a road segment by a lead-in line. This is consistent with the way in which an efficient network operator would build this. "Unfortunately" this approach generates lower cost than the approach Analysys is proposing. This approach would require longer horizontal trenches along the streets. We cannot clearly test the reason that the TERA model is deploying in this manner. We are clear however that for the example given by Analysys Mason, the model implements the most efficient approach. Analysys Mason describes an intelligent solution of the modeller and not a model error. Therefore the length of the road sections do not have to be increased as Analysys Mason has argued.

## 2.2 Trenching cost

49. Trenching costs are the most significant cost driver for access networks. This means that it is very important to determine their level appropriately. This has to be done in an objective manner, using independent sources not influenced by the regulated incumbent's historic data, its topology and possible inefficiencies. We have discussed this very important requirement extensively in our recent submissions[12].

50. Based on our analysis, we are sure that the approach demanded by Chorus and its consultant Analysys Mason is wrong and results in an overestimate of costs. Chorus and Analysys Mason state that Chorus' actual costs derived from Chorus' recent UFB and RBI project data as a result of quotation processes represent the most efficient costs an HEO would incur and therefore have to be taken by the Commission as model inputs. From an objective regulator's point of view this only could be true if all operators in the New Zealand market would face (at least) the same cost. That is, however, not the case. In any case a more objective approach to estimating the most efficient costs, would have been to ask all operators about their actual costs during the data collection phase.

**12** WIK-Consult, Submission of 12 August 2015, Sections 5.3, 5.4, 6.3, 6.4, 7.2.5, 7.2.12, 7.2.13, 7.2.14, 7.2.15, 7.2.16, 7.3.1.2, 7.3.1.4, 7.3.1.5, 7.3.1.7, 7.3.1.12, 7.3.1.18, 7.3.2.5, 7.3.2.6, 7.4.6.

51. We have examined the possible reasons why the Chorus costs from the UFB and RBI deployment might be overestimated, and may not be the most efficient costs which an HEO would incur.

- High cost can occur because the areas deployed with one contract are relatively small, so that the associated construction or project costs are high compared to the trench length built. For example, project sizes of below 50 m would be an indicator of possible higher costs. Further, the identification of 6000 UFB areas in relation to the 778 local exchange areas indicates a high probability of inefficiency - because this level of granularity results in a large number of very small construction projects and as a result very high overhead costs.
- A further reason for higher costs, can also be that the details of the deployment method are determined in advance instead of giving the supplier free hand to optimize cost in any given situation within acceptable deployment guidelines.
- In our experience we also have observed increasing costs if the tender is detailing too many specific cost items instead of asking for one fixed price per meter for the project, (with only some upside options for unforeseeable underground risks).
- Analysys Mason have proposed an extrapolation of the costs incurred in the UFB and RBI projects across all areas, including the rural area. This is relevant to the cost estimates applied since Chorus does not actually provide entire ESA cost data covering the modelled area, and, in addition, because the UFB and RBI projects Chorus is performing do not cover the entire UCLL area. We have significant doubts that the approach that Analysys Mason propose provides a sound and transparent estimate of representative costs for the modelled areas. In fact, as set out in more detail in Section 2.2.2, we see a trend for significant cost overestimation in the logic Chorus presents with a high initial cost level.

52. In our experience in other jurisdictions, the NRA often carries out a more detailed data collection process, and requests trenching cost data from all operators in the market. The Commission chose not to pursue this approach as far as we have understood. Instead the Commission approached the engineering company BECA[13] for a trenching cost estimate which is taking into consideration the different soil classes of New Zealand and one urban zone.

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**13** Planning, supervising and managing many infrastructure projects in New Zealand and abroad and being more objective than any construction company itself, whose own interest are high regulated prices for the sake of their own income.

53. Different surface types have individual opening and reinstatement cost. These are typically not documented in databases. In the absence of sound information, an average cost per soil type should be included in the trenching cost. We understand BECA's cost include these.

54. In the absence of fuller information on actual trenching costs faced by operators, we believe this approach to be reasonable for bottom-up cost modelling. The most important data for cost determination of an access network is an appropriate average trenching cost per meter per trench size, trenching methodology and soil class. BECA's cost model includes opening and reinstatement costs for all deployment methods considered such as excavation, backfill, surface repair, reinstate etc.[14]

### 2.2.1 Chorus' omitted cost are not omitted

55. In our experience as regulatory modellers, we generally do not favour an approach to the cost estimation which relies on excessively detailed data for cost modelling purposes. There are two reasons for this. On the one hand, excessively detailed information increases the complexity of the model, of the modelling effort and cost required, and the potential for model errors. On the other hand there is a risk of inherent significant cost overestimation due to measurement error and inadvertent double counting, and furthermore, if cost items are modelled at too granular a level, there is a high risk of parameter inconsistency if multiple sources are used.

56. An example of the risk of cost overestimation can already be observed in the case of modelling the lateral in too detailed a manner as already described in Section 2.1.1 above. Problems of overly detailed itemization can also be observed when considering the degree of detail in Chorus' UFB and RBI project data. A large number of projects do not contain full details of the various add-on cost Chorus seeks to claim as relevant in order to increase the trenching cost. Since they lack of details about arborist, traffic management, handling fees, these projects have not been omitted from the sample for the trenching cost extrapolations[15] Analysys performed. By this the sample size used for estimation and extrapolation got significantly smaller, and less clearly representative of the actual range of projects and costs incurred. As a result, the uncertainty inherent in estimations increased and reduced the quality and reliability of the Analysys Mason extrapolation. In comparison, all of the detailed itemized costs could have been included in an overall average trenching cost approach with a stronger claim to reliability.

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**14** See BECA model, BECA-report-FPP-corridor-cost-analysis-of-trenching-and-ducting-rates-in-NZ-28-May-2015.xlsx.

**15** Analysys Mason, Annex A, Statistical estimation of trenching costs based on Chorus recent UFB and RBI trenching experience, submitted by Chorus, August 2015.

57. We understand that the costs Chorus claims are omitted[16] are in fact already included in the average trenching cost data used by TERA. The same is true for Chorus' suggestion that some cable related costs are omitted also – we understand them to in fact already be included.

58. An all-inclusive average cost, as we understand BECA's data to be, are better suited to the modelling and cost estimation process. Since during modelling one does not know where arborist or traffic management cost will occur and at which amount, only an average cost per meter can be considered. As with the BECA data as we understand it, these factors should be priced into the average trenching cost instead of being treated as a separate item. This also makes it easier to use benchmarking to test trenching cost. Chorus/Analysys Mason did not give any evidence that BECA's data lacks any element of relevant cost, or that it underestimates efficient costs. Rather, Chorus/Analysys Mason have just assumed this by comparing the BECA data to some sample of Chorus' own project cost data.

59. Chorus'/Analysys Mason's methodology uses one example and derives from it several changes of input parameters.[17] In our experience, to analyse the data in this manner is completely incorrect. It is pure speculation to attempt to draw conclusions from one example (directional drilling) and extrapolate them to other calculations (such as chain trench, urban build-ups) in the absence of any compelling and uninterrupted chain of evidence. Even the example which forms the basis of this extrapolation is unsupported by dependable evidence: Some elements of BECA's costs are deleted (traffic management and overheads) in order to make them "comparable" with Chorus' data. This demonstrates that BECA already included costs which Chorus suggests should be omitted. In its cost calculation, Chorus then adds these costs back directly by averaged separate estimates or indirectly by averaged aggregated estimates. Chorus/Analysys Mason do not present any analysis of the basis on which comparable costs differ from each other. There is no analysis but simply assertions that the extrapolated efficient costs, after this treatment should be higher than those used by TERA.

60. In fact, we consider that the opposite holds true: BECA's costs reflect efficient costs which would be incurred for the cost modelling of the nationwide network of an HEO while Chorus' examples do not reflect that. That also holds for the arborists costs explicitly mentioned by Chorus/Analysys Mason as a missing add-on. While, as TERA stated, that this data have not been provided by Chorus, these costs cannot be expected in TERA's model. Given that all trenching costs and reinstatement costs were calculated by BECA, it is appropriate for TERA to

16 Chorus, Submission of 13 August 2015, para. 111.
17 Analysys Mason, Submission of 11 August 2015, p. 15.

expect that these costs have been included in BECA's costs. It is clear from BECA's last submissions that BECA considered arborist efforts to the extent necessary in its proposed "cover all" rates.[18]

61. We also note that handling fees and hauling fees for copper and fibre cables also have been claimed for at an average cost per meter, while fibre often is not hauled but blown in. Since Chorus now also makes a claim for other omitted cable installation cost we consider this simply to be a demand for double counting. It is unclear what difference Chorus considers exists between "cable hauling" and "cable installation" Here again, such detailed itemization gives rise to the danger of double counting.

62. We agree that aerial telecommunication cables should have a slightly higher price than the underground cables because of the pull enforcement they require. Here again, we consider that the costing data which Chorus provided may not represent the efficient costs which would be incurred by an HEO. As with trenching cost information, the Commission should not simply accept the Chorus data as representative of efficient costs, but instead investigate objectively benchmarked market data to ascertain that cost.

63. We will show that, in fact, all the additional cost elements claimed by Chorus have already been considered and are included in the last version of the TERA cost model. In its last version of the model TERA already added installation costs to copper and fibre cables, with the result that the cost for cables are significantly increased in the model:

18 BECA report, FPP Corridor Cost Analysis Response to Submissions, 17 April 2015, p. 8f.

Figure 2-5: Comparison of cable costs TERA model 2015 versus TERA model 2014

[

] **CNZCI**

Source: WIK calculation based on TERA cost models

64. In the TERA model this can be identified in detail in the sheet "Unit costs calculation"[19]:

a) Copper cables

The cells L459 to L536 show, that costs for installation/hauling, overhead and handling have been added [ ] **CNZCI.** As these cost vary significantly, we understand,

**19** See TERA Model CI-ComCom – Inputs – v8.0.xlsx.

that the cost differences also reflect the different costs between underground and overhead installations.

b) Fibre cables

In the cells L543 and M558 costs for installation/hauling, overhead and handling have been added to the original cable costs [ ] **CNZCI**. We can only explain these huge differences by a mixed calculation for underground and overhead installation. The remaining difference is not justified at all, as we have shown in our August 2015 Submission.[20]

65. The result of our analysis shows, that all cost elements which were claimed as omitted have in fact been added by TERA and thus are considered. This is not only confirmed by TERA by the significantly increased or added values in the model, but also by its statement "*Fibre and copper cables have been updated with the unit costs used in the model developed by Chorus.*"[21] These elements of cost have been considered in the model, and are not omitted as has been suggested. Nevertheless, we continue to have significant concerns at TERA's practice and the Commission's approach of simply taking the unadjusted costs supplied by Chorus without testing to ensure that they do in fact reflect efficient practices.

66. We compared the new fibre cable costs of the TERA 2015 model with the cable costs of the Swedish cost model (material costs including all installation and overhead costs). Except of one fibre cable, all cables in Sweden are cheaper up to a factor of 5 than the cable costs used in New Zealand:

**20** See WIK-Consult, Submission of 12 August 2015, para. 273 to 275.
**21** See TERA, Modelling Changes, June 2015, p. 8.

Figure 2-6: Comparison of cable costs in TERA 2015 model versus the cable costs of the Swedish cost model

[

] **CNZCI**

Source: WIK calculation based on TERA cost models and on Swedish cost model, http://www.pts.se/sv/Bransch/Telefoni/Konkurrensreglering-SMP/SMP---Prisreglering/Kalkylarbete-fasta-natet/Gallande-prisreglering/, Final HY Access model 10.1.xlsm, sheet "I_Cost_Cable", columns J and L

67. This comparison confirms, that TERA already has included all costs for installation/hauling, overhead and handling. Not only this, but it demonstrates clearly that there is still a need of further cost reductions in order to reflect efficiency. This is even more apparent since the Swedish cost base for the year 2013 is already lower today, and continues to decrease due to increasing demand

for fibre cables. In Sweden, for instance, we observe that there is an annual price decrease for the fibre cable of - 2.0%.[22] In fact, after extrapolating the prices of the Swedish model until 2016, all types of fibre cables are cheaper than in the base year 2016 of TERA's model.

68. TERA's own international comparison indirectly confirms, that the lower Swedish copper cable costs are appropriate for use in New Zealand: TERA here only made adjustments due to alleged differences between trenching costs and cable lengths. Cable costs per metre have not been adjusted in the benchmark by TERA.[23] That demonstrates that the Swedish copper cable costs represent a reasonable estimate of efficient costs. We see no indication why this should not also hold for the Swedish fibre cable costs.

### 2.2.2 Chorus and Analysys Mason approaches for trenching cost and their BECA critique overestimate cost significantly

69. Chorus UFB and RBI roll-out project data, even when the ring fenced large cities are excluded, still are to a very large extent restricted to urban areas[24]. They use project information from 125 ESA areas only[25,26], because these include more than 2 projects and have "*sufficient project data to derive robust average cost per metre'*[27]. We doubt this. The projects do not cover the whole ESA or even a major part of it – in fact, only projects below 50m have been excluded. The projects' size and further details are unavailable for testing and so cannot be checked. Thus, there is no proof or even any indication that these data should be considered as representative for the rest of the country – in fact the available evidence is to the contrary .

70. For instance, assuming that the project selection for the Analysys Mason extrapolation excludes all projects without cost details about reinstatement, traffic management, arborists and laterals, we have to conclude that the RBI projects, which all do not include these data[28], are accordingly completely excluded. This means that the remaining projects are not at all representative of the large rural areas at all.

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**22** See Swedish cost model, http://www.pts.se/sv/Bransch/Telefoni/Konkurrensreglering-SMP/SMP---Prisreglering/Kalkylarbete-fasta-natet/Gallande-prisreglering/, Final HY Access model 10.1.xlsm, sheet "I_Cost_Cable", columns P and N until row 30 respectively row 45.
**23** See TERA, International comparison of TSLRIC UCLL and UBA costs and prices, June 2015, Figure Table 6, page 23.
**24** Figure 1, Chorus, Submission of 13 August 2015.
**25** Chorus, Submission of 13 August 2015, para. 95.3.
**26** Analysys Mason, Submission of 11 August 2015, Annex A Section A3.2.
**27** Chorus, Submission of 13 August 2015, para. 95.2.
**28** Analysys Mason, Submission of 11 August 2015, Annex A Section A2.5.

71. It is the case that the reliability of Analysys Mason's extrapolation of costs from the selected projects across the entire modelled ESA is unclear not and the results doubtful. This is despite the fact that the overall description of their approach sounds, on the face of it to be reasonable. It is even more doubtful that the extrapolation to the rest of the other ESAs (excl. Wellington and Auckland), can be depended upon as a realistic cost estimate since those are the more rural ESAs. The lack of transparency in the extrapolation process means that we cannot check the estimations made and the extrapolations estimated for the rural areas. The clutter types considered in the Excel spread sheet only are those of denser populated areas ([ ] **CNZCI**). Also the road and rock types "other" respectively "soft" are missing.

72. Thus, the more rural segment of the modelled area is effectively ignored despite the fact that it plays a relevant role in UCLL cost determination (see Section 2.2.8). Chorus itself states[29] that from its *"UFB experience it is demonstrable that such areas* (WIK: Urban) *are much more costly than rural".*

73. Even the rest of the regression calculations in the Excel spread sheet remains intransparent since the files provided to the Commission now only have figures without any formula. Chorus itself states[30] that from its *"UFB experience it is demonstrable that such areas* (WIK: Urban) *are much more costly than rural".*

74. Regarding the regression of trenching cost our analysis of the description provided by Analysys Mason[31] is that it remains unclear to us:

- how the blending of the project data per ESA is performed (mean value, weighted mean value),
- how the regression weighting is used,
- whether the assumption of homoscedasticity is fulfilled in the data and
- how outliers are treated and why.

75. We believe that the use of the regression method in principle is correct, if the fitted relationship is representative in all areas. However, we severely doubt that the fitted relationship is representative in all areas. From the discussion above, it will be clear that the basic data over-represents areas where rollout has already started. (The best data from the areas around Wellington and Auckland (UFB data) is predominantly urban). Since the data selection is strongly driven by the availability of data, this means that there is an underrepresentation of rural and

**29** Chorus, Submission 13 August 2015, para. 110.
**30** Chorus, Submission of 13 August 2015, para. 110.
**31** Analysys Mason, Submission of 11 August 2015, Annex A.

remote areas in the data. This is critical since these areas are important contributors to the length of the access network.

76. The model might have a good representation of urban areas but clearly should not be taken to derive predictions for trenching costs in underrepresented areas. Surprisingly, this selection bias in the data is not even discussed. On top of this mismatch the over-representation of urban areas is reinforced in the estimation procedure weighting the observations with road lengths, so that urban areas (higher total road length) get a higher weight in the regression. This makes the outcome more suitable for the prediction of those areas that are well represented in the data set, and leads to the conclusion that the model is overestimating cost for the rural areas.

77. Chorus claims that the cheapest trenching methodology cannot be applied for a whole area, because such a deployment approach is not achievable[32]. Instead, 25% of the trenching should be considered to be performed in an open manner – at significantly higher cost. We do not agree! First, the trenching cost should be applied on the basis of the soil class, which might as a result substructure an area. Second, we would expect that barriers are included in the average trenching cost. Barriers of course have to be dealt with during trenching because the various trenching methodologies allow for different methods to deal with such barriers (see Section 2.2.5) and in many cases do not require classical open trenching at all. This especially holds for the hydro trenching methods mentioned below (Section 2.2.5). We believe 25% open trenching will not be required in rural areas in order to deal with barriers, unless it is the appropriate trenching methodology for that area. Other methods should be considered where appropriate.

### 2.2.3 Drill hole width increment negligible

78. Analysys Mason[33] claims that BECA's drill hole size is too small for many of the duct combinations possible in the model. In general we can confirm this observation, but only if one assumes that 110 mm ducts would be used. However the effect of choosing wider holes would in fact be minor due to the small increments to be made. Equally, if one was to follow the Downer recommendations for ducts (see Section 2.2.6 below) it is clear that the duct size used in the model is significantly too large, and the required hole size would decrease accordingly if the appropriate ducts were used. Thus, as a result, the modelled drill diameter actually has to be reduced instead of increased for the larger duct size as Analysys Mason claims.

**32** Chorus, Submission of 13 August 2015, para. 105 and 106.
**33** Analysys Mason, Submission of 11 August 2015, Section 3.3.

### 2.2.4 Harmonic weighting calculation

79. Chorus states that "*TERA have not applied a correction to its harmonic weighting calculation to derive the distribution of duct sizes*".[34] Chorus refers to Analysys Mason's evaluation of the TERA approach where they conclude that "*It is obvious that the intention is to model a harmonic weighting, not an exponential harmonic.*"[35]

80. We analysed TERA's model and model description and the we found, that TERA's model is doing exactly, what is set out in their model documentation. As set out below, there is no mismatch between TERA's model description and its model, as claimed by Chorus and Analysys Mason.

81. TERA calculate the average trenching costs for each combination of soil type and trench size. These costs depend on the number of ducts and size of ducts used. Therefore TERA estimates the average configuration of the number of ducts and size of ducts for each trench size. To do this, TERA assumes, that "*The weights used for the small, medium and extra large trenches are the inverse of the number of ducts, as the occurrence of large trenches decreases sharply with the size*".[36] Having a look at TERA's model confirms, that they are following this approach. Hereby TERA uses the exponential function for the negative value of the number of ducts: e^(-x) with the result that this reflects the intended sharp decrease of occurrence of number of ducts within a trench with the increase of number of ducts[37]:

| Number of ducts | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Inverse | 36,7879% | 13,5335% | 4,9787% | 1,8316% | 0,6738% | 0,2479% | 0,0912% | 0,0335% | 0,0123% | 0,0045% |

82. The specifics of the wording in their model documentation may not be precise or even misleading, but the sharp decrease of occurrence of the number of ducts in a trench is modelled by TERA as intended and is adequately represented by an exponential function. Using the suggested approach by Analysys Mason, the relation 1/x, would not reflect this sharp decrease, as we simulate:

| Number of ducts | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Inverse | 100% | 50% | 33% | 25% | 20% | 17% | 14% | 13% | 11% | 10% |

83. The relationship between the highest and lowest number of ducts is significantly lower than currently modelled by TERA. This result was not intended by TERA in

34 Chorus, Submission of 13 August 2015, para. 109.3 and para. 8.5, 86.3.
35 Analysys Mason, Submission of 13 August 2015, Section 3.4.
36 TERA, Model Documentation June, Section 5.2.3.2.
37 See CI-ComCom - Inputs for trenches - v8.0.xlsx, sheet "Soil-specific trenching costs", rows 60 to 64.

order to estimate realistic average trenching costs. We demonstrate the accuracy of this analysis by transforming the weights of the equation of the calculations above into the distribution of number of ducts:

| Number of ducts | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Distribution TERA | 63,21% | 23,26% | 8,56% | 3,15% | 1,16% | 0,43% | 0,16% | 0,06% | 0,02% | 0,01% |
| Distribution proposal Analysis Mason | 34,14% | 17,07% | 11,38% | 8,54% | 6,83% | 5,69% | 4,88% | 4,27% | 3,79% | 3,41% |

84. In other words: Using Analysys Mason's suggested calculation methodology would decrease the probability of 1 duct trenches from 62.21 % to 34.14 %. From our experience in network cost modelling, we can confirm, that in our view, TERA's approach is much closer to modelling an HEO appropriately than the suggested approach proposed by Analysys Mason.

85. It is not clear to us however why TERA has chosen to apply this estimation process instead of using the bottom-up calculated number of ducts per trench meter reflecting the correct results the geo-modelling process should deliver. The adoption of this approach remains an open question since the rationale is not dealt with in the TERA model documentation

### 2.2.5 New trenching methods

86. Downer also suggests that hydro trenching should be considered. This new trenching methodology[38], *"which fast becoming a preferred installation methodology in urban areas"* has a number of advantages. It allows small trenching down to 40 mm, reducing trenching cost significantly, has a much lower risk of damaging already existing underground services and thus is best suited for congested areas, and it can be brought closer to the property boundaries. On the other hand, it is unsuited for loose or even hard rock environments.

87. We (and others) have not mentioned so far that there also exists a hydro drilling (drilling fluid) methodology which quite often is used in Europe instead of conventional directed drilling. This approach also has comparable advantages to those described by Downer. We recommend that this trenching method should be considered in all cases where this is cheaper than the other methods.

88. We remind the Commission that we already proposed the careful consideration of efficient cost modelling including a range of modern trenching methods which Chorus publicly states that it also applies[39]. These technologies are micro trenching, shallow trenching and surface mounting of cables. The use of these

**38** Downer August 2015 Submission, para. 2.
**39** WIK-Consult, Cross-Submission of 19 March 2015, para. 136, see Chorus: https://www.chorus.co.nz/installing-fibre/from-the-street-to-your-house#from-the-street-to-your-house/from-the-street-ot-your-home?&_suid=1426656922868006591678996245387.

where appropriate would generate lower trenching costs than those generated by BECA.

89. Drawing experience from new European trenching tools and equipment demonstrates that in addition to Downer's observations, the application of new state-of-the-art tools and technologies for the more rural environments would reduce the trenching cost significantly and that these should be considered where appropriate. This would be more consistent with a the choices made by a cost minimising HEO.

90. New machines for trenching allow to use the most cost efficient methodology even over short distances by applying the appropriate toolkit to a tractor like engine and change the tool in an easy and quick manner.[40] This approach would significantly reduce trenching cost down to 8 €/m (mole plough) where its use is appropriate, as examples from Sweden, Finland, Denmark, Germany and Austria demonstrate (see Figure 2-7). One remarkable tool, a vibration plough, allows for fast and low cost trenching even in loose rocky soil classes.

Figure 2-7: Flexible trenching tools improve efficiency significantly


Source: Echontech, http://www.econtech.info/branchenloesungen/breitbandausbau/

40 Borst, Florian, Stellhebel Tiefbaukosten beim Breitbandausbau, 9. VDE/ ITG Conference Breitbandversorgung in Deutschland, Berlin, April 2015.
http://www.econtech.info/
http://www.huddig.com.

### 2.2.6 BECA trench width and duct size too large

91. Downer states[41] that open trenches of 200 – 300 mm width would be sufficient for hosting one 110 mm duct. That is consistent with what we know from our experience of German, Austrian, Swiss, and other European underground construction standards for telecommunication networks. Therefore we recommend that the trench width of 400 mm and the trenching cost in the BECA cost tables should be adapted accordingly.

92. Downer also states[42] that the 110 mm ducts are no longer the preferred method for hosting fibre cables but instead PE multiducts with an inner diameter of 40 – 50 mm are now preferred. The 110 mm standard ducts already have been used throughout the developed continents for copper access network installations and then also have been used for the first fibre installations. Now, PE multiducts offer the advantage of being flexible for future use. The new ducts take advantage of the significantly smaller fibre cable diameters and the ease of blowing them into the tubes instead of needing to be hauled. As a result, we recommend the Commission should take account of this state-of-the-art technologies in the final determination by using smaller standard ducts of 50 mm and smaller trenches of 200 mm accordingly. These trenches would be capable of hosting a group of up to 4 50 mm ducts also. This especially takes into account that the Commission’s task is to model the efficient costs for an HEO’s network being deployed today.

### 2.2.7 No reinforcement for large cable trenches

93. In their February 2015 Submission Chorus (para. 93.1) and Analysys Mason (Section 2.14) make the argument that there should be additional protection of trenches carrying more than 5,000 lines. WIK responded to this point already in its last Cross-Submission[43] stating that instead route diversity (e.g. along both sides of the roads) should be used, if such high densities of lines in a single trench were to occur at all in an efficient access network design. Downer clearly confirm WIK’s view that route protection is more generally achieved by route diversity and that the duct/trench reinforcement “*methodology is not used at all in New Zealand*”.[44]

94. We once again point out that all such cases, if they actually do occur at all, result in negligible additional cost since their costs are significantly below the cost overestimations described above as still included in the trenching cost. For the reasons set out above, and summarised below, we strongly believe that the total

**41** Downer, August 2015 Submission , para. 3.b.
**42** Downer, August 2015 Submission, para. 9.a. and 1.g.
**43** WIK-Consult, Cross-Submission of 19 March 2015, Section 4.6.2.
**44** Downer, August 2015 Submission, para. 13.a. and 1.f.

estimate of trenching costs in the model has to be corrected downwards instead of upwards as argued by Chorus with support from Analysys Mason.

### 2.2.8 Summary: trenching cost still are too high

95. All examples set out above demonstrate that there still are significant potentials for the reduction of the trenching cost used in the Commission's model in order to reflect efficient trenching costs. Despite the fact the access network being modelled serves the majority of the New Zealand population in urban areas, the trenching cost, and thus the UCLL costs are predominantly determined by the rural trenches. The trench length per home connected is significantly lower in urban areas. This is caused by the higher population density compared to rural areas. The higher trenching cost in urban areas does not outweigh that natural difference - the trenching costs per home connected in urban areas are a magnitude smaller than those in rural areas.

96. Modern trenching methods as we reported above are not being considered in BECA's reports and cost calculations. Also smaller trenches and improved ducts would reduce the trenching cost even more than they are now. We expect this to be taken into account in the final model implementation.

## 2.3 Aerial deployment

97. In principle aerial cabling can be deployed everywhere, not only in areas with already existing EDB infrastructure, as Chorus claims[45]. It can also be deployed beside the EDB infrastructure, if the EDB poles are not suiting because of pole overload, poor pole location, etc. as Chorus suggests[46]. We believe therefore that the 2% reduction for aerial cabling compared to the EDB aerial infrastructure share proposed by the Commission for use in the modelling has to be rejected. Instead, the telecommunication share of aerial deployment should be higher than the EDB share of aerial.

98. Typically the EDB infrastructure can be shared easily, but aerial telecommunication access lines can be deployed aerially without sharing the EDB infrastructure, when sharing is not appropriate or more expensive. The HEO also can bypass EDB trench segments by its own (parallel) segments, when required or appropriate. This negates the argument made by Chorus that where there are problems in sharing the EDB infrastructure there is no aerial cabling for telecommunication access[47]. Therefore in our view, all of Chorus arguments and its logic for reducing the level of aerial cabling, are unsupported by overseas

**45** Chorus, Submission of 13 August 2015, para. 116 ff.
**46** Chorus, Submission of 13 August 2015, para. 116.1.
**47** Chorus, Submission of 13 August 2015, para. 117.

experience, misleading, and irrelevant. Instead, there are good reasons that the smaller and less heavy fibre access lines are likely to be more acceptable to local populations and the local authorities than the larger power lines, as a trade-off for the benefit of getting broadband access at a lower cost.

99. We believe that Chorus misinterprets the statement of Suella Hansen (Network Strategies) in the Commission's conference of April 2015 regarding the re-use and additional cost of Vector's aerial infrastructure. Chorus interprets the statement, *"it was economical to reuse only 65% of its existing poles for aerial fibre distribution if it was selected as UFB partner"*[48]. We understand that 65% of the fibre could be re-used without any relevant additional investment, if investment would be required at all[49]. For the rest of the poles there could be parallel pole installations or additional reinforcement investments, or other solutions.

100. In order to complete the view we cite another statement of Suella Hansen in the same conference[50]: "*universally what I'm being told by the EDBs is that there is very small marginal cost associated with adding fibre to the existing distribution poles, and that's not surprising in view of the load that needs to be carried in respect of power compared to fibre infrastructure. So, in terms of the 50/50, that would appear to indicate that that is on the generous side.*" This statement makes clear that a 50:50 cost sharing is to the disadvantage of the telecommunication use taking into account fibre cable size (diameter), weight (fixing technology), and technology (no isolators). Thus it is more than justified to take pole rental fees into account which are far away from a 50:50 cost share such that telecom operators should bear the smaller share.

101. Analysys Mason[51] claimed for an additional pole on the minor side of a road in case of aerial deployment. This arguments has already been rejected as unjustified by WIK[52] because the building height would be sufficient to capture the crossing cable and keep road clearance for high vehicles passing underneath. This view is indirectly confirmed by Downer[53] who state that the average distance between building and boundary is about 14 m, so the span length does not require any additional pole. The use of additional poles on the minor side of the road are also not state-of-the-art in any aerial deployment we know in Europe. Nevertheless, the Commission has modelled Analysys Mason's suggestion of an additional pole on the minor side of the road without any further examination[54], and especially not taking up the arguments we presented in our March Cross-

48 Chorus, Submission of 13 August 2015, para. 118.
49 Commerce Commission, 2015 Conference Transcript, p. 70.
50 Commerce Commission, 2015 Conference Transcript, p. 396.
51 Analysys Mason, February 2015 Submission, Section 2.6.
52 WIK-Consult, Cross-Submission of 19 March 2015, para. 135.
53 Downer August 2015 Submission, para. 1.c.
54 Commission, UCLL July 2015, para. 1160.1.

Submission. We see no efficiency rationale in adding the costs of unnecessary poles.

102. We also consider that in any circumstances where an additional pole was to be deployed in reality these would in all likelihood form part of the lead-ins paid for by the property owners. This is because they are part of the ETP Network terminal connection line, which is the property owner's part[55]. For the same reason that the lead-in cost must to be excluded from the UCLL calculation to avoid the double recovery of cost, similarly this additional poles on the minor side should also have to be excluded from the UCLL calculation.

## 2.4 Modelling of ducts

103. According to both Downer and consistent with our own experience of best current practice in other cost modelling assignments, the ducts being used in the TERA model are outdated. This is because, as described above, fibre cables are significantly thinner than comparable copper cables and they can easily be blown into mini- and micro-tubes, which are hosted in larger tubes up to 40 – 50 mm inner diameter (see Section 2.2.6). This allows the HEO to decrease the trenching cost significantly by reducing the trench width and the drill hole diameter by approximately 50% (see also Sections 2.2.3 and 2.2.6). Thus, while Analysys Mason and Chorus argue strongly for infrastructure cost increase, in fact the contrary is required – current practice would mean a reduction in infrastructure cost.

## 2.5 Optimization

104. The models used in this FPP procedure should reflect a state-of-the-art efficient HEO network for UCLL and UBA services. While the MEA for UCLL has been determined as a combination of FTTH Point-to-Point topology complemented by FWA in the rural areas and the local exchange locations have been taken as scorched nodes the efficiency assumptions implemented in the Commission's model do not result in an efficient network as modelled, and the costs determined by the model are not the efficient costs required under a TSLRIC process.

**55** See Chorus, Contractors, Wiring homes for broadband, www.chorus.co.nz/contractors, printed 03. March 2015: *"The lead-in is the property owner's responsibility".*

105. Major network optimization deficits can still be identified:

- Not delineating the local exchange areas according to the shortest street distance of each building (respectively street segment as a proxy) as to the surrounding local exchange locations[56],
- Ignoring the augmented shortest path principle as the most cost efficient approach and instead optimizing each building's connection on an individual shortest path[57],
- Ignoring an all traffic core network optimization and its related effects downwards to the UBA network aggregation nodes[58],
- Not using a homogenous MEA for both applications, UCLL and UBA, resulting in an extremely inefficient and poor bandwidth supplying FTTC network for UBA instead of the nearly unlimited bandwidth FTTH might deliver[59].

## 2.6 Re-use of assets

106. Chorus welcomes the Commission‘s rejection of the argument that it should value re-usable assets differently to other assets.[60] We do not intend to repeat our arguments why that would be appropriate. That has been done extensively in several submissions and cross-submissions before. Instead we want to focus here on the potential impact of considering the re-use of assets on the UCLL cost, noting to the Commission that this is the usual business practice of Chorus today.

107. The Commission asked TERA to estimate the impact of allowing for the re-use of existing ducts, based on information provided by Chorus including the proportion of Chorus' underground network which is ducted and the 2014 net book value recorded for ducts.[61] TERA estimated that the resulting impact for UCLL would be a reduction in the UCLL price of approximately 9% if re-use would be considered.

108. TERA's calculation approach on the impact of re-use on UCLL cost was not made available to parties. Therefore we were not able to replicate it directly in the model, since we did not have any information on their approach including the parameter values used to make the impact calculation. Instead, we tried to re-

56 See Section 2.1.2, WIK-Consult, Submission of 12 August 2015, Section 7.2.12.
57 See WIK-Consult, Submission of 20 February 2015, Sections 3.3 and 5.9; WIK-Consult, Submission of 12 August 2015, Section 5.3 and 7.3.1.2.
58 See WIK-Consult, Submission of 20 February 2015, Sections 3.3, 4.2.8, 5.6.2 and 5.6.4; WIK-Consult, Submission of 12 August 2015, Section 5.3 and 6.3.
59 See WIK-Consult, Submission of 20 February 2015, Sections 1.2, 2.2 and 7.2.1; WIK-Consult, Submission of 12 August 2015, Section 6.2.
60 See Chorus, Submission of 13 August 2015, para. 179.
61 See Commission, UCLL July, para. 1315.

engineer TERA's results and substituted some investment values in TERA's model *ceteris paribus* by others, which we regard as more appropriate.

109. We assume that the asset categories "ducts", "trench", "manhole" and "pole" can be re-used. Under this assumption a re-use saving factor of about 28% of the corresponding investment generates the cost savings of 9% which TERA advised the Commission .

110. Chorus itself has announced publicly that it has been targeting 40% of its UFB deployment using existing ducts. The Commission has not made clear why that should not be an achievable target for all areas where the model currently uses ducts or poles. If we take this degree of re-use as a relevant parameter for the investment savings of the network elements mentioned in para. 109 we end up with a UCLL cost saving of about 13.8% in 2016 increasing to 14.3% in 2020 instead of 9%.

111. We recommend that the Commission includes these re-use assumptions into its model for calculating the UCLL costs for determining the final FPP price.

## 2.7 FWA

112. According to our understanding of the Commission's current approach, Fixed Wireless Access (FWA) is an alternative access technology in areas where either a fixed (fibre) cable based access infrastructure is too expensive to be deployed or in addition to the cost argument a copper line based access infrastructure cannot supply adequate bandwidth for at least basic broadband services or even cannot supply a voice connection due to its length.

113. If FTTH is used as the MEA for the fixed access network, efficiency objectives mean that the primary argument for the use of FWA must be a cost argument as an alternative to fixed line access. This is because fibre is not affected by any major length dependent attenuation and/or cross talk problems as is the case for copper pairs. In an FTTH network there is effectively no length constraint to provide broadband access at its highest quality.

114. On this basis, it must be incorrect to use the copper line length as the basis for deciding the customers to be served by FWA.

115. Under the TSLRIC approach set out in the current and preceding Draft Determinations, the Commission has decided customers would be served by a fibre MEA, with FWA serving customers in certain rural areas. In the current draft Determination, however, it is proposed the homes served by a copper line longer than 5.3 km in the model will be served by FWA instead. Only in case of a copper MEA an approach, based on the length dependent cost, would be appropriate.

Despite having consulted on the choice of MEA in the past[62] the Commission has not considered a copper MEA in combination with FWA until now.

116. Even if the MEA determined by the Commission had been a copper access network, we would have expected that those homes with long and thus expensive access lines are likely to be the same as those currently with poor copper bandwidth. Thus, even in this case a cost based approach for replacing most expensive fixed by wireless access would be rational. In fact, the choice of MEA means that these homes will be served by a fibre MEA and can be supplied with a bandwidth of 1 Gbps and even more. Thus, there is no reason to provide those customers broadband access with a different technology (FWA) for quality of service reasons.

117. When one takes into account the use of the fibre MEA, we strongly feel that the Commission's approach of selecting the relevant FWA served homes according to poor bandwidth related reasons is certainly completely wrong. We therefore strongly recommend that the Commission step back to the principle of the approach taken in the December 2014 Draft Determination, namely serving the most expensive access lines with FWA. This is consistent with the use of an HEO.

118. In this case, fresh consideration should be given to the selection of the areas served based on cost efficiencies. For instance the areas served by FWA should be contiguous, hexagonal or circles in shape. They should also be adapted to the geospecific conditions of the area served.

119. The size of the area should be modelled using LTE advanced as the state-of-the-art efficient mobile radio technology currently being deployed, and with sufficient frequency space to transmit 300 MHz peak bandwidth at 700 MHz, if required, due to the number of customers served. Smaller cell sizes could be appropriate for a larger number of customers served in parallel.

120. We do not repeat all of our previous arguments regarding FWA, but we confirm that they still hold and that we expect them to be taken into account in the final determination.[63] [64] [65] In particular, we address the question of unbundling in Section 3.1 below.

121. We agree with the corrections of the sharing assumptions that TERA made regarding the sharing of equipment. The backhaul line may be shared, but the FWA active equipment typically is not shared. From our experience in this area we have seen a range of cost reducing options for sharing, down to national

62 WIK-Consult, Submission of 20 February 2015, Section 4.2.3.2 and WIK-Consult, Submission of 12 August 2015, Section 7.3.2.2.
63 WIK-Consult, Submission of 20 February 2015, Section 4.2.6.
64 WIK-Consult, Cross-Submission of 19 March 2015, Section 4.8.
65 WIK-Consult, Submission of 12 August 2015, Sections 7.3.1.6, 7.3.1.19 and 7.3.2.9.

roaming in such areas. Therefore the sharing restrictions TERA might apply should only be limited to those which cannot be realized due to New Zealand specific regulatory constraints.

## 2.8 End-user contributions for lead-ins and subdivisions

122. Chorus still submits strongly that end-user contributions for lead-ins and subdivisions should be included in the Commission's TSLRIC cost calculation[66]. The company states that it will change its capital contribution policy towards end-users and even reverse relevant payments received under its capital contribution policy *"if an efficient final monthly rental price is set, and backdating confirmed…'*[67]

123. These arguments are impractical, and largely irrelevant. The key issue to be considered is not whether Chorus will pay back to end-users a certain amount of money it received in the last two or three years as capital contributions from end-users. In fact if that particular paradigm would hold, Chorus should actuallyhave to pay back to end-users the amount of any lead-in payments it had received over the last 30 to 40 years. Additionally, in this situation, Chorus would also have to pay to end-users the capitalized value of the costs incurred by end-users in providing the open trench for the lead-in on their property. It becomes obvious that such an approach is absurd and totally inefficient given the high transaction costs caused by any attempt to implement. Over any repayment time span, the issue of the time cost of money also should be considered.

124. Chorus raise a second argument as to why the UCLL cost should not foresee user contributions for lead-ins. Chorus highlights the fact that Chorus does not seek any contribution for new ordinary residential connections to its UFB network. While this sounds like a real world argument, it is not relevant to the HEO in the context of a TSLRIC model.

125. The Commission's HEO approach, however, has to abstract from the real world situation that during the transition from copper to fibre users will have access to two different access lines. It is obvious that users are not prepared to pay twice for one access line they are effectively using. This is not the case in the HEO's MEA world constructed for the purposes of TLRIC modelling. This world is defined as a steady state situation where users only have access to a single fibre access line and no longer to copper. Therefore in the MEA world the HEO can expect to receive the same user contribution for the lead-ins as Chorus currently is receiving for copper access lines.

66 See Chorus, Submission of 13. August 2015, para. 76ff.
67 Chorus, Submission of 13. August 2015, para. 76.2.

126. In fact, the potpourri of numbers on the lead-in policies of Chorus and its predecessors and corresponding cost do not provide any comprehensive analysis of the costs which have been covered by Chorus or by end-users in the past.[68] It might well be possible that Chorus and its predecessors have been overcompensated for the lead-in in the past. Price determinations on the basis of international benchmarking such as the benchmarked IPP prices which the Commission has applied for UCLL in the past did not take account of such user contributions at all. Therefore there is a material risk of overcompensation in the past.

127. Chorus has formulated the cost responsibilities most precisely in its instructions for contractors in March 2015: "*Our network is typically build up to the boundary of the property… The lead-in is the property's owner responsibility and can be installed by an electrician or builder.*"[69] That statement defines clear rules of responsibilities and identifies the party or parties bearing the cost. This should guide the Commission in modelling the lead-in costs. They should not be part of the recurring monthly UCLL changes because those costs are in the responsibility of customers and they have to bear them directly. The user should not pay twice for such costs and Chorus should receive no payment for costs which are not incurred by the company.

## 2.9 Exclusion of further cost for capital contributions

128. Chorus still makes much in its submission of the argument that capital contributions should not be deducted from the modelled TSLRIC calculation.[70] According to Chorus, this would directly follow from a forward looking perspective. A backward looking subsidy perspective would not be appropriate.

129. Chorus ignores the fact that from a forward looking perspective, a cost minimising revenue maximising HEO would not necessarily build a fixed access network such that nationwide coverage is provided, rather it would only build the network to the extent that it would be profitable. As a matter of social policy and social inclusion, it is only on the basis of appropriate national or local government subsidies or capital contributions that nationwide network coverage could be achieved. This principle holds true in a forward looking perspective in exactly the same way as it characterizes the network deployment in the past. Therefore, under a TSLRIC model, the forward looking cost perspective simply has to take (external) capital contributions into account when calculating the relevant TSLRIC for UCLL. In fact,

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**68** See Chorus, Submission of 13. August 2015, para. 79.
**69** See Chorus, Contractors, Wiring homes for broadband, Version '150302141646', printed from https://www.chorus.co.nz/contractorson March 03 2015.
**70** See Chorus, Submission of 13. August 2015, para. 55.

there is no effective difference between a forward looking and a backward looking perspective in this context.

130. Chorus states that by excluding all capital costs outside TSO areas *"the Commission has excluded far more costs than Chorus or its predecessors ever received from end-users"*.[71] Surprisingly, Chorus does not provide any quantitative evidence to support this statement. Furthermore, Chorus, in its submissions to the Commission totally ignores those contributions which itself, its predecessors (and the HEO) has got (or would get) directly from sources such as the Government or indirectly from the TSO funding mechanism.

131. Accordingly, we think it is both pragmatic and acceptable for the Commission to treat the TSO area as the boundary within which any relevant capital contributions will be identified for exclusion from the TSLRIC investment.

## 2.10 Relevant demand

132. The Commission's model dimensions the access network such that it covers all potential fixed line demand defined by the address points of a certain data base. Only the subset of active lines bears the costs of this access network deployed and dimensioned that way on a per unit basis. Active lines are defined as Chorus copper and fibre access lines, the LFCs fibre lines plus the HFC access lines. We note for completeness that, during the preparation of this submission, the Commission has issued a further consultation paper affecting the network footprint and the resulting estimate of demand. There is a separate submission process in relation to this material.[72]

133. We have argued several times and most recently in our August 2015 Submission[73] that the network should only be deployed for actual demand which covers all active access lines as defined above. Therefore we totally disagree to Chorus' submission that the Commission should exclude all access lines not provided by Chorus from the relevant demand.

**71** Chorus, Submission of 13. August 2015, para. 57.
**72** *Consultation paper – Network footprint and demand UCLL and UBA pricing review determinations* Commerce Commission 21 September 2015.
**73** See WIK-Consult, Submission of 12 August 2015, Section 7.3.1.22.

# 3 Modelling UBA

## 3.1 MEA

134. We once again[74] repeat our firm view that no HEO would deploy a new copper telecommunication access network today. This is important since the Commission once again has treated the relevant portions of the copper access network as the UBA MEA in its further draft UBA determination of July 2015. This is despite the fact that the Commission now at least recognises that it is a viable option to also consider the same underlying physical MEA infrastructure for both, UCLL and UBA. We continue to hold the view that all arguments presented in our August 2015 Submission are valid and should be considered further in making the final determination.

135. The Commission states that it has now calculated the TSLRIC cost for both an FTTH MEA and, as before, an underlying copper MEA for UBA, only resulting in *"minimal"* differences.[75] We are unable to reproduce this result. There is no detailed description of these calculation processes, either in the Commission's further draft UBA determination or in TERA's model description.

136. We have however attempted to verify the outcome of the Commission's/TERA's FTTH MEA approach for UBA, in the absence of any information as to their process.

137. In the following paragraphs we summarise our approach to replicating the Commission's cost comparison of the UBA MEA. In the TERA UBA model there is a switch allowing the calculation of an FTTH MEA. Following the model logic path within the model structure gives the impression that TERA has used all cabinet locations for hosting DSLAM like Ethernet aggregation switches instead of using the UCLL fibre lines (without cabinets) and aggregating the traffic in Ethernet switches at the local exchange locations. This latter approach is more consistent with the forward looking requirement and efficiency considerations underlying the HEO construct and the TSLRIC methodology. As the Commission note in paragraph 188[76] under TSLRIC the "*hypothetical efficient operator is not constrained by the legacy decisions of the incumbent in respect of, for example, network technology, network design, the nature of the assets and cost structures. The characteristics and costs of [Chorus] are therefore not a necessary consideration in regards to the network that is built and operated".* This approach would scale much better than the use of DSLAMs in the cabinets and makes the very expensive active cabinets and small racks redundant.

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**74** See WIK-Consult, Submission of 12 August 2015, Section 6.2.
**75** See Commission, UBA July 2015, para. 778.
**76** Commission UCLL July 2015

138. We would expect a significant difference between the FTTH MEA (Option 1) and the copper MEA (Option 2). All the relevant components of Option 1 are less expensive than the comparable components of Option 2[77]:

- The DSLAMs used in Option 2 are more expensive than the significantly better scaling Ethernet aggregation switches located in the MDF locations of Option 1.
- This outcome is supported even more strongly because the DSLAMs have to be designed for outdoor cabinet installation. In contrast the Ethernet aggregation switches are hosted in the existing local exchange buildings offering an ideal electronic hosting environment.
- Under this outcome too, all cabinets, and also all active components, the power access and power supplies and the racks located in the cabinets become redundant, being replaced by one Ethernet aggregation switch rack at an location, where the power access already exists.
- The core network connections of Option 1 would require significantly less fibres than Option 2: Option 1 needs one fibre per MDF location, Option 2 needs individual fibres for each of the various DSLAMs in the MDF access area. This reduces the core network cost in case of Option 1.
- In addition, if the core network cost were allocated according to the infrastructure underground space consumption (per fibre used), Option 1 should carry significantly less core network trench cost because of the significant less fibres backhauling the MDF Ethernet switches (compared to the many DSLAM backhauling fibres of Option 2). In general, we note also that not allocating the infrastructure cost according to the (underground) space consumption per fibre line, is a modelling choice we regard as a general modelling omission.
- The 92 Option 1 FDS handover switches are significantly smaller with regard to the interfaces required since they only aggregate the MDF location Ethernet switches instead of the large amount of DSLAMs in Option 2. As a result, there are no or at least significant less FDS locations required hosting more than one switch, thus also reducing the inter-switch connections considered in the model. Accordingly these components are cheaper in total when comparing Option 1 with 2.
- Expanding the Ethernet switch family being used in the model by different, , more modern switches and especially smaller size switches would further decrease the system’s cost.

77 See WIK-Consult, Submission of 12 August 2015, para. 222

Therefore we clearly expect Option 1 to be significantly cheaper than Option 2, e.g. by a factor of (at least) 2. Since this does not appear to be the case, we assume therefore that there is either a fault in the model implementation, or a misunderstanding of the details of the model outcome for a fibre MEA by the Commission. An exact quantification of the "real" cost differences between Option 1 and Option 2 would require a re-appraisal, and possibly remodelling of the whole UBA fibre MEA approach in the model.

139. Choosing a fibre MEA for UCLL and UBA (Option 1) rather than the copper MEA (Option 2) would result in different bandwidth outcomes which could be supported by both access technologies. Option 1 (FTTH) is very flexible in the bandwidth supported per end-customer and is nearly unlimited regarding bandwidth and quality of service, while Option 2 only supports copper DSL speeds, varying depending on the length of the copper access line. The only appropriate and efficient make or buy decision can only be made on the same underlying physical infrastructure.

140. Chorus[78] rejects the inclusion of FWA in the UCLL MEA because it does not meet the full UCLL functionality and cannot be unbundled. We recognize, as the European Commission does in its recent market recommendation[79], that there are circumstances for NGA architectures where physical unbundling may not be economically and/ or technically feasible. This is currently given in New Zealand also with any NGA architecture based on fibre access lines. Therefore for areas where these conditions apply, a virtual physical unbundling may replace the physical unbundling. This approach in Europe is called Virtual Unbundled Local Access (VULA). A VULA in principle is a bitstream with a local handover enabling the access seekers a wide degree of own product definition. FWA may allow for such bitstream access instead of the impossible physical unbundling. This implicitly requires an operator to use FTTH and FWA for the UBA market also, and thus also enable the use of FWA for UBA where more cost effective instead of lower capability copper FTTC infrastructures.

## 3.2 Network optimization

### 3.2.1 Costs for design and test of the new network and the commissioning of the new assets

141. Chorus and Analysys Mason argue strongly that the Commission should add additional costs for the design and testing of the new network and the

**78** See Chorus, Submission of 13 August 2015, para. 129 ff.

**79** European Commission, Recommendation on relevant product and service markets of 9.10.2014, C(2014) 7174 final incl. Annex and Commission Staff Working Document SWD(2014) 298.

commissioning of the new assets.[80] Generally, it is true that accounting for such costs may be justified. They are part of the overall cost of constructing a new network. However, Analysys Mason does not show that TERA has not already accounted for those costs, for instance by adding the costs for installation plus internal Chorus project management fees plus service companies overhead costs, or by adding costs via its OPEX and non-network cost model. We would expect that these costs already have been taken into account in other overall costs, (as is common modelling practice) instead of an excessively detailed itemization.

142. We note also that the arguments made by Analysys Mason show that they believe the costs reported to the Commission by Chorus have been used in the TERA modelling without consideration of efficiency adjustments. It appears that they argue further that the unadjusted Chorus costs should now be further readjusted upward by adding additional itemization for the costs of design, testing and network commissioning. This additional cost argument appears to us to be partly due to the perception of omission as a result of the undifferentiated cost descriptions observable throughout TERA's model. We are of the opinion that it is impossible for TERA to analyse the cost data provided to the Commission by Chorus to this level of granularity. Again, we would expect that the costs for design, testing, and network commissioning would be included in the overall cost information already provided.

### 3.2.2 Costs for VDSL splitters

143. Chorus and Analysys Mason argue also for the use of VDSL cards with integrated splitters and resulting higher costs.[81] This approach too does not properly reflect the behaviour of an efficient HEO. An HEO using the relevant MEA produces fixed voice services over its IP network (VoIP, Voice over IP). As a result, the old splitters used for PSTN network access lines are redundant even given a copper MEA for UBA, and of course this is irrelevant in the case of a fibre MEA for UBA. Therefore additional costs for splitters should not be considered in the model at all.

### 3.2.3 Timing of data source

144. Chorus and Analysys Mason also strongly argue that the Commission should be reversing the price trend calculation made by TERA.[82] The statement that price data of Chorus are backdated to 2013 and then are extrapolated by its price trend

**80** See Chorus, Submission of 13 August 2015, para. 169 and Analysys Mason, Submission of 11 August 2015, Section 4.1.2.
**81** See Analysys Mason, Submission of 11 August 2015, Section 4.1.3.
**82** See Chorus, Submission of 13 August 2015, para. 171 and Analysys Mason, Submission of 11 August 2015, Section 4.1.4.

is unsubstantiated anywhere in the information made available to us. As a result, since the concrete data has not been provided, neither Chorus nor Analysys Mason, have demonstrated that the price data reflect data of 2014.

### 3.2.4 Dimensioning of SFPs

145. Chorus and Analysys Mason state, that "*TERA do not consider whether the RSP ports on the first data switch provide sufficient capacity for the aggregated traffic from the DSLAM*" and so in 2020 the sub-racks in the exchange location would not provide sufficient capacity to host SFP ports.[83] TERA assumes a maximum capacity of [ ] **CNZCI** per SFP exchange (DSLAM exchange).[84]

146. Even if we assume that the claimed port restriction of 2 in [ ] **CNZCI** is true, an examination of the calculations and of further considerations, necessary for an HEO, show that one subrack is sufficient to host the necessary SFPs. We use the traffic value stated by Chorus of 397 kbps / end-user for December 2015 and extrapolate it to the last month of the regulatory period.[85] The result is 2,944 Mbps / end-user (1,024kbps = 1Mbps). A subrack can host up to 15 xDSL cards with 48 ports and 1 SHDSL card with 24 ports[86]. This makes 744 ports in total and results in a total traffic of 2,190 Mbps. Using a 20% spare capacity for DSLAM ports[87] will reduce the maximum traffic load to 1,752 Mbps. Two SFP deliver a capacity of 1,741 Mbps (1,024Mbps = 1Gbps). This would mean a capacity override of just 0.66 % in the last year of the regulatory period.

147. As a result, it must be recognized, that the SFP capacity of the exchange DSLAM is the only asset, which is provided with a spare capacity of [ ] **CNZCI**.[88] This is inconsistent with the model treatment of the other assets. Moreover, a reduction of the spare capacity [ ] **CNZCI** will still allow enough scope to increase the SFP capacity if needed. This also will make an additional subrack redundant, thus eliminating the huge spare capacity of the additional subrack and possibly an additional rack. It is appropriate to plan spare, but not excessive capacity for events such as uncertain capacity growth and unexpected load bursts reflecting the dynamic traffic behavior of a real network.

148. In this context, we have considered whether, in our opinion a cost-minimising HEO would install this amount of redundant (sub)rack capacity. For the reasons

**83** See Chorus, Submission of 13 August 2015, para. 158.1 and Analysys Mason, Submission of 11 August 2015, Section 4.2.
**84** See TERA model, CI-ComCom - UBA Inputs v8.0, sheet "Input – Assets".
**85** See Chorus, Submission of 13 August 2015, para. 153.
**86** See TERA model, CI-ComCom - UBA Inputs v8.0, sheet "Input – Assets".
**87** See Analysys Mason, Submission of 11 August 2015, Section 4.3.
**88** See TERA model, CI-ComCom - UBA Inputs v8.0, sheet "Input – Assets", formula of cell J25.

set out below, we conclude that such an HEO would not build this level of excess spare capacity:

a. Reaching the upper capacity limit just occurs at the end of the last year of the regulatory period. As spare capacities can be used, an HEO would not install an additional subrack (and possibly an additional rack) at the beginning of the regulatory period given that that equipment would be idle for almost all the time. Instead it would install the additional equipment when, or shortly after, existing spare capacity could not meet unexpected demand.

b. This conclusion is reinforced by the fact that traffic assumptions in the model are optimistic even accounting for the probability of overestimation. As noted, an HEO will make its expansion investment decision based on the way in which the traffic develops in reality. Where the capacity limit reaches a critical level, an HEO starts planning its use of the spare capacity as the interim solution. It then will start capacity upgrades just in time and driven by actual demand, but certainly not five years in advance and based on traffic assumptions. This approach to planning spare capacity best describes the usual efficient behavior of efficient operators consistent with the HEO model.

c. Additionally it should be taken into account that the traffic forecast is already optimistic and does not reflect the fact that heavy users will tend to migrate to FTTH infrastructure. As this happens, the average busy hour traffic of copper network users as modelled in the current UBA model will decrease accordingly. Moreover, when forecasting demand, it must be kept in mind that data traffic over fixed networks will also be partly substituted to some extent in future by mobile networks, as customers will use more and more smartphones.

### 3.2.5 Spare capacity in DSLAMs and FDS

149. Chorus and Analysys Mason recommend that TERA should use a 20% spare capacity factor in the UBA model for the relevant exchange and cabinet line cards[89]. They refer for support to WIK's Submission of February 2015. We advise that both parties misunderstood and incorrectly applied our statement. WIK stated ranges of port utilization for DSLAMs (70-80%) and switches (80-90%). In fact, these ranges reflect the practice of network operators not being able to activate all ports due to single port failures, contract termination and spares required for new customers. The lower bound of the range reflects dynamic factors of network

89 See Chorus, Submission of 13 August 2015, para. 172.1 and Analysys Mason, Submission of 11 August 2015, Section 4.3.

operators in order to determine the date of an additional port card order for its network equipment in case of growing demand. The upper bound of the range reflects the long term utilization factor, that means the maximum load of equipment in the long term. As a result it is clear that it is only the upper bound which is relevant for cost calculations, and when this is applied to exchange and cabinet line cards, this leads to a 10% spare capacity of the relevant switches.

### 3.3 Exclusion of certain capital cost

150. As in the case of UCLL, discussed above, Chorus also argues against the need to remove capital contributions from TSLRIC in the context of UBA.[90] Chorus claims in particular that no account should be taken of the funding received through the RBI initiative.

151. Chorus' main argument of not considering RBI subsidies is that *"RBI funding was provided to support deployment in areas where fibre deployment to the node was uneconomic."*[91] In our opinion, that is exactly the reason why it has to be considered and excluded from the estimate of the TSLRIC investment for UBA. It is clear from Chorus' own statement if nothing else that otherwise service would not be provided by the HEO in those areas.

152. Chorus have criticized the approach of the Commission which considers the application of capital contributions to fund DSLAMs. Chorus argues that the RBI initiative did not fund DSLAMs, and suggests that accordingly those capital contributions should be eliminated completely for UBA. In our view, this argument is incomplete and only says that the implementation approach of the Commission is inappropriate. To the contrary, we have argued and proved in both our February and our August Submissions[92] that all relevant assets have to be treated as capital contributions including the deployment of fibre in the feeder segment.

153. To the extent that Chorus is correct in suggesting that some or perhaps even much of the RBI subsidy was applied to upgrade the Layer 1 level of the network, that funding still needs to be taken into account in the TSLRIC modelling. If that is indeed the case, it gives the Commission a strong reason not to consider the RBI funding in the context of UBA but to consider it in the context of UCLL.

**90** See Chorus, Submission of 13. August 2015, para. 159ff.
**91** Chorus, Submission of 13 August 2015, para. 160.1.
**92** See WIK-Consult, Submission of 20 February 2015, Section 2.7 and Submission of 12 August 2015, Section 6.5.

## 3.4 Input parameter values

### 3.4.1 Type of SFM

154. Chorus and Analysys Mason recommend that TERA update their switch unit costs to consider SFM-4 instead of the currently considered SFM-3.[93] We agree in so far as this would reduce directly or indirectly (caused by increasing economies of scale and/or scope) the costs of UBA production. In areas of the network where SMF-4 is not efficient the model should continue to use SMF-3.

### 3.4.2 IOM switch cards

155. Chorus and Analysys Mason state that TERA has not included either the direct or indirect cost of IOM switch cards.[94] We cannot identify whether the costs of the IOM modules are already included in the aggregated cost positions of the TERA model. As we have already pointed out in our previous submissions the use of the IOM module doubles the switches port capacity.[95][96] It does appear that this capacity enhancement so far has not been considered in the TERA model. We strongly urge the Commission that this capacity effect has to be included for efficiency reasons.

### 3.4.3 SFP

156. Evaluating costs of DSLAMs and switches used by TERA we discovered another inefficient equipment specification leading to increased costs . Following the links in the UBA input model to sheet “Q 6.17.1 - 3”, we identified , that only SFPs enabling a transfer of signals up to 40 km are used.[97] This leads to inefficiently high costs as the majority of SFPs deployed in New Zealand are transferring signals over shorter distances. Efficient deployment would use the significantly cheaper 10 km version of SFP where shorter distances allow, and would better reflect the efficient costs of an HEO. Spark estimated the share of 10 km SFP units would to be around 50% for an HEO in New Zealand. That means that for around 50 % the 40 km SFPs are required only. As a result, the investment cost in the TERA model 2015 from the use of 40 km SFPs is significantly overestimated.

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**93** See Chorus, Submission of 13 August 2015, para. 170 and Analysys Mason, Submission of 11 August 2015 Section 4.1.3.
**94** See Chorus, Submission of 13 August 2015, para. 170 and Analysys Mason, Submission of 11 August 2015, Section 4.1.3.
**95** See WIK-Consult, Submission of 12 August 2015, para. 316, 317.
**96** See WIK-Consult, Submission of February 2015 , para. 369, 372.
**97** See CI-ComCom - UBA Inputs v8.0.xlsx, ““Q 6.17.1 – 3”, cells D95 and D105.

# 4 OPEX

157. Chorus has claimed that there is substantial agreement between all parties that the use of actual operator accounts is in line with an orthodox TSLRIC approach.[98] This is inconsistent with the submissions made by the parties in this process. For instance, we have repeatedly stated in our submissions that Chorus' actual OPEX is not a dependable starting point to identify the relevant OPEX of the HEO's MEA network in New Zealand. We have proposed alternatives to this starting point. Vodafone and Spark have made similar points. Although it is true that many regulators have followed a similar path in their determination of OPEX, it is certainly not the orthodox approach of TSLRIC. The orthodox approach would require to model OPEX bottom-up in the same way as CAPEX are modelled. The orthodox approach would be the most coherent, dependable, and most consistent way of determining efficient OPEX for the HEO.

## 4.1 LFI adjustment

158. Analysys Mason criticizes the LFI adjustment currently used in TERA's model, and suggests that it is not appropriate because it does not properly take into account the weather conditions in a particular moment in time in Ireland.[99] We find this discussion surprising as an approach to testing the LFI. In fact this comment stems from TERA's single sourced benchmark approach which is itself weak as an approach from a methodological perspective.

159. Rather than speculating on the impact of the weather conditions in Ireland at a certain moment in time, it is more important to examine appropriateness of the efficiency adjustments related to OPEX from an old copper to a new copper network to assess the resulting target LFI on its appropriateness. TERA currently uses a target LFI of 9.4% in its model instead of Chorus' actual LFI of 15.8% to make these efficiency adjustments.

160. The relevant question is actually whether an LFI of 9.4% properly represents the LFI of a (brand) new copper access network. We know European countries, where the actual LFI of old copper networks is already below 10%. A study conducted for OFCOM identified that the actual LFI of BT OpenReach's old copper network for the reference year 2012/13 amounted to 11.2%.[100] These observations clearly indicate definitively to us that an LFI value for a new copper network should be below 10%.

98 See Chorus, Submission of 13 August 2015, para. 13.7.
99 See Analysys Mason, Submission of 11 August 2015, Section 5.1.
100 See Cartesian, WLR and LLU Fault Rates Additional Analysis, Final Report, NON-CONFIDENTIAL VERSION,15 May 2014, Prepared for OFCOM, page 15, figure 9.

161. It has to be noted that TERA's approach of conducting the LFI adjustment is highly conservative, independently of the actual value of the LFI used for making the adjustment. TERA only applies the LFI adjustment to a small subset of the relevant OPEX, namely maintenance and labour costs.[101]We have criticized this approach already[102] and explained why it is a conservative approach.

## 4.2 Efficiency adjustment for fibre network

162. The Commission uses a 40% efficiency adjustment from a copper to a fibre network in its current version of the TERA model. Chorus suggests that an adjustment in the order of 15% to 30% would be more appropriate.[103] We have provided most recently in our August Submission further evidence that operators can save significantly more than 50% of their OPEX if they switch to a fibre network.[104] We concluded (and want to confirm again) that in our view, the original adjustment factor of 50% used in the December 2014 version of the cost model is more appropriate than the factor of 40% as used in the July 2015 version of the cost model.

## 4.3 Non labour OPEX cost trend

163. Analysys Mason claims that a non-labour OPEX price trend of 0% is too low.[105] It is important to note that these elements of the production value chain are also subject to both efficiency and productivity improvement. From this perspective, we think a cost trend of 0% is not too low, but rather that it represents a more conservative approach taking all factors into account.

## 4.4 Benchmarking

164. L1 Capital tries to mount a strong rebuttal of TERA's approach to estimation of operating expenditure based on a benchmarking approach.[106] This analysis represents an extension of the benchmark between the OPEX of Chorus and BT OpenReach which L1 Capital had presented in its February Submission.[107] We had already shown in our March Cross-Submission that this part of L1 Capital's benchmark comparison simply shows that Chorus is as efficient or as inefficient as BT OpenReach in its copper network, not more and not less.[108]

**101** See TERA, Model Specification June, p. 11.
**102** See WIK-Consult, Submission of 12 August 2015, para.154.
**103** See Chorus, Submission of 13 August 2015, para. 138.
**104** See WIK-Consult, Submission of 12 August 2015, para. 251.
**105** See Analysys Mason, Submission of 11 August 2015, Section 5.3.
**106** See L1 Capital, Submission of 13 August 2015, p. 14f.
**107** See L1 Capital, February Submission, para 297.
**108** See WIK-Consult, Cross-Submission of 19 March 2015, para. 89f.

165. When a close examination of the L1 Capital analysis is carried out, it is clear that their approach is unrelated to any modelling numbers. First of all the total OPEX of $409 million which L1 Capital uses, seems to be derived at a company level rather than a more accurate estimate is allocated to UCLL. This would be the approach followed by TERA which they must have done in the modelling context. In fact, to relate all of Chorus OPEX to one service reveals no insights into the proper estimation of operating expenditure for the UCLL and UBA services.

166. To implement TERA's fibre efficiency adjustment L1 Capital then effectively applied a 60% and not a 40% adjustment. L1 Capital then compared Chorus' OPEX per line with that of the fibre business of Comcast Cable in the US. Because L1 Capital did not source those numbers at all it is highly questionably, at least it is completely unclear whether L1 Capital's analysis actually used comparable OPEX numbers. L1 Capital used “Technical Costs” to represent Comcast Cable's fibre OPEX. It remains uncertain whether that assumption is appropriate, or whether those costs might, for instance, include labour costs which should have been capitalized. This unsubstantiated baseline number is then inflated by a significant mark-up for administrative costs. This adjustment is totally inappropriate because in fact, administrative costs are not treated as OPEX in TERA's cost model. If one corrects for the calculation errors in L1 Capital's proposed adjustments to TERA's modelling, and for the administrative costs for Comcast, then the resulting “OPEX” per line in the model as derived by L1 Capital is rather close to Comcast's OPEX.

167. It would be inappropriate to read too much into this result due to the nature of the L1 Capital analysis. Nevertheless, it suggests to us that if correctly considered, TERA's adjustment may well lead to a level of OPEX which is close to that of the fibre company L1 Capital regards as comparable. This view should be regarded with caution given the lack of transparency and apparent miscalculations by L1 Capital. The only firm conclusion which can be drawn is that L1 Capital does not provide any reliable evidence to support their argument that TERA's OPEX are too low.

168. The limitations of the benchmarking exercise conducted by L1 Capital does however also confirm our view: the relevant benchmark for TERA's OPEX assumptions in the New Zealand model should be to compare with other cost models which model a fibre access network. In our March Cross-Submission we have compared the OPEX cost share for UCLL of various models.[109] The OPEX cost share in TERA's current model now amounts to 10.9% for UCLL. When this is compared to a cost share of 9.3% in Spain and 8% in Denmark, one can at least conclude that the Commission's model (after the adjustments) does not underestimate the level of the relevant OPEX.

**109** See WIK-Consult, Cross-Submission of 19 March 2015, para. 95.

# 5 Non-recurring charges

## 5.1 The Commission's approach of setting non-recurring charges

169. The Commission has adopted a general top-down costing approach for NRCs basing on benchmarking approaches. Chorus tries to attack this approach by stating that it does not reflect the efficient cost of a New Zealand access provider.[110] They then go on to assert that only Chorus' actual costs, and those of its service companies would properly reflect TSLRIC costs.[111] This proposal ignores first of all the potential for efficiency improvements achievable under an HEO MEA approach in the context of a TSLRIC model. It also ignores, the fact that Chorus started a range of activities for its fibre line products in order to increase the efficiency of transaction processes.[112] These efforts made by Chorus in order increase productivity and to approach the efficiency of an HEO should also be considered in adjustments to the costs for copper line services

170. In this context we consider Chorus' first core statement, which is intended to prove, that its tendering processes result in efficient costs and so Chorus' [ ] **CNZCI**[113] does not however prove what it should prove. It may be true, that the current process design for e.g. the field service, a tender process (assuming that the tender process itself and the service company market is competitive) can lead to efficient cost levels. However, cost efficiency will only be attained, if the design of all processes performed by suppliers in its entirety is cost efficient, and including all interactions between Chorus and its service companies. In other words: if the processes tendered by Chorus are not efficiently carried out, even an efficient and competitive tender will not of itself lead to cost levels that reflect efficient TSLRIC costs.

171. We have provided evidence in our August Submission which strongly suggests that in fact the underlying processes of Chorus are not efficient. The actual cost of Chorus and its service companies do not reflect TSLRIC costs due to these significant inefficiencies.[114] Any TSLRIC determination therefore needs to make adjustments to actual costs to achieve (increased) efficiency. Reliance on actual Chorus costs, and those of its service companies is not a suitable alternative to determine TSLRIC costs of NRC based services. It is clear based on the evidence we have presented that Chorus and its supplier's costs would need evidence-based adjustments to be able to meet the Commission's efficient cost-based

**110** See Chorus, Submission of 13 August 2015, page 17.
**111** See Chorus, Submission of 13 August 2015, page 4.
**112** See also para.139 of this Cross-Submission and WIK-Consult, Submission of 12 August 2015, para. 156.
**113** See Chorus, Submission of 13 August 2015, para. 333.
**114** See WIK-Consult, Submission of 12 August 2015, Section 3.6.

pricing standard. This assertion holds even more true, because Chorus is probably not able to deliver own reliable data (including inefficiencies, see also below in detail, in Section 5.2).

172. We turn to examine Chorus' second core argument, namely that Chorus itself uses the same services of its service companies as do its purchasers of NRC based services. This statement is irrelevant.[115] First, simply consuming the same inputs (assuming that this statement is correct) does not necessarily lead to the same costs for Chorus and for its purchasers of NRC based services, as we have shown in our August 2015 Submission.[116] Second, even if these costs would be the same, this does not necessarily lead to the conclusion that these represent efficient costs. In other words, other sales markets, in which Chorus is using inputs sourced from its service companies' for the production of its services, may suffer from reduced competition. Accordingly, Chorus is able to pass those inflated, inefficient costs to all purchasers including wholesale access and products of other sales markets without recognising that they are inefficient costs. It is well understood that incumbents are often able to subsidise inefficiencies by smaller margins for a while and can bear inefficient processes.

173. Moreover, Chorus sees a contradiction in the Commission's approach, simply because it would assess the benchmarking methodology critically in order to determine proper TSLRIC costs of monthly rental charges.[117] There is actually no contradiction. The benchmarking methodology applied here is a practical approach to determine charges for NRC based services. Even in this case it holds true, that the bottom-up costing approach is the first best alternative to efficiency benchmarking. However this situation differs significantly to the process of estimating the TSLRIC based monthly charges: A bottom-up model to determine charges of NRC based services is possible to design, but it is much more complex than a bottom-up model of an access network.

174. We further note that Analysys Mason recommends a deep process analysis in order to improve the FPP process concerning charges for NRC based transaction services.[118] Generally, in the sense that it would deliver a more accurate solution, the use of deep process analyses would be reasonable. Any such deep process analyses, while complex and time-consuming would enable the Commission to build a bottom-up cost model for NRCs which is in fact the first best solution.

175. Therefore, the benchmarking methodology remains as the only practical possibility. Benchmarking is in fact an adequate practical approach (having the remaining time-frame of the FPP process in mind) to estimate TSLRIC costs of

**115** See Chorus, Submission of 13 August 2015, para. 342.
**116** See WIK-Consult, Submission of 12 August 2015, para. 141 to 145.
**117** See Chorus, Submission of 13 August 2015, para. 345.
**118** See Analysys Mason, Submission of 11 August 2015, Section 6.1.

NRC based services as a second best approach. Accordingly we generally support the choice of this methodology by the Commission. Nonetheless, we have made several proposals to adjust aspects of this approach in order to improve the estimation of the TSLRIC costs of NRC based services. [119] In our view these modifications to the Commission's benchmarking approach represent an adequate compromise between the remaining time-frame and the accuracy of a TSLRIC determination for the cost of NRCs in a first best sense.

176. In the following sections we will show, that the submissions made by Chorus and Analysys Mason do not show that the benchmarking methodology used by the Commission is generally inappropriate. In order to improve the readability of this discussion, we use the headlines and structure of Chorus' Submission of August 2015.

177. As a preliminary comment before discussing the detailed arguments raised by Chorus and Analysys Mason, it is important to raise a structural problem in the provision of transaction services. The existence of this structural issue is also indirectly related to the level of pricing for those services.

178. Due to its position as a monopoly provider of network access infrastructure, Chorus has no incentives to optimise its access network such that fault identification is handled efficiently and effectively minimised. Currently, RSPs have nearly no ability to identify whether a fault ticket brought to their attention by customers is caused by themselves, the customer or Chorus. It is only Chorus which has this ability to identify the reasons for a fault ticket in the vast majority of cases. RSPs also do not have access to the network management tools of Chorus enabling them to identify the reasons for a fault themselves.

179. If Chorus does not identify a fault, RSPs nevertheless have to pay Chorus a charge for "No fault found" (at a proposed amount of $ 81.40 (UCLL) and $ 76.30 (UBA)). As a result of this transaction process and the asymmetry of information, Chorus has no incentive to minimise the occurrence of such fault tickets by investing in an appropriate network quality or the quality of its network support systems for avoiding such unnecessary requests. Not having such incentives leads to an inflated level and amount of the response "no fault found".

180. RSPs are therefore not only burdened by the charges for transactions services but also by the probability that such responses will occur and potentially lead to a completely unjustified extra charge without any additional costs for Chorus. Such additional cost for the others would be avoided if Chorus would act efficiently (see also para. 213 for further discussion of this point).

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**119** See WIK-Consult, Submission of 12 August 2015, Section 3.7.

181. Such inefficiencies in the provision of transaction services are difficult to handle via the pricing scheme because they basically follow directly from the structure of the telecommunication market in New Zealand. The pricing scheme for the corresponding transaction services would only incentivise Chorus to keep an unnecessarily high level of transaction services or responses if Chorus would be able to charge RSPs for the costs caused by its own inefficiencies. Then Chorus would not have an incentive to minimise the amount of avoidable transaction services and responses. In any case we would conclude, that the Commission should be rather strict in its efficiency adjustment and not take an overly conservative approach in the sense of allowing Chorus to charge for its own network related inefficiencies. The same holds for other costing parameters in its NRC costing approach.

## 5.2 Benchmarking based on average task times

182. Chorus has expressed a variety of criticisms of the efficiency benchmarking approach of the Commission. One of Chorus criticisms, that TERA itself has conceded, is that the identification of comparable activities is difficult.[120] This statement is not particularly relevant to the outcome however. First the Chorus position ignores the fact that activities may well differ between countries for efficiency reasons. It is precisely the objective of a benchmark to identify inefficiencies in order to determine TSLRIC costs. This means that differences between activities are both acceptable and useful to identify what the Commission exactly is looking for. Secondly, a benchmark methodology is a practical and acceptable approach and therefore allows for some inaccuracies in detail. Chorus' statement does not prove that TERA's approach overrides the acceptable level of inaccuracies. Chorus is just assuming that it does: "*We do not think that TERA's effort to "extract as much comparable information as possible from the available data, in order to restrict the comparisons between similar tasks only" truly mitigates the risk that the Commission is not comparing equivalent activities*".[121]

183. Analysys Mason's critique in this context, which relates to the trade-off between task duration and labour costs fails in its generality. It may be true, that "*benchmarked countries may use more experienced (and therefore expensive) labour, which might drive down task times but not overall cost*".[122] Analysys Mason does not provide evidence for this assertion, or show that this holds for TERA's benchmark, and, nor do they show, if that would apply here, that the resulting error leads to a relevant underestimation of the total efficient costs. This brings us to the second point - an overestimate of task times could easily be the

**120** See Chorus, Submission of 13 August 2015, para. 349f.
**121** See Chorus, Submission of 13 August 2015, para. 349f.
**122** See Chorus, Submission of 13 August 2015, para. 351 and Analysys Mason, Submission of 11 August 2015, Section 6.2, p. 28.

result. The duration of activities does not only depend on the cost of labour but even more also on other factors like process organisation, tools used etc. It could easily be the case relating to TERA's benchmark values, that the duration of activities are lower than Chorus' (and its service companies'), but that the best practice country works with cheaper labour costs. In that case the benchmark value of TERA would not represent the achievable efficiency.

184. Chorus states a number of specific issues in order to demonstrate that the precise circumstances of New Zealand would not have be considered and that this could lead to an underestimation of task times estimated by TERA' s benchmark.[123] Again, Chorus makes a number of statements without providing evidence and as a result these issues remain unproven. For instance, Chorus postulates "*There are a number of New Zealand specific factors that may drive higher average task times for certain non-recurring charges than other countries*" and just lists examples of New Zealand specific circumstances but delivers no firm evidence that this leads to underestimation of task times estimated by TERA's benchmark.[124] Secondly, TERA's benchmark itself can have caused an overestimation of task times. It can be the case, that the New Zealand specific factors claimed by Chorus differ materially in the benchmark countries, where they may well be even more influential. Thirdly, other factors in the benchmark countries can have a greater impact on task times than in New Zealand with the effect of overestimation of task times within TERA's benchmark.

185. In addition, the New Zealand specific factors suggested by Chorus itself do not hold particularly strongly as causative factors. As the analysis of Spark shows, health and safety obligations, local authority requirements, working standards etc. do not differ significantly from European countries.[125] We add some further European considerations which rebut Chorus' general statements:

a) Standards of workmanship and quality

It is a usual regulatory approach in European countries that high standards are imposed by the STD or are generic. For example in Denmark, one of the best practice countries, the national regulatory authority, the Danish Business Authority, supervises the incumbent's reference offer leading to high standards and quality.[126]

**123** See Chorus, Submission of 13 August 2015, para. 352f.
**124** See Chorus, Submission of 13 August 2015, para. 352.
**125** See Spark Submission of September 2015.
**126** See http://danishbusinessauthority.dk/reference-offers, https://wholesale.tdc.dk/wholesale/produkter/aftaler/Sider/productadditions.aspx.

b) Third party commercial requirements and interfaces with RSPs

It is a usual European practice to outsource processes to third parties or to meet RSPs' requirements by using RSP equipment. For example in Germany, the incumbent Deutsche Telekom outsourced a lot of processes and closed a lot of contracts with RSPs and also relies on RSP equipment. This is the general nature of collaboration between incumbents and RSPs respectively service companies. We cannot recognize that the situation in New Zealand differs from that in European countries.

c) End-user premises or an exchange is fed by aerial

It is a usual European practice that certain parts of the network are realised with aerial infrastructure.

d) UCLFS product "Centrex"

It is a usual European practice that voice only services are also offered by European incumbents as wholesale product (for example Wholesale Line Rental in the UK and other countries).[127]

186. Chorus makes the criticism that the service codes of its service companies do not match with singular benchmarked elementary activities and that these therefore are not comparable to Chorus' service codes which organise numerous outcome-based tasks within one code.[128] Beside the lack of detail available, Chorus' data is obviously even not able to identify an example of an inefficient task time for NRC based services. This statement shows even more strongly, that the benchmarking methodology is actually necessary in order to estimate efficient cost. This conclusion is supported even more strongly when Chorus admits, that instead of using real (and inefficient) numbers it only uses estimates of task times: "*the cost component breakdowns provided to the Commission are estimates, gathered for the purpose of informally benchmarking service company proposals rather than for the purpose of obtaining actual data about task completion rates*".[129]

187. In a further argument Chorus tries to persuade the Commission that the variance of task times of the countries in the benchmark would represent evidence that activities in these countries are not comparable and so are not fit for benchmarking purposes.[130] Chorus does not provide any evidence to support the statement, that these differences in task times are based on output differences.. The opposite is more likely to be true: The differences in task times are more

**127** See http://stakeholders.ofcom.org.uk/telecoms/groups/close-groups/carrier-pre-selection/.
**128** See Chorus, Submission of 13 August 2015, para. 353f.
**129** See Chorus, Submission of 13 August 2015, para. 355.
**130** See Chorus, Submission of 13 August 2015, para. 356 to 359.

likely to reflect the different stages of efficiency set by a particular national regulatory authority. Our experiences in European regulatory processes confirm this proposition. In general, transaction services offer significant capacity for efficiency improvements.

188. Another of Chorus' statements clearly reveals that current transaction charges do not actually represent the relevant cost but are intentionally set above the cost level.[131] Some activities are priced above efficient costs simply in order to incentivise certain behaviour by the purchasers. This does not reflect the usual regulatory practice which is to set cost-based prices. Chorus' statements are misleading because Chorus ignores, that the Commission's statement refer to the STD process. This is irrelevant for the current FPP process. As the charges are set currently in the FPP process, the costing approach is based on TSLRIC representing efficient costs and outcomes. We understand that the Commission is rejecting Chorus' demand that it should accept inefficient, "incentivising" costs and instead proposing charges basing on TERA's TSLRIC approach.[132] Setting transaction charges at the level of efficient costs usually provides sufficient incentives for efficient behaviour of access seekers and access provider and there is no reason why these costs be artificially inflated for regulatory purposes. For example, often a purchaser cannot identify the location of the fault on its own and needs the help and support of the incumbent to do so. There appears to be no policy reason for a purchaser to be charged an above cost price for requiring an unavoidable service of this type. If Chorus were to provide the RSPs access to its network management tools or at least transmit more detailed fault tickets, they could identify the reasons for faults much better and the inefficient hand-over of such fault identification requests to Chorus could be avoided.

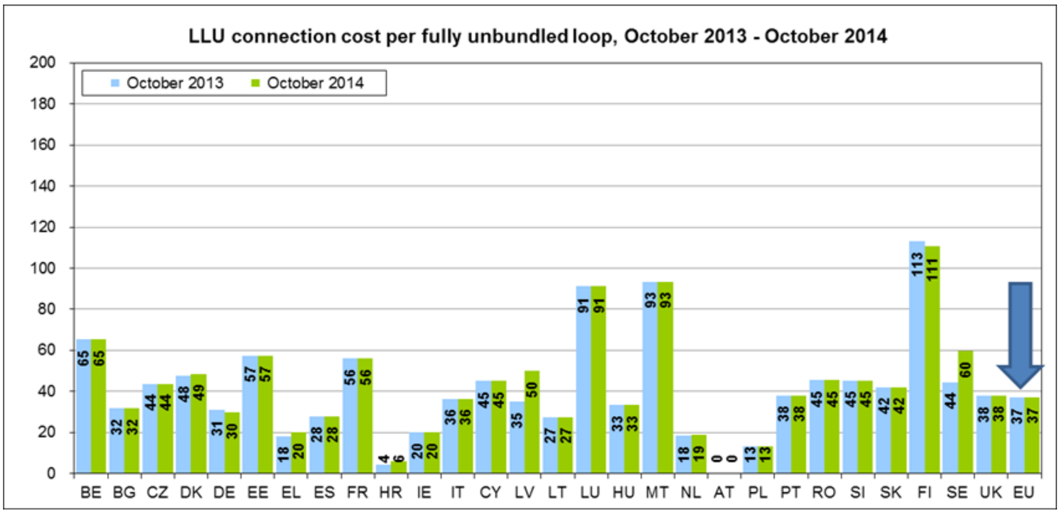
189. Finally, Chorus argues in favour of basing a benchmark value at or above a mid-point instead of taking the lowest point of the benchmark.[133] Here Chorus refers for support to statements of WIK and Network Strategies made at the Commission's conference in April.[134] We strongly reject Chorus' interpretation of our words. WIK and Network Strategies made their statement, that national regulatory authorities make more use of midpoint values in order to reflect a conservative approach in the context of determining costs and cost model input parameter values within a country. This statement was not made in the context of an efficiency benchmark between different countries. Frequently, NRAs within countries will have already chosen a conservative approach, so that benchmark values already represent conservative values. It is not appropriate for an approach to benchmarking to further increase the level of benchmark values which are already conservative. In the absence of more detailed information this

**131** See Chorus, Submission of 13 August 2015, para. 360f.
**132** See Commission, UBA July, para. 659.
**133** See Chorus, Submission of 13 August 2015, para. 362.
**134** See Chorus, Submission of 13 August 2015, para. 363.

means that taking the lowest point by TERA within its benchmark is a well justified approach. This approach is further supported by the fact that TERA's benchmark values are distorted upward because in some cases they incorrectly include transport times. Similarly, TERA's assumption that all costs are borne by the service company, and that there are no Chorus internal costs, creates a distortion. TERA's benchmark values can include technician times and administrative times for the completion of a given activity, which are already covered by Chorus internal costs.[135]

190. Additionally, taking a mid-point view instead of the lowest point would be contrary to the objective of HEO efficiency and the approach to an efficient TSLRIC determination of costs. We do not comment further on the remaining arguments raised by Chorus, since we already dealt with these above.[136] Finally, we comment on the last statement made by Chorus. They comment that effectively only two countries determine the benchmark result without any clear evidence that these results are adequately representative for efficient producers in New Zealand[137]. First of all, we consider the case, where the anonymous country set the lowest benchmark time, but the second best practice country, Denmark, also has the same low value. Thus, the further comments are allowed to focus on Denmark. We set out again below the benchmark of ULL transaction charges in Europe that we already presented in our Submission in August.

Figure 5-1: LLU connection cost per fully unbundled loop in the EU




Source: EU Financial indicators, fixed and mobile telephony, broadcasting and bundled services indicators – 2014, sheet "8) LLU pricing", rows 226 – 259 and WIK calculations for NZ.

**135** See TERA, Non-recurring charges, methodology document of April 201, Section 2.2.1.1.1, p. 23.
**136** See Chorus, Submission of 13 August 2015, para. 364f.
**137** See Chorus, Submission of 13 August 2015, para. 364f.

Figure 5-1 shows, that the best practice country of TERA, Denmark (DK), has connection charges significantly above the EU average and that individual countries with comparable labour costs, for example Germany (DE) or the Netherlands (NL), are significantly below the Denmark value. This shows, that Chorus' assertion that the value of Denmark represents an outlier and should be ignored is not accurate. It is true that it is somewhat above the European average. If TERA would have been able to identify task times in more European countries as it actually did, the result would likely have been a significant lower relevant benchmark value. We also note that an outlier value can in some circumstances be caused by a very efficient value so that even taking an "outlier" value in that case would be justified in order to determine efficient costs.

## 5.3 Determination of weighted average national service company charges

191. Chorus repeats its argument that the Commission should choose a [ ] **CNZCI** approach for averaging transaction service costs between CSAs.[138] It may quite possibly be the case, that the distribution of cost causing activities can vary between the CSAs depending on the period regarded and so the resulting average costs over all CSAs. Chorus's main argument is that TERA's current approach, which uses the average weighted by volume of lines per CSA, does "not sufficiently mitigate Chorus' (or an HEO's) risk."[139] Chorus simply chooses to ignore the fact that this risk, which is caused by the change of distribution of activities between CSA, exists on both sides: for Chorus (or an HEO) **<u>and for the purchasers.</u>** It is equally likely, that the distribution of the activities changes to the disadvantage of the purchasers, so that the purchasers, even with the current TERA approach , (using the average weighted by volume of lines per CSA, have the risk of overpaying the efficient costs. In other words: Why should the purchasers exclusively bear the risk of changing parameters of the cost calculation? In a competitive environment, vendor and purchasers share the risk or the risk is compensated by a price adjustment clause which is open for cost changes in both directions. Therefore the current TERA approach using the weighted average instead of a [ ] **CNZCI** calculation and taking account of the possibility to change the cost calculation in future, if significant changes occur, adequately simulates what would happen in a competitive environment.

192. Chorus' further statements, namely that "UFB build, and the migration away from copper as fibre becomes available" and the "geographic movement of active lines in the first regulatory period is likely to be greater than a periodic review of the weighted average can account for",[140] are simply not supportable. Changes of

**138** See Chorus, Submission of 13 August 2015, para. 368 - 372.
**139** See Chorus, Submission of 13 August 2015, para. 371.
**140** See Chorus, Submission of 13 August 2015, para. 373.

distributions due to the migration of customers to fibre lines would only result in changes of costs of fibre transaction services but not of the copper transaction services regarded here. Even if there would be an effect on the copper transaction services, the same argument that we presented above would hold in this context.

## 5.4 Service company and Chorus overheads

193. Chorus argues that the Commission should recognise, that it is obliged to compensate service companies for overheads and that this reflects real world costs in New Zealand.[141] The problem with this argument of course is simple: real world costs do not necessarily reflect efficient costs. In so far as Chorus is responsible for such inefficiencies, the inflated costs are not justified by obligations. Accordingly these costs should not be taken into account by the Commission as a valid basis on which to determine TSLRIC costs. Analysys Mason does not provide any substantive evidence but simply claims that passing on the cost of service company overheads reflects an efficient cost approach.[142] As we have shown in our August 2015 Submission, service company overhead costs are inflated and do not reflect efficient costs.[143] Furthermore, we have shown that "real world costs" in New Zealand can well be lower than assumed in TERA's costing approach.

194. Analysys Mason's statement is inaccurate in asserting that "*The way the Chorus overhead has been calculated will result in an under-estimate as the new lower charges (based on lower time estimates) will lead to less revenue for NRC and thus the dollar amount of overhead recovered with the new charges will be lower.*"[144] Analysys Mason assumes incorrectly that all of Chorus overhead costs are fixed cost that cannot be controlled or adapted by Chorus without supplying evidence for this thesis. Analysys Mason ignores the impact on this assumption of the TSLRIC cost concept, which regards all cost as variable in the long run. In contrast, the approach chosen by TERA to calculate Chorus' overhead mark-up reflects this concept adequately. It should be noted, that the reduction of NRCs does not necessarily lead to overall efficient overhead costs. We have shown in our August 2015 Submission, that Chorus overhead costs are significantly inflated due to in part an outdated IT infrastructure with the effect of inflated IT and labour costs and outdated cost data.[145]

**141** See Chorus, Submission of 13 August 2015, para. 374.
**142** See Analysys Mason, Submission of 11 August 2015, Section 6.5.
**143** See WIK-Consult, Submission of 12 August 2015, Section 3.6.3.
**144** See Analysys Mason, Submission of 11 August 2015, Section 6.5.
**145** See WIK-Consult, Submission of 12 August 2015, Section 3.6.4.

## 5.5 Use of LFC as a cross-check

195. Chorus lists various examples in support of the argument, that fibre related transaction activities are not comparable to copper related activities and so the final comparison of copper activities against fibre activities is limited.[146]

196. WIK shares this view. Due to significant differences between copper and fibre related activities, a comparison and a benchmark between the outcome of the international benchmark with the activity costs of LFCs is not justified. The main reason why fibre connection activities differ significantly from copper connection activities are as follows:

   a) *Material:* Copper ULL is connected by taking a simple and cheap copper wire ("jumper"). Fibre ULL is connected by taking a much more expensive fibre patch cable.

   b) *Labour for connection:* Taking a simple copper wire for connection is done very quickly: The worker uses a small copper roll, unwinds the wire for the appropriate length, cuts it and clamps it with a special tool quickly into the clamp device. The procedure for a fibre patch cable is much longer: The worker has to measure the necessary length of the cable, identify the right size of patch cables first from a set and then plugs it at both ends into the ports. This requires preconfigured patch cables incl. connectors in advance. If he has no fitting patch cable at hand, he has to prepare one additionally to the appropriate length.

   c) *Labour needed for functionality test:* This procedure needs much more time with fibre cables. They have to be calibrated after plugging in with special equipment (which represents an additional cost factor in comparison to copper) while copper jumper is simply fit for purpose after clamping.

   d) *Customer premises are often, in comparison to existing copper networks, not prepared for fibre networks.* This is the main reason why an FTTH rollout often stops at the street section. Fibre ULL connections mostly demand additional efforts for in-house wiring, ODF installation, lead-in, implementation etc.

197. Furthermore, fibre connecting is a relatively new process in New Zealand with lower connection volumes and less experience compared to copper connecting services. Vodafone and Spark report, that processes set up for connecting fibre customers have not yet been optimised for efficiency. Chorus itself has reported issues unlikely to be seen in established processes. For example, Chorus has

**146** See Chorus, Submission of 13 August 2015, para. 376.

reported that, with high demand, some customers have "really bad experiences" getting connected to fibre, with about 30% of installation appointments cancelled on the day.[147] The fibre connection service currently seems to be far away from being a steady-state and efficient process. Therefore the cost of fibre connections of the LFCs do not yet represent efficient cost for fibre connections. This is confirmed by Chorus' announcement of a range of actions to be taken in order to improve these services.[148]

198. These cost differences between copper and fibre connection services are technology-generic and not country-specific. Therefore fibre connection services are also more expensive than copper connection services in New Zealand. [ ] **CNZCI** costs which the Commission used for a national cross-check of Chorus' connection costs therefore do not provide a relevant national benchmark because these costs simply are not comparable.

199. According to our assessment, connection services provided for fibre connections are not comparable to those provided over the copper access network.[149] Connection services for fibre lines are much more cost intensive than for copper lines basing on an efficient TSLRIC approach. We want to demonstrate these cost related differences at the example of (cost-based) copper- and fibre-based transaction charges in Germany. Fibre and copper ULL have been price regulated products. We present the result of the price decision of the German NRA in Table 5-1, as both product types were price regulated. We chose the variant with one fibre as it is cheaper than the variant with two fibres. This represents a very conservative approach:[150]

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**147** See recent media report http://www.stuff.co.nz/business/industries/68875282/Chorus-hopes-to-connect-homes-to-UFB-on-Saturdays.

**148** See also para.139 of this Cross-Submission and WIK-Consult, Submission of 12 August 2015, para. 156.

**149** This also seems to be the Commission's view (see Commission, UCLL July, para. 591).

**150** See decision of Bundesnetzagentur, BK4-04-027, http://beschlussdatenbank.bundesnetzagentur.de/index.php?lr=view_bk_overview&getfile=1&file=854

Table 5-1: Copper and fibre connection charges in Germany

| Connection type of ULL | Copper 2 wire DSL able charge in € | One fibre charge in € | Delta in [%] |
|---|---|---|---|
| Transfer without site visit | 50.46 | 107.33 | 112.7% |
| Transfer with site visit | 66.1 | n/a | n/a |
| New connection with cabinet visit without site visit | 75.9 | 203.26 | 167.8% |
| New connection with cabinet visit with site visit | 104.08 | 388.57 | 273.3% |
| New connection without cabinet visit without site visit | 64.94 | 156.64 | 141.2% |
| New connection without cabinet visit with site visit | 93.12 | 341.85 | 267.1% |

Source: WIK calculation based on Bundesnetzagentur, decision BK4-04-027.

200. It can be observed, that connection services for fibre are, at minimum, two times more cost expensive than copper connection services. Furthermore, with an increasing number of location visits being required in addition to the MDF visit, this factor increases up to nearly four times. The more labour intensive fibre switching activities additionally carry weight.

201. We have expressed general conceptual reservations about the use of a national benchmark to correct international benchmark data, and in particular if that is done in an asymmetric way which inflates costs.[151] Our overall conclusion in the fibre/copper cost comparison goes even further. Fibre network based connection services are from a cost perspective simply not comparable to copper access network connection services. Therefore, we strongly recommend that the Commission does not persevere with its cross-check against New Zealand costs.

202. In this context, we also reject the proposition by Chorus that the Commission should increase the results of the international benchmark to the level of the LFC benchmark.[152] Here Chorus contradicts its earlier comment when stating, that the relative activities between copper and fibre are not comparable. Surprisingly, Chorus also make the statement, that TERA supports an LFC adjustment, where

151 WIK-Consult, Submission of 12 August 2015, Section 3.4.
152 See Chorus, Submission of 13 August 2015, para. 377f.

this has not been reflected in any of the corresponding charge proposals of the Commission. We could not find any evaluation or other statement of the Commission referring to TERA's recommendation to do an LFC adjustment. It currently remains unclear to us whether the Commission actually rejected TERA's recommendation, or whether the charge proposal does not reflect the opinion of the Commission due to processing errors. Our concern is that the Commission could follow TERA's recommendation without any clear supporting evidence. We say this because the TERA document contains a range of small inconsistencies, (for example figure 5, minute value of column Denmark and the minute value in the describing text below differ). It is possible, that the Commission actually supports TERA's recommendation for further inflating the NRC charges by an LFC adjustment, but that TERA simply forgot to adjust the numbers in the summarising charge proposal table. In any case, on this point, we refer the Commission to our August 2015 Submission[153] and to our further statements in this section. We are clear in our arguments that the LFC costs are not adequate for use in determining TSLRIC based costs for copper transaction services. As a consequence, we reject the suggestion that an LFC adjustment as recommended by TERA would provide an reliable guide to TSLRIC costs..

## 5.6 Approach to charges based on Chorus' internal time only and comments to singular NRC based services

203. Chorus also rejects the use of international benchmarking for Chorus internal activities by referring to the efficiency adjustments made to the service code related activities.[154] In order to avoid repetitions we refer to Sections 5.1 and 5.2 of this Cross-Submission, which rebut Chorus' statement relating to Chorus' internal activities, and which apply equally to this point.

204. Chorus comments further on some individual services in Part Five and especially in Appendix C of its August Submission. Chorus claims for four services in the corresponding charges, that only Chorus internal efforts have been considered in the corresponding charges but that the costs of service companies have not been taken into account: Special manual prequalification investigation order, manual line testing, abortive end-user site visit and cancellation charge (post truck roll).[155]

205. Generally it is acceptable to add costs to services, but only if they have been overlooked and if they reflect the efficient production of these services. However, we have doubts about the justification of the additional costs claimed by Chorus if the HEO efficiency considerations are properly taken into account.

**153** WIK-Consult, Submission of 12 August 2015, Section 3.4.
**154** See Chorus, Submission of 13 August 2015, para. 376.
**155** See Chorus, Submission of 13 August 2015, para. 381f.

206. Chorus also makes claims for additional costs expensed by its service companies for the service manual prequalification order. An HEO does not rely on the service manual prequalification orders, as stated in detail in our August Submission.[156] An efficient HEO would use accurate network documentation and management systems, which makes inefficient manual prequalification unnecessary, and which removes additional inefficient costs from both Chorus and RSPs. [

]. **CNZCI** For instance, from our regulatory experience in Germany we know that such inefficient ping-pong games, for example were caused by name or address misspelling in incumbent's data-bank occur. Such unnecessary back and forth communications took place until the incumbent completely reorganised its IT systems and interfaces to RSPs in an efficient manner. Thus at minimum, any such charges caused by incumbent's inefficiencies should not be adopted in estimating TSLRIC costs, simply in order first to encourage the incumbent to improve its transaction processes and provisioning systems, and second so that RSPs can avoid unnecessary and inefficient additional internal costs. In other words, currently RSPs in effect pay double for the incumbent's inefficiencies: First for unnecessary pre-qualification processes in order to be able to place an order. Secondly after RSPs passed this hurdle, for the inefficient provisioning process itself.

207. The same principle holds true for the service manual line testing process, carried out in order to identify electrical characteristics in the case of line provisioning. An HEO provides this data by a data bank, and additionally, interferences between lines are avoided by a cable management software system ex-ante. Ex-post analysis by manual test is not necessary. The additional corresponding costs claimed by Chorus therefore should not be considered. So far line testing occurs with fault clearance. These costs are already covered by the monthly recurring charge which includes the activities for fault clearance. But this leads to the effect, that inefficiencies and their costs inflate the monthly recurring charges. Manual line testing should not occur at all, since it can be performed automatically in almost all cases. Therefore, exceptions are only acceptable in case of repeated faults at the same line and complex fault analysis. Consequently, also the monthly recurring charges have to be further decreased.

208. In the case of the service abortive end-user site visit Chorus argues in favour of setting incentives to honour appointments with service companies[157] and tries to

**156** WIK-Consult, Submission of 12 August 2015, para. 165 to 169.
**157** See Chorus, Submission of 13 August 2015, Appendix C, para. 425.

avoid time reductions in the case of maintenance tasks.[158] There are two reasons, why it does not reflect an efficient process for the service company provider to get an extra payment for this. Firstly, we know from purchasers in Europe, that they make it their service companies' responsibility for not meeting the end-customers (for reasons such as: incumbent provided wrong address to service company, technician was not able to read the correct address, technician was under time pressure, rang the bell and immediately disappeared etc.). Secondly, an efficient process would implement the possibility of courtesy calls. Customers are reminded by an automatic computer call of the site visit some hours before the planned visit and if customers do not react to the door bell, the technician gives customers a call. Thirdly, often work has to be done in areas, where also neighbours have access, or in case of private areas an efficient process foresees alternative arrangements such as provision of neighbours address and telephone number in case of absence (and leaving an access key to him/her). In such cases access to rooms and other areas are made possible. An efficient process of this type reduces the costs for redundant truck rolls to a minimum. As far as we can tell, this kind of process efficiency does not seem to be foreseen by Chorus at present. This perception is further confirmed by Chorus announcement of its approach to reducing rescheduling of fibre line provision.[159] Under this approach, Chorus sets up separate service numbers and additional service teams for improving the process of the end-user site visit. An HEO would also improve this process for copper line provision and would additionally install further process improvements, as we have shown above, and further IT improvements, as we have shown in our August 2015 Submission.[160]. [

] **CNZCI**. The current inefficiencies for copper line provision hold for both processes with end-user site visits: provisioning and maintenance tasks. The charges for abortive end-user site visit should therefore be set to zero in order to incentivise Chorus to improve its processes.

209. We have shown in para. 208 above, that an extra payment to cover costs of additional services of service companies would not occur for an HEO. Therefore we argue that only the internal costs for Chorus have to be taken into account, as currently modelled by TERA, in order to incentivise Chorus to be efficient. That principle also holds true for analogue SLU and UBA services. [161]

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**158** See Chorus, Submission of 13 August 2015, Appendix C, para. 426, 428.
**159** See Chorus, Informer 277, 24 August 2015.
**160** WIK-Consult, Submission of 12 August 2015, Sections 3.6.4 and 3.6.6.
**161** See Chorus, Submission of 13 August 2015, Appendix C, para. 439, 446, 448-455.

210. Finally, Chorus also argues strongly for the service “cancellation charge (post truck roll)” charges for UCLL and UBA, which include end-user site visits and other processes.[162] Insofar as the cancellation is not caused in Chorus’ area of responsibility, a charge to cover Chorus’ unavoidable costs may be justified. To charge an end-user site visit (maintenance) or a full provisioning charge in such cases is however not justified. The STD defines “post truck roll cancellation” as “cancellation of an order after RFS date notified to Access Seeker and after truck roll confirmed.”[163] Thus, to pay end-user site visits or full provisioning charges as required by Chorus does not reflect that the services are an ongoing process and are dependent on the time of cancellation. Following Chorus’ approach can lead to unjustified charges for elements of the service parts, in excess of costs incurred or work performed by Chorus or its service companies. For example, after cancellation the site visit was not completely fulfilled and should not be charged for in its entirety depending on the time of cancellation.

211. An efficient process in the present day is fully automated between the network operator and its service companies. A cancellation is immediately passed to the IT systems of service companies also and efficient service companies use “online tracking systems”, immediately calculating a new adapted truck roll route and informing the service technician during truck roll. Moreover some process costs, like preparing work information for the service technician can be used in a second truck roll and are not sunk. So it is an efficient practice of incumbents to charge fees depending on the point in time of cancellation. Only in the case the service technician already rings the doorbell, should sunk costs like end-user visit have to be paid additionally.

212. In this context Chorus’s arguments for charging a flat fee[164] are not appropriate. As the actual costs depend on the point in time of cancellation, as we have shown above, flat fees do not reflect the real costs. As we see it, Chorus claims that it should receive a charge which is not cost-reflective. Such a charge is not efficient, and in fact is counter-productive as a means to set adequate incentives because a flat fee, especially a full payment of the service, does not incentivize the purchaser to launch its cancellation at the earliest possible point in time. The additional argument by Chorus, that a flat fee is charged to it by its service companies, also does not hold here. This assertion simply shows, that Chorus did not organize its processes and the corresponding tendering processes efficiently.

213. Furthermore, Chorus claims for uniform UCLL and UBA charges and not for task time oriented charges for the result “no fault found” in response to a logged fault.

**162** See Chorus, Submission of 13 August 2015, Appendix C, para. 426 to 431, 437.3. 448 -455.
**163** See Commerce Commission, STANDARD TERMS DETERMINATION FOR CHORUS’ UNBUNDLED BITSTREAM ACCESS SERVICE, SCHEDULE 2 UBA PRICE LIST PUBLIC VERSION, 5 November 2013.
**164** See Chorus, Submission of 13 August 2015, Appendix C, para. 428 – 430, 453 -455.

This obviously appears to be done in order to give purchasers the incentive to avoid wrong fault clearance services.[165] The opposite is in fact the outcome. The result “no fault found” and a corresponding charge bears the risk of abuse by the access provider. Standard fault clearance costs are usually covered by the maintenance costs included in the monthly line charge. We know for instance from purchasers in Europe, that incumbents are more likely to be incentivised to repair the line, close the ticket and try to get an extra payment by signalling the result as “no fault found”. Moreover it has to be added, that there are fault cases, where both parties are needed to identify the exact location of the fault, so that the purchaser cannot avoid ordering a fault clearance service. That also holds for the UBA service.[166] Therefore, in our view, there is no reason to get an extra payment in addition to the charge already made for the fault clearance service. It does not cover service processes and just transfers the risk of uncertainty of fault location and inefficient Chorus processes unilaterally to the purchasers.

214. Chorus argues that it should receive an additional payment reflecting additional paper invoices for UCLL, SLU and UBA.[167] Insofar as these costs are justified, the charges should be based on the number of pages printed, because an efficient process is completely IT automatized and does not rely on manual working time. [

].**CNZCI**. As costs for electronic billing are reflected by the monthly recurring charges of SLU, UCLL and UBA, these charges include inflated billing costs due to inefficient internal billing processes and unnecessary for handling the complaints made by RSPs. Therefore monthly recurring charges should be lowered in order to reflect efficient billing processes of an HEO

215. Concerning its service “Remapping design charge” Chorus argues that it should receive the benefit of a fixed charge instead of POA, which overrides the current fixed charge.[168] Generally we support a charge, which is not based on a POA, but we propose a charge with a fixed sum per DSLAM location, which reflects that the costs correlate with the number of DSLAM locations affected.[169] This is consistent to the Chorus information of that shows a significant variance of average and maximum costs of [ ] **CNZCI**.[170] A charge depending on the main cost driver is more adequate to reflect the risk of variance than a simple fixed charge.

**165** See Chorus, Submission of 13 August 2015, Appendix C, para. 420f.
**166** See Chorus, Submission of 13 August 2015, Appendix C, para. 445.
**167** See Chorus, Submission of 13 August 2015, Appendix C, para. 432 to 435, 440, 447.
**168** See Chorus, Submission of 13 August 2015, Appendix C, para. 443.
**169** See WIK-Consult, Submission of 12 August 2015, para. 122.
**170** See Chorus, Submission of 13 August 2015, Appendix C, para. 444.

216. Generally we share the Chorus view, that a fixed price can offer more certainty.[171] But this may not in all circumstances lead to the effect, that the risk of predictability of variance will be completely shifted to the purchasers. An example of this is where a price is set overriding the weighted average as Chorus suggests should be the case with nationwide averaging costs of service codes (see Section 5.3 of this Cross-Submission). If the predictability is too uncertain and the variance can be reduced to a few more parameters, a price formula should be set instead of a fixed charge or a POA, as we for example proposed for the service "Remapping design charge" (see above).

217. Finally, we like to point out that several UBA transaction charges require a more expensive charge due to port changes or visit at cabinet or exchange site. So far these port changes, cabinet or exchange site visits are initiated by a shortage of ports. Such charges are not justified as sufficient spare capacities are foreseen in the network of an HEO (see para. 149 of this Submission) and in such cases port changes, cabinet or exchange site visits are not necessary. We recommend that the corresponding service descriptions are adequately specified by enumerating the cases with justified port change, cabinet or exchange site visits.

## 5.7 CPI or labour costs

218. Chorus and Analysys Mason argue that the Commission should *"continue applying an annual adjustment linked to changes in the Labour Cost Index"* of the NRC based transaction services.[172] Generally it is adequate to reflect changes of labour costs in the next regulatory period. But this also holds for all other components which influence the costs such as task times, IT costs, transport costs as well as process and productivity improvements. Why should for instance the price of a certain transaction service be increased by the labour cost index if the fuel cost for vehicles used to provide the transaction service decrease? In total we expect an annual cost reduction and therefore we suggested a moderate price reduction factor of -3% to -5% p.a.[173] This moderate factor already considers the change of labour costs. It is supposed to represent the net effect of labour cost (increase), the change of cost of other input factors (which might increase or decrease) and the increase in process efficiency and productivity. It is a moderate factor, if compared to the change in the (regulated) costs of transaction services in other jurisdictions, which we presented in our October 2014 Submission and our August 2015 Submission.

**171** See Chorus, Submission of 13 August 2015, Appendix C, para. 457.
**172** See Chorus, Submission of 13 August 2015, para. 387.
**173** WIK-Consult, Submission of 12 August 2015, para. 91.

## 5.8 Conclusions

219. We summarise our conclusions derived from our analysis as set out above:

- Chorus' Submission ignores the full potential for efficiency improvements achievable by an HEO approach and its own public statements of its plans for efficiency improvements.
- Chorus' critique, provided in order to rebut TERA's international benchmark, determining costs of an efficient HEO, is not well justified. TERA's international benchmark in principle represents an appropriate approach to the estimation of efficient charges. Nevertheless, in its implementation, some further adjustments should be added to the results of TERA's international benchmark and other cost positions not checked for increasing efficiency.
- TERA's current approach to weigh service costs per CSA by volume of lines per CSA is adequate and deals fairly to distribute the risk of changing of costs per CSA to Chorus and RSPs. In contrast, Chorus' percentile approach fails.
- Chorus' statement, that its real overhead costs reflect efficient overhead costs remain further unsubstantiated and ignores WIK's evidence that there are efficiency potentials available to them and not yet considered.
- Inflating NRC related costs by using the benchmark values of LFCs is not adequate. Fibre transaction processes differ significantly from copper transaction processes and cause higher costs in comparison to copper transaction processes. Such higher costs do not represent efficient costs for copper transaction services.
- Several transaction services, for example 'manual prequalification order', 'manual line testing' or communicated results like 'no fault found' are the result of Chorus' inefficient systems and processes. Therefore such charges have to be set to zero, because the corresponding costs do not reflect an efficient HEO and Chorus should be incentivised to establish efficient processes, so that additionally avoidable internal costs of RSP will be prevented.
- A moderate price reduction factor of -3% to -5% p.a should be applied to NRC based transaction services in order to reflect changes of labour costs and further efficiency potential coming up in the regulatory period.

# 6 Backdating

## 6.1 Regulatory predictability and uncertainty

220. A number of submissions argue that regulatory predictability requires backdating FPP prices to the date at which the IPP prices became effective. It is therefore important to consider the aspects of uncertainty and regulatory risk which may be generated by, or accompanied with, the FPP process. The important issue and question in this context is whether and to what extent the Commission's decision on backdating may contribute to regulatory predictability and to reduce regulatory risk.

221. Price determinations which rely on the basis of a complex cost model that is being developed for the first time necessarily take a certain period of time. In the context of the New Zealand copper pricing review, this time starts from when market participants submitted applications for an FPP and runs to the Commission's final decision date on FPP prices, currently intended to be December 2015. Valid (new) IPP prices for UCLL have been in place since December 2012, and similarly, in place for UBA since December 2014. This has created a period of about three years during which market players do not know the forward looking wholesale prices for UCLL and UBA, and so must base relevant business decisions on prevailing wholesale prices and on expectations of the outcome of the Commission's cost modelling exercise. Market participants must bear the risk that their expectations may not align with the final regulatory price determination. This is part of a regulatory risk market players should be, and are, aware of when they apply for an FPP.

222. Regulatory risk associated with an FPP has several dimensions, all of which generate uncertainty for business decisions related to the choice of the business model, investments and retail prices. Chorus seems to suggest that only Chorus currently suffers from such uncertainties. This is not the case. Rather, such uncertainties symmetrically impact on all stakeholders in the market, in particular the RSPs. These uncertainties relate to:

- the duration of the process;
- the final wholesale prices; and
- whether or not there will be backdating of the final FPP prices (and the potential implementation mechanism of a decision to backdate).

223. These elements of uncertainty contribute to the regulatory risk associated with the FPP process. Uncertainty has an economic price which may include the delay of

decisions or inefficient decisions or additional cost. The New Zealand economy would be better off if such risk could be avoided or minimised.

224. We do not comment on whether the Commission is bound, for legal reasons, to delay its (final) decision on backdating until the date of the final FPP determination. From an economic perspective a (binding) decision at an early date – preferably at the beginning of the FPP process – would reduce a substantial part of the regulatory risk associated with backdating. A decision not to backdate would eliminate this additional regulatory risk. On the other hand, given the final pricing decision is unknown until the end of the process, a decision to backdate made at the very end of the FPP process, would maximise this aspect of regulatory risk.

225. Although the regulator cannot remove the risk for market participants associated with the exact outcome of the TSLRIC cost calculation, it can influence that risk to a relevant degree. Every appropriate measure that makes it easier for market participants to anticipate the outcome of the regulatory cost calculation reduces this part of the regulatory risk. Early decisions properly communicated to the market and a transparent modelling and input parameter generation process contributes to reducing this part of the regulatory risk.

226. Changing positions and modelling elements during the process involves a trade-off. On the one hand, the regulator changing its mind on matters including key pricing/costing principles, modelling approaches and input parameter values during the FPP process decreases the ability of market participants to predict the final outcome. On the other hand, that the regulator takes note of and fairly assesses contributions of stakeholders in their submissions and cross-submissions, and is prepared to change positions and assumptions if stakeholders convincingly bring new evidence to the attention of the Commission or contribute relevant critique, are key elements of a fair, transparent and efficient process. We consider that the contribution made towards an efficient and informed decision by a regulator being open to change positions far outweighs the associated increase in uncertainty regarding predictability of the final outcome. This holds in particular if a regulatory change in positions is transparently documented and explained.

227. If regulatory risk is the key issue and problem associated with the FPP that may (and probably will to a certain degree) distort relevant business decisions, we must consider whether backdating would contribute to reducing such regulatory risk.

228. A decision to backdate, has no impact on the duration of the FPP process. The duration of a TSLRIC regulatory pricing process is obviously driven by other factors. One might argue that backdating reduces the incentive of the Commission

to streamline and strive for a short FPP process duration, as the Commission might take the view that it does not matter how long the process takes, as the effective date of the FPP would be the starting date of the IPP. We strongly reject such a view because we judge the Commission to be well aware of the impact of uncertainty on business decisions.

229. We have considered whether a decision to backdate might reduce the regulatory risk regarding the outcome of the regulatory cost calculation and final price determination, and conclude that no, it does not. This risk is independent of whether backdating will occur or not. In both the case of backdating, and of no backdating, stakeholders must develop their own expectations of the outcome.

230. A decision to backdate, if it is not determined at the beginning of the process, can also not reduce the regulatory risk associated with backdating. Only a decision not to backdate, made at the beginning of the regulatory process, can eliminate the regulatory risk associated with backdating. In contrast, a decision on whether or not to backdate, made at the end of the FPP process maximises the regulatory risk associated with backdating. Stakeholders do not know whether backdating will occur or not. Furthermore, they do not know what amounts are at stake: both in terms of the final price level and in terms of the duration of a backdating period. Stakeholders might not even know whether they will receive, in the end, a positive (revenue) or a negative (cost) contribution if backdating is to be applied.

231. Our clear conclusion is that a decision to backdate has no impact on major components of the regulatory risk associated with the FPP process. Nevertheless, overall there is an increase of the regulatory risk of the FPP process which follows directly from the uncertainty around the question of backdating. If stakeholders know that backdating will occur, or face the risk that it might occur, their business decisions during the FPP process have to be taken under the prevailing risk that wholesale prices will be changed ex post and that they have to be aware a lump-sum payment will be required between market participants. If they know in advance that no backdating will occur then they would have a stable, transparent set of wholesale prices on which to base business decisions. Therefore a decision to backdate does not decrease, but rather increases, regulatory risk.

232. Chorus seems to suggest that not only itself but also the RSPs which requested the FPP by the Commission expected the "true costs" of UCLL and UBA to be above the price level as determined by the Commission in the IPP. Chorus supports this view by referring to the proposal that RSPs made for the aggregate copper price in August 2013, namely $ 37.50[174]. It is clear to us that this proposal represented an early attempt at commercial negotiation to achieve a certain outcome, and was not in any way related to an expectation (or even estimation) of

**174** See Chorus, Submission of 13 August 2015, para. 284.

the relevant calculated TSLRIC cost by the RSPs. If the RSPs could have created a TSLRIC estimation of costs within a month or two, then so could the Commission, and the FPP process would not have taken this many years. The August 2013 pricing proposal was made in a totally different context to the current TSLRIC regulatory costing process.

233. Moreover, the offer mentioned above was made on the basis that Chorus would make concessions on fibre pricing and speeds. Thus, we understand from Vodafone and Spark that it would have been part of a package deal where RSPs would receive more value on fibre services in return for RSPs agreeing to a $ 37.50 copper UBA price. Furthermore, the offer intended to deliver certainty to the industry as soon as possible. In total the offer therefore implicitly recognised that RSPs were making an above-cost offer to receive other benefits in return which are not related to copper access services. It is inappropriate to suggest that this price represents an anchor (for any party to the FPP proceedings) for what an accurate TSLRIC price would reflect.

## 6.2 Regulatory time consistency

234. Sapere submits that time consistency is an important principle in the case of price regulation to maintain efficient investment incentives in the sector[175]. Time consistency, as per Sapere's report, is a component of regulatory predictability. We fully agree at this high level of principle.

235. Sapere concludes that when applied to the copper pricing review determination, time consistency requires "*that the FPP determination, and the resulting prices, apply from the same date as the IPP determinations apply.*"[176] According to Sapere this conclusion follows from the 'assurance function' provided by the FPP, which is explained as: if access seekers or the access provider are not satisfied with the outcome of the IPP pricing determination method, they are assured by law that a different price determination method will be applied by the Commission upon their respective application and request. We fully disagree with this conclusion.

236. Sapere totally ignore the inherent time requirements necessary for the Commission to switch from one price determination methodology (IPP) to the other (FPP) and the implications of the added complexity of a TSLRIC modelling approach when compared to a benchmarking exercise. Even more importantly, Sapere also totally ignore the efficiency implications of a decision to backdate. TSLRIC pricing is a method developed specifically with the objective of achieving economically efficient outcomes. The ability of TSLRIC in an applied regulatory

**175** See Sapere, para. 8ff.
**176** Sapere, para. 18.

exercise to deliver efficiency benefits also depends on the timing from which TSLRIC prices apply. If Parliament would have expected the Commission to ignore the efficiency implications of an assessment in the application of backdating we fully expect that it would have determined the time validity of the FPP prices within the Telecommunications Act itself. We also note that the 2000 Fletcher Report, underpinning the current regulatory regime, does not consider, let alone mention, the concept of backdating regulatory decisions. That Parliament has chosen not to consider nor mandate backdating, clearly enables the Commission to have discretion to conduct the usual section 18 assessment to inform such a decision.

237. Whilst we reject Sapere’s characterisation of the applicability of time consistency to this regulatory process, we believe that time consistency does have a meaning for this FPP process, that itself leads to certain requirements on the Commission.

238. We share Sapere's view that time consistency is an essential component of regulatory predictability.[177] The Commission, however, would not be violating this principle if it were not to backdate the FPP prices. The Commission, in this FPP process to date, has not made a (binding) final decision on backdating. All parties understand that it will make this decision in the context of its final determination of the FPP prices, as this timing has been clearly signalled by the Commission. Thus the Commission has made no previous commitments to backdate, or not to backdate. One may criticise this lack of commitment - we also did that with regard to regulatory uncertainty[178] - but so far, we recognise that the Commission has behaved consistently. Whilst in its December 2014 draft determination the Commission signalled being in favour of backdating, a position that was then revised in its July 2015 draft determinations, the Commission nonetheless made clear in both draft determinations that the draft decisions are preliminary, subject to review based on stakeholders' submissions, and open to a final assessment by the Commission. The Commission has made clear that its draft decisions were not binding and the final decision is yet to be made.

239. The Commission would violate time consistency if it had made a binding decision on backdating which it would withdraw during or at the end of the FPP process.

240. Sapere’s arguments on time consistency attempt to relate the Commission's decision on backdating to Chorus’ investment cycle.[179] This is totally misleading. There is no indication at all that the Commission (in its majority) has made its decision in relation to Chorus’ investment cycle. The argument made by Sapere is purely speculative. There has also been no prior regulatory decision on backdating, made by the Commission in a different case, which could be

**177** See Sapere, para. 10
**178** See para. 224 of this Submission.
**179** See Sapere, para. 11 and para. 90ff

interpreted that way. Sapere provides no evidence for its speculation at all, simply because there is no evidence to support these claims.

241. The Commission does not use its analysis on the status of Chorus' investment cycle[180] as an opportunistic argument on the sunk nature of Chorus' investment. It simply demonstrates that there will be no impact on Chorus' investment in the case that backdating occurs, and also no impact if it does not backdate. The Commission's position does not represent time inconsistent decision-making as Sapere claims.[181] The Commission's majority view is not more and not less than the analysis of the dynamic efficiency implications of backdating. Everything else which Sapere brings to the table in this context remains pure speculation.

242. Furthermore, Sapere's analysis of investment impacts of backdating is focussed solely on Chorus' investment. It totally ignores the impact of the Commission's decision making on RSPs' investment. We have shown in our August 2015 Submission that impacts on these investments may be even more obvious and relevant.[182]

243. The impact of backdating on RSPs' investment becomes obvious when they have to make provisions on potential future backdating payments in their balance sheet. Investment capabilities of a firm depend on the structure of equity and liabilities in its balance sheet. Any increase in liabilities set aside for potential future backdating payments reduces the capability to finance investment. This holds as long as there is a relevant probability that such payments may be made and as long as the provisions prevail.

## 6.3 'Assurance function' of the FPP

244. Sapere's submission on the 'assurance function' that is supposedly provided by the FPP is tautological. According to Sapere, the 'assurance function' requires that the FPP determination and the resulting prices apply from the same date as the IPP determinations apply.[183] What the 'assurance function' requires is thus set by a stated definition and not by analysis. Any meaningful and non-tautological use of an 'assurance function' would have required an analysis of the impact of backdating on business decisions, yet this has not been conducted by Sapere. The 'assurance function' is not eroded if the relevant services are to be priced by the TSLRIC method once these prices are determined. Forward looking regulatory pricing is what the New Zealand law assures to access seekers and the access provider. Not more and not less.

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**180** See Commission, UCLL July, para. 886.6
**181** See Sapere, para. 93
**182** See WIK-Consult, Submission of 12 August 2015, para. 58f.
**183** See Sapere, para. 104.

245. We find it essential to highlight that we are not aware of this so-called regulatory concept that Sapere refers to as an ‘assurance function’, that is so well-defined to have a meaningful content. We view this construct of an ‘assurance function’ to be nothing more than a definition that has been created by Sapere. We would warn that no conclusion can be derived from a principle that does not exist, and which moreover has simply been created to describe a certain regulatory decision in a certain context and support a certain viewpoint.

246. Chorus rejects the notion that the Commission must base any decision to backdate by showing that it demonstrably promotes competition. Rather Chorus proposes that the whole purpose of the FPP is to substitute an earlier set price by another price, once determined using a different methodology.[184] This position ignores that the Commission claims (and in our view has) discretion to use its best judgement in a decision on backdating. If the Commission has discretion, then its decision must be based on the relevant criteria of section 18 of the Telecommunications Act.

247. L1 Capital notes that its investment in Chorus was based on an FPP price being above the IPP price and that an expectation of backdating formed a considerable part of their investment case.[185] This might have been the expectations of a particular investor. And this investor will have arrived at its expectations by making speculative assumptions under uncertainty. The fact that certain investors make speculative assumptions regarding the outcome of a regulatory process simply cannot be interpreted as a condition or limitation on the Commission’s own decision making.

## 6.4 Impact of different implementation models of backdating

248. The Commission has signalled consideration of a variety of implementation methods for backdating. Chorus insists that backdating must occur, and prefers implementation via a lump sum payment. All implementation considerations have their own impact on the efficiency distortions caused by backdating. Backdating requires a decision that the start date for FPP prices is prior to the final determination decision. Furthermore, the price relevant at that starting date has to be determined, via a decision of how to calculate a previously-relevant price at the date of decision making. Finally the method of payment of the backdated amounts of money has to be determined.

249. The Commission considers two forms of payment for a backdated IPP-FPP differential (or a combination of both approaches): lump-sum payments and a claw-back payment mechanism. Lump-sum payments are modelled in three

**184** See Chorus, Submission of 13 August 2015, para. 287.8.
**185** See L1 Capital, August 2015 Submission, p. 7

different forms: as a one-off payment, as a yearly smoothed lump-sum (equal annual payments spread over a nominated number of years) or as a monthly lump-sum (equal payments each month for twelve months). In the claw-back approach the backdating payment is recovered by an increase in the monthly UCLL/UBA charge over a nominated period of the upcoming regulatory period.

250. For a variety of reasons Chorus prefers a lump-sum payment "*as it enables parties to work through these commercially as wash ups …*"[186] To mitigate negative impacts on the cash flows of RSPs Chorus offers appropriate repayment schemes to individual RSPs.

### 6.4.1 Backdating by lump-sum settlements

251. The (July 2015) further draft determination of the UCLL price proposal of the Commission of $ 26.74 (price proposal for 2016) would include a material increase in the UCLL price compared to the currently prevailing IPP price of $ 23.52. The “levelised” TSLRIC modelled price for UCLL is $ 27.59 which is 17% higher than the IPP UCLL price of $ 23.52, or a $ 4.07 increase.[187] Calculating the backdated difference on the model cost calculations of the Commission would require an backdated amount of $ 3.37 (= $ 26.89 - $ 23.52). This would mean that an RSP would have to pay a lump-sum of $ 4.04 million for each 100,000 customers. We estimate that the total of lump-sum payments for UCLL, SLU and UBA would be approximately $ 43 million in aggregate.[188] This is a large sum of money which would have a significant impact on investment abilities of RSPs.

252. Depending on the level of profitability and the overall business development in terms of demand, the (lump-sum) transfer of such amounts of money may also have an impact on the financial viability of an RSP and its ability to stay in the market. We expect this to be an issue for smaller RSPs in particular.

253. We therefore share the Commission’s analysis and conclusion that backdating via a lump-sum payment would not promote competition for the long-term benefits of end-users at the RSP level.[189] We would further extend this assessment: backdating via lump-sum transfers are detrimental to competition in the retail market by reducing investment incentives in the downstream market and potentially inducing market exit.

**186** Chorus, Submission of 13 August 2015, para. 322 and para. 324
**187** See Commission, UCLL July, para. 882.
**188** See Commission, UCLL July, para. 929.
**189** See Commission, UCLL July, para. 868.3.

### 6.4.2 Backdating by applying a claw-back mechanism

254. If the Commission were to decide to backdate to 1 December 2014 by applying the claw-back mechanism, the price increase for UCLL would be $ 0.77 over the five year regulatory period.[190] This implies a price increase between 2.9% and 2.7%. In case of UBA the price increase would amount to $ 0.03 or 0.3%.

255. Implementing backdating through a claw-back mechanism creates a different structure of impacts compared to a lump-sum payment implementation. A claw-back mechanism would inflate the regulated UCLL prices over the regulatory period such that the revenue requirements of the relevant lump-sum payment is met. Implementing by claw-back would lead to substantive price increases and the inflation of the wholesale price level above a TSLRIC-based UCLL/UBA price for future years.

256. A claw-back mechanism would increase wholesale prices for RSPs and therefore their marginal cost of providing broadband access services. The Commission argues that such "*across-the-board cost increase is unlikely to have first order competition effects.*"[191] We are not sure what the Commission has in mind with "first order competition effects". It is obvious to us that such an implementation of backdating will have competition effects, be they first order or second order effects.

257. We agree with the view and analysis of Commissioners Gale and Welson that backdating in the form of claw-back is less damaging to RSPs than lump-sum backdating.[192]

258. If benchmark-based IPP prices have been "wrong" if compared to "true" cost modelling-based FPP prices, the economic distortions caused by "wrong" IPP prices cannot be corrected by distorting (future) FPP prices. The opposite holds. Increasing future UCLL prices by applying a claw-back backdating approach would generate new and additional distortions. This simple assessment is totally ignored in Chorus' and Sapere's analysis of backdating.

259. We have analysed and discussed such distortions in the context of considering an uplift to the TSLRIC prices.[193]

260. The Commission's own welfare analysis approach regarding a TSLRIC uplift clearly demonstrates that any increase of the UCLL wholesale price above the TSLRIC level will not enhance but decrease welfare and would therefore not enhance consumer benefits.

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**190** See Commission, UCLL July, para. 930.
**191** Commission, UCLL July, para. 869.2.
**192** See Commission, UCLL July, para. 886.
**193** See WIK-Consult, Submission of 8 May 2015.

## 6.5 Some more efficiency aspects of backdating

261. We address the argument in favour of backdating: that if backdating is applied, the appropriate FPP price is earlier in the market compared to a situation where there is no backdating. This argument was originally raised by Commissioner Duignan.[194] For this to hold, business decisions on the business' model, strategy, investment and retail pricing (which depend on the regulated UCLL and UBA wholesale prices) can be made earlier compared to a scenario where there is no backdating of the FPP price. This, however, is not the case.

262. Wholesale prices are in the market when they are known to the market players. Backdating does not provide any timely information on the (exact) wholesale prices. The uncertainty about the level of the wholesale price is unaffected by backdating. The relevant and appropriate business decision can only be made once the wholesale prices are determined and known. That is the point in time where the FPP prices are in the market and not earlier and so when access prices become efficient prices. This holds in particular when there is potentially a large range of estimates on the table of the potential outcome of a TSLRIC exercise, which moreover has never been conducted before. This is exactly the situation in New Zealand.[195]

263. The present situation is that IPP prices have been in the market for a certain while. Market players have to, and actually do, adapt their business decisions according to the prevailing IPP prices, whilst knowing that wholesale prices will change once the FPP process has concluded. Effectively market participants have no opportunity to behave differently in response to a particular element of the Commission's decision behaviour: the Commission will – as explicitly stated and intended – make its (very) final decision on whether or not to backdate only in combination with and at the same time as it will decide on the FPP prices. When a decision on whether or not the FPP prices will be backdated is delayed until the very last minute of the FPP process, backdating – also for this reason – will not effectively bring the FPP prices earlier into the market. Decisions made during the period which the IPP applies cannot be undone at a future point in time.

264. Chorus argues that RSPs have reacted to potential wholesale price increases as a result of the FPP determination by increasing their retail prices during the FPP process and that some of them have already passed on price increases to consumers.[196] It is true that some retail price movement can be observed during the FPP process. Chorus seems to suggest that such price movements indicate that there could be no competitive or allocative efficiency implications related to backdating. This is actually not the case. RSPs (as well as Chorus) have to base

194 See Commission, UCLL July, para. 899.1.
195 See WIK-Consult, Submission of 12 August 2015, para 53.
196 See Chorus, Submission of 13 August 2015, para. 287.9.

their business decisions during the FPP process on their expectations on the outcome of that process. It is not a viable option to postpone each decision until the FPP process has come to an end. As we have already shown in our August 2015 Submission[197] and which we further elaborated upon in this Cross-Submission[198], such decisions have to be made under significant uncertainties. That is why backdating has an impact on competition and on efficiency.

265. Efficiency is not supported by a wholesale price which market participants do not know. Therefore from the efficiency point of view the final FPP price cannot be the correct price for the period prior to 1 December 2015. The correct price is the one on which market players are able to base their decisions upon. The potential efficiency improvements of a TSLRIC price are simply not achievable ex post. They are only achievable if market players can base their decisions on such a price. To quote DotEcon: ‘bygones are bygones’.[199] There is no way out of the conclusion that backdating would be a wealth transfer from RSPs and their customers to the access provider.

## 6.6 Conclusions

266. The FPP process is a source of regulatory risk. Risk and uncertainties are related to the duration of the process and the final wholesale prices. These risks are inevitable but can be managed and minimised by the Commission. Backdating would not contribute to reducing the regulatory risk. Moreover, it is a source of additional regulatory risk. This additional regulatory risk can only be mitigated or even avoided if the Commission making the (binding) decision not to backdate at an early stage of the process.

267. We agree that time consistency is an important regulatory principle in the case of price regulation to maintain efficient investment incentives in the sector. The Commission would not be violating this principle if it were not to backdate the FPP prices. The Commission has made no commitments towards backdating. Therefore the efficiency assessments related to backdating must determine whether backdating should occur or not. Sapere wrongly assumes that the Commission relates its decision on backdating to Chorus' investment cycle. This is misleading and effectively wrong.

268. The ‘assurance function’ of the FPP assures the access seekers and the access provider that the FPP prices will substitute the IPP prices, whenever they are determined. Not more and not less. If Parliament had expected the Commission to ignore the efficiency implications of backdating, it would have determined the time validity of the FPP prices within the Telecommunications Act itself.

**197** See WIK-Consult, Submission of 12 August 2015, Section 2.2.1
**198** See Section 6.1 of this Cross-Submission
**199** See DotEcon, Backdating of FPP prices in New Zealand, August 2015.

269. Backdating by lump-sum payments does not have the same negative impact on allocative efficiency as the claw-back approach. Lump-sum transfers, however, are detrimental to competition in the retail market by reducing downstream investment incentives and potentially inducing market exit. Furthermore, lump-sum payments have negative impacts on investment if operators have to make provisions for them.

270. Due to retail market competition a claw-back mechanism would increase retail prices. Economic distortions caused by "wrong" IPP prices cannot be corrected by distorting (future) FPP prices. The opposite holds. Additional distortions and welfare losses occur.

271. It is not true that the final FPP price is the "correct" wholesale price for the time period before the Commission reaches its final decision on the FPP price. This is not the case because market participants cannot efficiently base their business decisions on their business model, investment and retail prices on wholesale prices which are not known to them. Wholesale prices which should induce efficiency are in the market when they are known to market players. Backdating does not bring forward the ability of market participants to base business decisions on final FPP prices any earlier.

## Imprint

WIK-Consult GmbH
Rhöndorfer Str. 68
53604 Bad Honnef
Germany
Phone: +49 2224 9225-0
Fax: +49 2224 9225-63
eMail: info(at)wik-consult.com
www.wik-consult.com

Person authorised to sign on behalf of the organisation

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