Chorus

BRINGING NEW ZEALAND
BETTER BROADBAND

Submission in response to the Commerce Commission's Section 9A Backhaul Study

23 September 2016 – Public Version

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EXECUTIVE SUMMARY

This is Chorus' submission on the Commerce Commission's *Section 9A Backhaul Study: Preliminary questions in understanding domestic backhaul services* paper.

The backhaul market has evolved significantly over the last decade, contributing to the vibrant retail markets for voice and broadband services we see today. There are multiple national backhaul providers providing extensive geographic coverage with tailored solutions to meet the requirements of retail service providers.

In 2012, the Commission found that the large majority of backhaul links were competitive, and competition will only have grown in the years since the Commission's last review. The areas where there is still only one provider are largely low demand (one customer) areas.

There is a strong case for taking a national market view of backhaul. And on a national market view, the backhaul market is competitive and capacity growth is frequent, suggesting few impediments to entry or expansion.

If the Commission continues to take a link-by-link view, competition and the threat of entry is credible even in the areas where there is a single current backhaul provider, if demand is sufficient. If demand isn't sufficient, customers still have sufficient countervailing power to constrain pricing. Indirect routes between two points may also constrain more direct routes between those same points. No matter how you define the market, the evidence points to actual or potential competition for backhaul services.

If there was a lack of competition this would likely show up as excessive prices: but this simply isn't the case. Even in areas where there is only one backhaul provider (which are generally areas supplying legacy services) our commercial prices simply reflect regulated national averaged prices previously set by the Commission. Any attempt to increase prices to excessive levels would be met with network overbuild, switching providers, bypass or high levels of complaints.

Against this market backdrop, we think the Commission should conclude markets are competitive and there are grounds to investigate deregulation of the existing backhaul services under Schedule 3 of the Telecommunications Act.

Our backhaul services

We provide a number of commercial backhaul services today. At a high level those commercial services fall into the following categories:

	Types of backhaul services	Description
1	Capacity based services (**Capacity Backhaul Services**), including for example UBR Backhaul, CRT, and ICABS	These services are priced on the basis of bandwidth and distance, applied nationally. They are also traffic agnostic and available between UFB/RBI points of interconnection (**POIs**), between exchanges and POIs, between exchanges and to other points on request, as appropriate for the service.

2	Tail Extension Services (**TES**), including for example for UBA, Baseband IP, HSNS and NGA	These services extend the access service, carrying traffic specific to that service, and are priced on the basis of 'per access line' and distance. They are available between areas where the associated service is provided and distant handover points.
3	Commercial Backhaul Service (**Commercial Backhaul Service**), including backhaul for legacy PSTN services and UCLL/UCLFS where there is no regulated service because a link has been determined to be 'competitive'	The Commercial Backhaul Service is priced on the basis of bandwidth and distance by applying the Commission's regulated backhaul pricing from 2008. The pricing was set on a national averaged approach that did not differentiate rural/remote links with higher costs/prices. It is available for any traffic type. It is typically only used in rural/remote areas where neither UFB or RBI backhaul nor the newer Capacity Backhaul Services are available and is used for mobile and PSTN backhaul. [ ]**Chorus CI** There is an alternative to the Commercial Backhaul Service in most cases. RSPs can move for example, from legacy technology based services to Baseband IP (including Baseband IP Extended) and to take Baseband IP TES or take HSNS and HSNS TES.

Of course we also provide regulated backhaul for UCLL/UCLFS, UBA and SLU between points, and carrying traffic, determined under the relevant STDs but we have limited or no take-up for these services.

The world has changed since backhaul was first regulated

Our vision is to provide better broadband to all New Zealanders to maximise the potential economic and social benefits that come from a digital world. We see high quality broadband as the fourth utility and an essential service for New Zealanders. We intend to meet this need as an open wholesale access provider, including by supplying backhaul services.

As New Zealanders' demand for both speed and the volume of data has grown significantly over the last few years, backhaul demand has grown in parallel. We have continued to invest in our network to meet this demand, offering new commercial backhaul services and reducing prices as costs have decreased. We expect this trend in data growth to continue. We have the right incentives to continue to provide commercial

backhaul that meets our customers' needs at a commercially appropriate price. There's no service, quality or pricing issue that should concern the Commission.

Today's backhaul market has evolved considerably since regulation was put in place almost 10 years ago. The current UCLL/UCLFS Backhaul and UBA Backhaul STDs were introduced in 2008, and SLU Backhaul in 2011, in the context of a vertically integrated network operator with a bottleneck access asset. At the time regulation was considered necessary to ensure take up of the bottleneck copper access services wasn't undermined by a lack of adequate backhaul. The backhaul market was still evolving - just as there was little retail competition, there was little backhaul competition.

In 2012, the Commission carried out its last competition review of the UCLL/UCLFS Backhaul and UBA Backhaul links. The Commission found:

- 80% of the UCLL/UCLFS Backhaul primary links it assessed were competitive;[1]
- 95% of UCLL/UCLFS Backhaul secondary links were competitive;[2]
- 68% of UBA Backhaul primary links were competitive;[3] and
- 95% of UBA Backhaul secondary links were competitive.[4]

A lot has changed since that last competition review. The pace of change in the telecommunications markets means 4 years is a long time. In fact, in the Commission's last assessment of backhaul links in the context of the proposed Vocus/M2 merger, the Commission concluded the backhaul market was national and competitive. It noted: "*At the upstream backhaul level, Vodafone and Spark will continue to be the major providers of backhaul services and all parties we have spoken to have noted that the backhaul market is very competitive*."[5]

Since 2012, we've evolved our commercial backhaul services, including introducing new services. Our Capacity Backhaul Services allow customers to aggregate traffic from different services on the same backhaul link. Our TES backhaul services allow customers to buy backhaul on a per access line basis. These commercial services have been introduced in response to customer demand and evolving technology (such as the introduction of fibre access). Our commercial backhaul services are widely available across New Zealand and are priced on a national basis.

The prices of our backhaul services have also dropped over this time as the market grew, costs reduced in some areas, and backhaul competitors sought to increase their market share. As described above, our Capacity Backhaul Services and the Commercial Backhaul Service are priced based on a combination of capacity and distance rates applied nationally and TES backhaul services are priced on the basis of distance and per line. Our rates don't discriminate based on the level of competition on a particular link or area.

[1] 171 out of 215 links – leaving only 44 primary links still subject to regulation.

[2] All 36 out of 38 links – leaving only 2 secondary links still subject to regulation.

[3] 42 out of 62 – leaving only 20 secondary links still subject to regulation.

[4] 36 out of 38 – leaving only 2 secondary links still subject to regulation.

[5] Vocus Communications Limited and M2 Group Limited [2015] NZCC 33, page 11.

The Commercial Backhaul Service is generally used on links where there is no alternative backhaul provider and they tend to be remote or rural links. These remote/rural links are generally high cost areas but remain priced using the nationally averaged pricing structure determined by the Commission in 2008 despite their higher cost.

As a wholesale only operator, our incentive is to supply access products at regulated and quasi-regulated prices to cover our costs and increase our returns by growing demand for our services. This means we have every incentive to continue to offer and evolve backhaul services that can grow demand for access products.

The past concerns that a vertically integrated operator might not have the appropriate incentives to grow the take up of access services simply doesn't exist today. In fact the opposite is true. We have every incentive to support the uptake of the access services with backhaul. We offer backhaul at the same prices to all RSPs so they compete for customers on a level playing field.

Those same RSPs can be our competitors too, who may decide to build rather than to buy our service as they are vertically integrated. So we've got the right incentives to ensure our backhaul pricing is sufficiently attractive to stimulate demand for access products, and our service is competitive against existing and potential new competitors.

Backhaul market today is national and competitive

There are good reasons to view the backhaul market on a national basis and as competitive. The majority of the backhaul links are subject to competition, there are a number of national backhaul competitors (some with similar network length to ours) and also localised backhaul competitors, our largest customers are also vertically integrated backhaul competitors, demand is growing, and if demand is sufficient, entry occurs.

We expect the backhaul market to continue to evolve, particularly as demand for broadband grows. Greater demand is also more likely in remote/rural areas. This should improve the economics of backhaul entry in these areas and we would expect this to be an opportunity for even greater competition.

Demand is centred on links where there is more than one backhaul provider but pricing on single provider links is constrained not only by the threat of entry but also by the fact most customers are national purchasers of services. Customers on the more remote links can generally threaten to switch backhaul providers nationally, giving them countervailing power over us. We may retain single provider links but not gain the bigger prize of backhaul for the whole network.

Even where on specific backhaul links we don't face direct competition, alternative routes may make direct competition on those links unnecessary.

So even without regulation we wouldn't be able to exercise market power in an area. Any perceived lack of competition on any part of the backhaul network is therefore small and certain to become smaller over time.

However, if the Commission considered the backhaul market on a link-by-link basis, it's likely to conclude the markets are competitive and there's no need for regulation, as

there are few impediments to entry or expansion, our customers exercise countervailing power, and we are commercially incentivised to grow demand.

There is also an important issue of regulatory consistency given the Commission's recent views that the backhaul market is national and competitive in its merger decisions.[6]

There is no backhaul market concern

We provide commercial backhaul services that are traffic-type agnostic and meet the market needs. Our commercial backhaul pricing on remote/rural links is also appropriate given these are high cost areas and generally serving legacy products.

We provide a number of commercial backhaul services, as discussed above. Spark has commented that the regulated backhaul services provide only a limited number of capacity options.[7] Larger capacity steps on our new fibre backhaul services isn't problematic. However, if customers want smaller backhaul capacity options and lower prices on more remote links for legacy technology, additional investment and cost is required for equipment for these smaller capacity steps, if legacy equipment is even available. That investment doesn't make sense when legacy traffic volumes are low, are expected to decline even further over time and alternative new technology solutions are offered[8]. While the pricing of equipment to provide greater capacity may have decreased, the costs of smaller capacity haven't.

The focus shouldn't be on legacy backhaul services – and certainly not incentivising remaining on legacy technology and backhaul to support it. Instead the focus should be on incentivising migration from legacy services to new technologies (like Baseband IP) and meeting future growth in backhaul demand using modern technologies.

If there was limited competition you would expect to see excessive pricing. There can be no suggestion we are earning excessive returns. In particular, the pricing of the Commercial Backhaul Service links in areas where there is a single provider was set based on the regulated nationally averaged backhaul pricing. The prices of our Capacity Backhaul Services have dropped over time, in particular our pricing for CRT. While the Commercial Backhaul Service's regulation based prices haven't dropped in the same way, this is because these links are higher cost rural/remote links with cost levels above the nationally averaged price to begin with. Again, while the equipment costs to provide greater capacity may have decreased, the same can't be said for smaller capacity steps which are characteristic for the remote/rural links.

Further regulation not required

If the Commission concludes there is limited existing or potential competition in parts of the backhaul market, it should undertake a cost benefit analysis before deciding whether (and, if so, how) to regulate. Factors that would need to be considered include:

[6] Telstra/Clear, Decision 447, dated 7 December 2001; Vodafone/TelstraClear [2012] NZCC 33, dated 29 October 2012; and Vocus/M2 [2015] NZCC33, dated 3 December 2015.

[7] Spark, submission on the Review of Schedule 1 services, 23 May 2016, paragraph 52: "Voice services are being offered over a number of competing technologies today that were not available or in widespread use when the resale services were added to the Act in 2001. These services provide an effective substitute for, and competition to, Spark's PSTN voice services and as a result, PSTN based services are in decline as customers migrate to competing services and platforms."

[8] Spark, submission on the Review of Schedule 1 services, 23 May 2016, paragraph 3a.

- The relatively small number of these areas and the small volumes;
- Regulation is likely to negatively impact additional backhaul entry and expansion and therefore competition. Whereas, as an open access wholesale provider, we have the right incentives to invest already and will do so if the business case makes sense;
- The cost of regulation, including possible investment distortions;
- It's higher cost remote/rural areas where providers haven't built competing backhaul networks. In this context, a nationally averaged price isn't appropriate and a price for the single provider links would need to be established;
- Links with a single provider largely supply areas with legacy technology, such as ATM or PCM remote. Requiring us to supply legacy backhaul locks us into the legacy services and stifles innovation. A technology agnostic regulated backhaul service (for example) in these areas wouldn't be efficient as it would require investing more in legacy backhaul services, assuming legacy equipment was also available; and
- Careful consideration of the regulatory outcome being sought. While we supply commercial backhaul to mobile and fixed wireless operators, these are access services offered by vertically integrated operators and are not Chorus bottleneck access services. We don't see a case for regulation for the reasons set out above. In particular, the mobile market is considered competitive and there doesn't seem to be a regulatory concern that needs to be addressed through regulated backhaul. Spark and Vodafone also both have similar sized networks to ours that they use to self-supply.[9]

In the case of regulation, we don't believe the obligation should lie on us alone to be a regulated backhaul provider where there is no alternative backhaul provider. If the concern justifying regulation is potential excessive pricing, the obligation should be on any network operator that has existing, or builds new, network on a specific backhaul link where there is a single provider.

Current competition test for link by link assessment remains appropriate
Provided a realistic assessment of actual and potential backhaul competition is adopted, the number of non-competitive links is likely to be small. If the Commission maintains a link by link market approach, we don't think there is a case to move to a more onerous competition test.

Backhaul costs vary geographically
Finally, backhaul regulation should recognise that backhaul costs vary geographically. So, given the remaining links where there is likely to be a single provider tend to be remote/rural high cost links, any regulated price should take this into account.

Structure of our submission
Our submission responds to the new issues as follows:

- **Part A –** The backhaul market is national and competitive;

[9] [2015] NZCC 33, 3 December 2015, page 11 - based on the Vocus and M2 Group application.

- **Part B** – The current regulated backhaul services;
- **Appendix A** – Sets out information on our backhaul services; and
- **Appendix B** – Sets out the answers to the Commission's specific questions. We have tried to gather information and respond to the Commission's questions in the time available. It's difficult for us to comment in detail on where other network operators have backhaul network and their terms of service.

PART A: THE BACKHAUL MARKET IS NATIONAL AND COMPETITIVE

Backhaul market is national and competitive

1. The backhaul market should be viewed nationally and as competitive. Backhaul has developed significantly since certain backhaul services were first regulated in 2008 and even since the Commission's last competition assessment of the regulated backhaul services in 2012. This market definition is consistent with the Commission's most recent consideration of backhaul markets in the context of the Vocus and M2 merger determination.[10] The Commission found a "national backhaul services" market and indicated it was very competitive.[11] We agree.

Development of the backhaul market

2. The backhaul market has evolved significantly in the last few years.

3. In the past, backhaul wasn't required. The original business model for RSPs, when faced with a national vertically integrated incumbent, was to build their own national networks to carry toll calls and bypass the incumbent.

4. As the market evolved, and access regulation was introduced, backhaul was required to take the regulated access service from the handover point to the RSP's site. For layer 1 services this is the local exchange or cabinet and for layer 2 services it has been the first data switch. The model assumed that RSPs had invested in the network to get to the local handover point and only required access in the last mile.

5. Commercial services then developed as it became clear that:

    5.1. There were better and more efficient solutions than each new entrant overbuilding existing backhaul network; and

    5.2. There were cases where it didn't make economic sense for new backhaul build.

6. In 2008 when the Commission first regulated backhaul services, the market was still evolving and most of the links were regulated. The past concerns that a vertically integrated operator might not have the appropriate incentives to grow the take up of access services simply doesn't exist today. Since the introduction of the regulated backhaul services we became an open access, wholesale-only service provider. We have every incentive to support the uptake of our access services with backhaul and that's what we're doing.

7. By 2012 the Commission found there was significant competition. Since then the backhaul market has developed even further as a result of the implementation of UFB, the creation of Chorus as a wholesale only service provider and continued investment and competition.

[10] [2015] NZCC 33, 3 December 2015, paragraph 33.

[11] [2015] NZCC 33, 3 December 2015, paragraph 60.

8. UFB has resulted in dark fibre backhaul being made available in all UFB areas and we also make inter-exchange fibre backhaul available at low prices for any service (not just fibre access services).

A national market

9. We think it's appropriate that the backhaul market is viewed as a national one. This market definition is consistent with the Commission's most recent consideration of backhaul markets in the context of the Vocus and M2 merger determination[12] and other merger decisions.[13] If the Commission takes a different view in this context, it would be useful to understand the reasons for such a different approach.

10. The existence of several large national backhaul providers supports a national market. If we are the largest backhaul provider, we're of a similar scale to Spark and Vodafone. As the Commission found in the Vocus and M2 merger determination[14] there are five major backhaul providers - us (with >8,000 km of backhaul network), Spark (with >8,000 km of backhaul network), Vodafone (with 7,500 km of backhaul network), Vocus (4,200 km of backhaul network) and Kordia (the length of its network was undisclosed).

11. Even when there is just one backhaul provider between two points, commercial pressures exerted on a national basis prevent above cost pricing on those links. In other words, competition on both the demand and supply sides takes place on a national basis. So the market shouldn't be a narrow link by link approach but instead take account of the broader context and adopt a national approach. Specifically:

    11.1. On the supply side, as noted above the main backhaul providers compete on a national basis;

    11.2. On the demand side, many of our backhaul customers are national or near national. When they are negotiating prices on more remote links, they can credibly threaten to switch backhaul providers on a national basis, as a negotiating tactic. They also can and do split their backhaul providers. We are aware of a number of backhaul customers who have several backhaul providers. This gives them significant countervailing power as they trade-off the merits of single vs several backhaul providers in their purchase decisions;

    11.3. Importantly, a number of our key backhaul customers are also backhaul providers (competitors). Being vertically integrated those customers have significant countervailing power. They can credibly threaten to self-provide, including via bypass. Vertically integrated providers can "self-underwrite" their sunk investments, through their own volumes. Because we're not vertically integrated, we are reliant on traffic volumes from those vertically integrated backhaul competitors to make investment decisions;

[12] [2015] NZCC 33, 3 December 2015, paragraph 33.

[13] Telstra/Clear, Decision 447, dated 7 December 2001; Vodafone/TelstraClear [2012] NZCC 33, dated 29 October 2012; and Vocus/M2 [2015] NZCC33, dated 3 December 2015.

[14] [2015] NZCC 33, 3 December 2015, page 11 - based on the Vocus and M2 Group application.

11.4. While rolling-out backhaul does incur sunk costs, there has clearly been a lot of capacity growth. For example, as shown by FX Network's (now Vocus) overlay of the Napier-Taupo route (which was already served by us, Spark and Vodafone) and it's also on the East Cape Gisborne to Whakatane route with us.[15] Kordia has also increased the capacity on its existing network. These examples illustrate that impediments to entry are manageable if the demand can justify the rollout cost, whether due to growing demand the investor believes it can capture, vertical integration and/or underwriting contracts; and

11.5. In the few remaining areas where there is just one backhaul option (whether supplied by us or another provider), this is likely to reflect a lack of volume/demand compared to costs. Nevertheless, the broader rollout experience suggests that if a single backhaul provider attempts to raise price above the competitive level, entry would be likely. The economics of entry improve as volumes grow and costs reduce, and broadband demand continues to grow.[16]

12. Only if there's evidence of an entry barrier on a particular route where there's only one backhaul provider (for example, sustained above cost pricing) should the market not be viewed as national. But we don't think that is the case.

It's a competitive national market today

13. The national backhaul market should be viewed as competitive for the reasons discussed below.

14. The last Commission competition assessment in 2012 for the regulated backhaul services showed the large majority of the links assessed were competitive. Consistent with the Commission's finding in the Vocus and M2 merger determination, the market is viewed as being competitive.17

15. There is significant competition for the provision of backhaul services:

15.1. As the Commission found in 2012, two backhaul providers between points is sufficient to achieve workable competition. Backhaul is a high fixed cost, low marginal cost business. Profit is very sensitive to volumes, giving backhaul providers a very strong incentive to compete. Prices have been declining, which is consistent with this view;

15.2. There are a number of national fibre backhaul providers and localised backhaul providers, as set out above, and at least three of us have very close backhaul network lengths.[18] The Commission previously commented that other parties believed that the backhaul market was very competitive.[19] The

[15] https://www.chorus.co.nz/chorus-and-fx-networks-begin-12-4m-fibre-project-to-enhance-gisborne-s-network.

[16] We note that technology cost for existing technology may drop but new technology may be cheaper.

[17] [2015] NZCC 33, 3 December 2015, paragraph 60.

[18] [2015] NZCC 33, 3 December 2015, page 11 - based on the Vocus and M2 Group application.

[19] [2015] NZCC 33, 3 December 2015, paragraph 60.

Commission is best placed to obtain data about coverage of backhaul networks to assess coverage. We estimate that at least 90% of end users with copper connections are connected to sites where multiple commercial backhaul options are available, whether from us or an alternative provider. These are sites inside UFB areas or are on the main national fibre routes. All UBA, Baseband IP and all fibre services are delivered to handovers with multiple backhaul options;

15.3. There has been significant new entry/capacity growth in the backhaul market. A backhaul provider's ability to roll out network in the lower cost urban areas is the same as in higher cost rural areas, if there is sufficient demand; and

15.4. Rural backhaul is also used by mobile operators who make a build or buy decision on how they connect sites. We provided fibre backhaul to the majority of RBI sites, but there are some sites that used microwave instead.[20] So we aren't the only backhaul provider in rural areas.

16. There is often competitive tension even where there is only one provider directly connecting two points:

16.1. Just because there is only one provider directly connecting points A and B doesn't necessarily mean there is no competitive tension between those links. It can be the case that a less direct route still provides an economic substitute and so there may still be competition[21]. Bypass doesn't need to be direct. Because it's low cost to increase backhaul capacity and quality isn't affected much by distance, a bypassing investor might take advantage of economies of scope and find it economic to compete between points A and B indirectly. For example, if we have a direct link between Porirua and Naenae, a rival might find it more economic (taking into account bundled volumes) to rollout on the Porirua – Wellington – Naenae route;

16.2. The sites where we're the only party providing backhaul tend to be rural sites outside the main centres. These routes typically have low connection counts and are far from the main routes. PSTN is the majority of the traffic on these links. We offer an alternative access service of Baseband IP which has the option of the TES backhaul service, but uptake is only just starting to increase;

16.3. Even where there isn't existing alternative backhaul provider on the remaining links, there is often potential alternative providers as there are no significant impediments to entry or expansion. For example, this year we decided to launch the NGA TES service to support RSPs, particularly in regional areas where they might not expect high growth or who might be

[20] https://www.vodafone.co.nz/press-release/green-energy-cell-site-gives-mobile-safety-boost-to-kauaeranga-valley/

[21] As acknowledged in the Commission's UCLL Backhaul decision [2008], NZCC 626, see for example para 188.

targeting a niche market in areas, where they may have limited backhaul options as well as to generate revenues; and

16.4. As RBI and UFB initiatives roll out further we would expect traffic and backhaul growth, making competition more likely.

17. Customers have countervailing power, as set out above:

17.1. A number of our key customers are also backhaul providers and are vertically integrated with significant countervailing power to threaten to self-provide, including bypass. We are regularly told by backhaul customers that they assess any pricing against the alternative case of building the network themselves; and

17.2. For many customers that operate over a number of geographic areas it's effective to threaten to switch providers if offered unattractive terms in respect of any particular link.

18. There is no evidence that we are acting inefficiently or pricing our backhaul services to achieve excess returns. The pricing of rural/remote links needs to be considered in terms of the underlying costs of these links – they are high cost and have low volumes of traffic. If the prices were too high we would expect competitive entry or customers to build their own or customers to threaten us by switching to another backhaul provider.

19. It's also important to keep in mind that our backhaul services are an economic complement to our access products. So we have incentives to keep our backhaul prices low, as this will encourage take-up of our access products which are our dominant source of revenue.

20. We see many examples that backhaul is competitive. Set out below are a few examples where we have lost business to backhaul competitors.

Examples

Regional backhaul link: *A customer asked us to quote for a backhaul link on a particular regional route. Our customer considered the quoted price was too high and told us they had a better offer. Another backhaul provider didn't have a link on that particular route but based on a commitment from the customer was willing to build one.*

National backhaul: *A customer recently released an RFP for national backhaul – linking its major nodes. We quoted for the backhaul and our customer indicated it was higher than it currently paid to another provider.*

Inter-island link: *A customer approached us for a link between the North and South Islands but later informed us they had a better offer from a backhaul competitor and we didn't win the business.*

Build buy decisions for network expansion: *Customers approach us for new links or access tails to extend their network to new sites. They have a choice of links from us or building their own fibre links or using another technology and we don't always win their business.*

21. We also have a number of examples where we have won backhaul business from other backhaul providers in the last 12 months, including in rural areas.

No evidence of any market concern

Our commercial backhaul services meet our customers' needs

22. We believe that we are providing backhaul services that meet the market and facilitate retail competition (or downstream competition). We are open to discussing our customers' needs and ensuring that they are met where the business case makes sense. Given the competitiveness of the market, and our role as a wholesale-only provider, we are strongly incentivised to be responsive to our customers. There is high uptake of TES and demand for CRT type backhaul is strong in a price sensitive market.

23. In addition to the regulated backhaul service, we offer a number of commercial backhaul services. A high-level explanation of these specific backhaul services is set out in **Appendix A**.

24. In terms of any potential concerns, we already provide commercial backhaul services that don't distinguish on the basis of traffic type and a range of backhaul options, as explained above. And we're always open to discussing our customers' emerging needs. So we don't believe there is a real regulatory concern that needs to be addressed by regulation in terms of the services, or quality of the services, we offer.

25. For legacy technology traffic there are sufficient backhaul options available – the Commercial Backhaul Service (which may be provided over copper or fibre technology) or Baseband IP TES. Given that we expect legacy traffic to decline even further over time, it doesn't make sense to invest further in additional equipment for smaller capacity or legacy interfaces to be compatible with our new fibre backhaul services. To build one of our new technology links to scale down capacity and add interface equipment would drive additional cost over today's backhaul. A better outcome for New Zealand would be to create incentives to move services from legacy to modern service constructs and network infrastructure.

Commercial pricing doesn't justify a regulatory solution

26. The prices of our Capacity Backhaul Services have dropped over time, in particular our pricing for CRT. The change in CRT pricing was part of a normal competitive market dynamics. The price drop was enabled by the increase in forecasted volumes and a reduction in equipment costs at what was emerging technology became more mainstream – the same signals that would have been seen by other backhaul providers.[22]

27. We don't believe the commercial prices of our backhaul services on links that currently have a single provider justify regulation. These links which tend to be where we provide the Commercial Backhaul Service. There are good reasons why prices didn't drop where we're currently the only provider despite them dropping on other links:

[22] More information is set out in our response to question 16 in Appendix B.

27.1. The pricing was originally set based on cost based regulated pricing, which applied a national average to all links;

27.2. These links tend to be higher cost both in terms of capex and opex and lower volume. For example, sending out maintenance crews to rural areas costs more than in urban areas and as the volume of legacy services decreases the unit cost to maintain the assets increases. So it's not surprising they haven't dropped; and

27.3. There's no evidence that we are acting inefficiently or pricing our backhaul services on these links to achieve excess returns. And as already discussed, the fact that there has been a lot of expansion implies that impediments to entry can be managed. So lack of entry into these areas, where we're the only backhaul provider, implies that pricing in those areas isn't above competitive levels.

Demand will continue to grow in rural/remote areas making backhaul more economic

28. UFB and RBI will increase traffic and demand for backhaul in the relevant areas and will accordingly improve the economic case for backhaul investment, including potentially in areas currently where there is only one provider. This view seems to be supported by Kordia.[23]

29. We expect RBI2 and UFB2 will be similar. A driver for the RBI2 programme and rural backhaul in general is the potential for greater data use in rural areas. Potential data drivers for traffic growth in regional New Zealand in particular relate to the fact that people living in these areas are likely to have higher reliance on the internet in various ways across different industries:

29.1. Basic services – for example, the closing of regional bank branches is placing an increasing reliance on internet based online banking;

29.2. Health – in the short term 'telehealth'. This can range from Skype calls from home with a local GP or hospital, to telehealth between a local medical centre with specialists in the main cities or internationally.[24] In the longer term we expect the increasing use of in home monitoring equipment, robots[25], and in home medical equipment to support an ageing population living at home longer;

29.3. Education – Government initiatives like Community Online Learning will support the greater availability of online learning.[26] Online education options

[23] http://www.computerworld.co.nz/article/print/606265/kordia-upgrades-north-island-backhaul-networks/. In this article it refers to Kordia saying it anticipated a "coming bandwidth tsunami driven by the ultrafast broadband rollout" and "That tsunami is breaking now and Kordia has more than enough capacity to meet customer demand in the foreseeable future".

[24] http://www.telehealth.co.nz/

[25] See: http://fortune.com/2016/05/30/asus-zenbo-robot/

[26] See: http://www.stuff.co.nz/national/education/83485577/government-education-reform-focuses-on-schoolaged-children-learning-from-home

are expanding (e.g. Coursera)[27] but also making increasing use of video, which will drive traffic growth. New technologies such as virtual reality will only increase this over time;

29.4. Tourism – New Zealand tourism is primarily based around getting out of the main cities and 'seeing the country'. This is from both an international tourism perspective and a domestic one. People are increasingly traveling with smart phones and tablets, sharing larger photos and videos of their trips and using the internet to explore where to go next. The trip to the traditional Kiwi bach is also becoming more connected, with research showing people prefer baches with Wi-Fi.[28] While some might think that being connected at the beach isn't a good thing, it's important to keep in mind that 'acceptable' activities like listening to music/radio, playing games and watching videos are all shifting to being online;

29.5. Agri business/smart farms – farms will increasingly implement monitoring and sensor technology. Examples of government initiatives include RFID tags on all stock, the use of sensors including drones and robots to monitor the weather, pollution, soil quality, drones for monitoring farms and measuring crops[29]. While this is likely to require wireless connectivity on the farm with integration with cloud services for data storage and analytics, which will require backhaul connectivity. Farm workers also no longer accept the isolation of rural living and have the same need for internet connectivity to support entertainment, social contact and learning; and

29.6. Such innovation won't just be limited to farms. The IOT can provide solutions that can detect forest dangers, place real time work orders and provide forestry management insights. DOC are also looking at various technologies to help combat pests/predators in national parks.

30. These factors contribute in aggregate to an increasing demand for bandwidth, further improving the competitive market for backhaul across the country.

Further regulation isn't required

Factors to consider in any decision to extend or amend regulation

31. In terms of implementing new, or extending existing, backhaul regulation, the Commission should be slow to draw the inference that there is a problem requiring regulatory intervention without firm evidence. It should also carefully weigh the costs of additional regulation against any perceived benefits – just as there should be careful consideration of the justification for continuing backhaul regulation in the changed circumstances of the current market. It's not sufficient that parties would simply (although understandably) like a cheaper price.

[27] See: https://www.coursera.org/

[28] See: http://m.nzherald.co.nz/sponsored-stories/news/article.cfm?c_id=1503708&objectid=11607814

[29] See: https://www.technologyreview.com/s/526491/agricultural-drones/ and http://www.stuff.co.nz/business/farming/agribusiness/83088439/nelson-company-develops-drone-technology-to--for-farmers

32. To justify new, amended or continuing regulation of backhaul services there needs to be evidence that:

    32.1. There is a competitive issue (ongoing or new) requiring regulation;

    32.2. The regulatory benefits outweigh the regulatory costs;

    32.3. The proposed regulatory solution is proportionate to the competition concern; and

    32.4. Regulation would best meet the section 18 purpose statement. In this assessment, the adverse effects of regulation of backhaul links on competition need to be taken into account: regulation would likely discourage future investment/competitive entry on new backhaul links and additional investment in existing backhaul links.

33. Given the positive market dynamic and the nature of backhaul services, which are aggregated in nature and lacking the monopoly type characteristics of the access network, the threshold for regulation seems unlikely to be reached.

34. The primary efficiency benefit of regulating backhaul is minimising allocative inefficiency, or equivalently maximising volumes. Obviously the more competition (or threat of competition) there is, the smaller this benefit. It is clear that the overwhelming majority of backhaul links are subject to current and vigorous network competition, with other links constrained by countervailing power and threat of bypass or entry. There's no evidence of excessive pricing.

35. The primary cost of regulating backhaul is investment distortion, particularly undermining investment, with negative implications for volumes, quality and ultimately price. The risk of regulatory-induced investment distortion increases as the likelihood of contestability and competition increase.

36. For example, if there's currently a single backhaul link between two points that actually have sufficient volume to justify a new, competitive link, there's a risk that regulation of that existing link would deter further rollout. This is a worse outcome for retail competition.

37. If competition is feasible, it's generally considered to lead to more efficient outcomes than regulation - competition is more likely to reveal and incentivise true/efficient costs and lead to the quality that customers prefer. This is a better outcome for retail competition.

38. The regulatory benefits potentially outweigh the regulatory costs for that link (although there is still the question of the appropriate form of regulation) only if:

    38.1. Demand between two points means that it's only economic to have one link; and

    38.2. Other pressures on the link owner don't constrain pricing.

39. But, as volumes grow (or are expected to grow) between those two points, the balance of the costs and benefits changes. Regulation is likely have a negative impact when volumes are sufficient to make the threat of entry between the two points credible.

40. Regulation would likely discourage future investment/competitive entry on new backhaul links and additional investment in existing links. Dynamic efficiency costs would become larger as demand grows. Growing demand would require investment to meet it and maintain quality. Regulation might deter the investment of either or both:

    40.1. The network operator – for example if the regulated price is too low; and

    40.2. An entrant – as the regulated price will become the price ceiling for commercial backhaul. And there are regulatory risks that it is too low or may be changed by the regulator.

41. It would be worthwhile for the Commission to test why other parties haven't built their own backhaul. The most appropriate way to gather this information is likely to be under a section 98 notice.

We shouldn't become the regulated backhaul provider for all traffic

42. The current regulated backhaul services were introduced when UCLL and UBA were regulated to support take up of those access services – to ensure that a lack of backhaul wouldn't prevent take up of the access services. Given the market today, and looking forward, there isn't the same case for us to be a regulated backhaul provider for all traffic types or to be required to aggregate different commercial and regulated/semi-regulated traffic types.

43. In the case of new or amended regulation, we don't believe the obligation should lie on us alone to be a regulated backhaul provider where there is a single provider. Particularly in the case of aggregated access traffic that's unrelated to our network, like mobile and fixed wireless access. If the concern justifying regulation is potential excessive pricing, the obligation should be on any network operator that has existing, or builds new, network on a specific backhaul link where there is no alternative backhaul provider.

PART B: THE CURRENT REGULATED BACKHAUL SERVICES

Competition test for link by link assessment

44. While we don't think regulation is necessary, the Commission has asked some questions about the current competition test. If the Commission adopts a link by link market definition, we think that the competition test currently adopted by the Commission remains appropriate.

45. We have already explained why the economics of backhaul imply that two players will be sufficient to achieve workably competitive outcomes. Consistent with this, prices have actually been falling. Given the positive market dynamics where backhaul lacks natural monopoly characteristics and demand is growing making backhaul more economic, it's difficult to see how a more onerous test would be justified. Two competitors should be sufficient.[30]

46. The Commission has previously considered whether there should be two or three competitors, and considered the fact that the ACCC adopted three competitors. The Commission thought two were sufficient. We don't think there is any justification for changing this approach. While the Commission noted that UCLL Backhaul was in an emerging market and imposing price regulation could deter competitive investment, and the backhaul market has developed significantly since then, the conclusion is still sound as backhaul investment is still likely as traffic volumes grow.[31]

47. There's no evidence suggesting a problem with New Zealand outcomes to justify a change to the competition test. This is important because regulation is costly. This fact combined with the economics of backhaul competition suggests two competitors is still the appropriate threshold.

48. When assessing competition in the past the Commission took into account indirect competition via alternative routes. Indirect competition is a particular feature of the ring-based design of many fibre networks. We agree with the Commission's approach that indirect routes should be regarded as competing with direct routes, provided there's no quality degradation from using the alternative route (e.g. delay due to the longer length).

49. On the distance criterion, we don't believe a distance criterion is required at all. For the reasons already described, all backhaul links in New Zealand are contestable or otherwise subject to competitive pressure, and the market should be defined as a national one. Consistent with this, the proximity of a rival from a Chorus exchange

[30] See Decision 626 at paragraphs 174 – 175. The Commission noted that the ACCC concluded that three providers of transmission capacity on a particular route was sufficient for effective competition but noted that the declaration regime in Australia, which initially allows for commercial negotiation and then arbitration if that fails, was different from the STD process in New Zealand. Under an STD process, once a finding of limited competition is reached, the service is subject to cost-based price regulation. A different threshold in relation to finding limited competition than that applied in Australia was appropriate.

[31] This is also consistent with the Commission's view in its "Draft report on whether Spark's Resale Voice Services should be omitted from Schedule 1 of the Telecommunications Act 2001", dated 23 September 2016.

has no impact on our pricing, because a broader set of commercial pressures is more important.

50. However, if the Commission comes to a different view, there is certainly no reason to reduce (tighten) the existing distance criterion. Growing volumes of data and reducing costs mean that contestability can only be increasing. So if anything the distance criterion should be relaxed. The recent move by the ACCC to tighten the distance criteria seems odd in this context and the actual distance chosen (150m) appears arbitrary.

Pricing of the regulated STD backhaul services

51. When the UCLL/UCLFS Backhaul and UBA Backhaul STDs were first set there were relatively few competitive links and nationally averaged pricing was adopted. Now the majority of the regulated backhaul links have been determined to be competitive. As discussed above, the backhaul links where there is a single provider are now likely to be rural/remote high cost links.

52. On a nationally averaged basis we might expect the pricing of backhaul services to decrease as demand grows and some of the input costs reduce. But we don't believe a nationally averaged approach is appropriate given the nature of the remaining regulated links and therefore the backhaul service provided. Regulation should recognise that backhaul costs vary geographically, so any regulated pricing should account for the higher cost for remote/rural links.

53. The Commission refers to a trend of declining prices, including in Australia. Care should be taken in extrapolating the outcome from the ACCC's price modelling to New Zealand. The ACCC has reduced prices on non-competitive links in Australia, benchmarked off prices for competitive links. There's a critical distinction between New Zealand and Australia. In New Zealand, the 2008 regulated price was a geographically uniform one. In Australia the 2012 regulated price was structured by geography[32]. So it's quite plausible that efficient prices/costs on non-competitive (rural) links in New Zealand are still higher than the 2008 regulated price, even if costs on non-competitive (urban) links have been falling.

54. The ACCC's approach isn't easily transferrable to, or necessarily appropriate for, pricing links in New Zealand:

    54.1. The ACCC had to make an ad hoc adjustment for the Bass Strait. It's possible that New Zealand has a number of such exceptions related to geographic issues that would reduce the effectiveness of a benchmarking approach, or at least increase the need for ad hoc adjustments;

    54.2. The regression model was changed between 2012 and 2016, because of changes in the market (see page 38 of the ACCC's final report). This demonstrates that the model is specific to the market it's designed to apply to and can't simply be transferred to the different New Zealand context; and

[32]See https://www.telstrawholesale.com.au/download/document/tw-rate-card.pdf

54.3. The ACCC's model was unable to accurately price low capacity (<2.5Mbps) backhaul. The traffic capacity for our commercial backhaul is typically 100MB or 1GB so is likely to suffer from the same issue. That is, that low capacity backhaul is difficult to benchmark when the majority of traffic is at higher capacity.

55. One of the ACCC's focuses was to enhance retail competition where backhaul is provided by vertically integrated players who have no incentives to offer efficient prices to their rivals. This isn't an issue for us given our incentives to increase use of both the access and backhaul networks and avoid bypass by vertically integrated customers or direct competitors.

APPENDIX A: EXPLANATION OF OUR COMMERCIAL BACKHAUL SERVICES

Set out below is a brief explanation of our commercial backhaul services.

Backhaul Service	Description
1 Capacity Backhaul Services	
UBR backhaul	Extends a number of Basic UBA access tails to a remote Handover Point nominated by the RSP. RSPs select from a range of throughput options to determine the dimensioning of the pipe from the Local Aggregation Path (LAP) to the remote Handover Point. The UBR Backhaul service is available from each UBA Coverage Area to the RSP's nominated Handover Point.
ICABS (inter candidate area backhaul service in UFB areas for any traffic typed)	A dark fibre or layer 2 service between exchanges within a candidate area with price based on a combination of distance and capacity. In RBI1 areas this is known as RBI Layer 1 Inter-exchange Backhaul Service. The RBI Backhaul Service has same terms and conditions as UCLL/UCLFS Backhaul and RBI Sub-loop Backhaul Service has same terms and conditions as SLU Backhaul.
CRT (Chorus Regional Transport) service	A national transport service that can be used to connect to a remote exchange within a remote Candidate Area where retail service provider equipment is co-located in an exchange. CRT can be concatenated with DFAS, ICABS or BFAS to a remote location within the serving area of the remote Central Office. A layer 2 service with no limitation on traffic carried and price based on a combination of distance and capacity.
2 TES backhaul services	
Tail extension services, including for UBA, Baseband IP, NGA and HSNS	These are per access services, basically an extension of the access service to a distant POI with price based on a combination of distance and capacity. They are available anywhere the relevant access services are available.
3 Commercial Backhaul service	
PSTN Backhaul Service	This is a 2 Mbps (E1) backhaul service providing access to, and interconnection with, the Baseband Service. Price is based on capacity and distance. This is a legacy service.
Commercial UCLL/UCLFS Backhaul	This is a replica of the regulated UCLL/UCLFS Backhaul service in areas where the regulated service has been de-regulated on the basis of the Commission's competition review. A layer 2 service with the same price structure as the regulated service i.e. based on a combination of distance and capacity and the same price.

Backhaul Service	Description
4 Aggregation of Ethernet and legacy traffic	
CNS (Chorus Network Service)	This is a complete outsourced aggregation solution for Ethernet and legacy TDM/SDH traffic that can be combined with other Chorus services e.g. backhaul. A layer 2 service and price is based on aggregation equipment and ports, backhaul type, distance and capacity. This is a virtual service similar to TES. One component is a virtual aggregation then an associated backhaul component the capacity of which is determined by the virtual aggregation.

APPENDIX B: RESPONSE TO THE COMMISSION'S SPECIFIC QUESTIONS

Set out below is Chorus' response to the Commission's specific questions. We think the Commission should seek information from backhaul providers about the location and types of backhaul provided in order to get a clear and accurate market view.

	Question	Chorus position
1	In your view, have we adequately defined the scope of our domestic backhaul services study? Please explain your view.	We believe the appropriate scope of the domestic backhaul services study is a national market and this is consistent with the Commission's previous merger decisions. The Commission has previously expressed its view on the relevant geographic market for backhaul services as follows: ▪ In Decision No. 447, Acquisition of Telstra Corporation Limited or TelstraSaturn Limited by Clear Corporations Limited (**Telstra/Clear**)), dated 7 December 2001, the Commission made a distinction between local data access networks (sometimes referred to as "data tails") and backbone transmission. Regarding the supply of backbone transmission, the Commission concluded that the relevant market was the wholesale market for backbone transmission in New Zealand. In other words, the Commission's view of the relevant market for backbone transmission in 2001 suggested there was a national market for the wholesale access to domestic backhaul services; ▪ In Vodafone New Zealand Limited and TelstraClear Limited [2012] NZCC 33 (**Vodafone/TelstraClear**), dated 29 October 2012, the Commission considered that for the purposes of the competition assessment of the provision of backhaul transmission services to mobile networks, the appropriate market was the national market for backhaul services; ▪ In Vocus Communications Limited and M2 Group Limited [2015] NZCC 33 (**Vocus/M2**), dated 3 December 2015, the Commission defined the relevant markets for (1) national backhaul services and (2) data tails. This view of the relevant markets is consistent with the view taken in 'Telstra/Clear', as well as in 'Vodafone/TelstraClear'. Based on the decisions above, the Commission's proposed geographic market dimensions that are linked to a notional geographic reach, as discussed in paragraph 20 of the Section 9A Backhaul Study, seem inconsistent with its previous views in the merger context. It may be argued that 'International landing station backhaul' services should be viewed as part of the relevant market for local data access or data tails. However, all the other proposed geographic dimensions, i.e. main trunk (national) backhaul services (routes), regional backhaul services, intra-regional backhaul services and metropolitan backhaul services, shouldn't

	Question	Chorus position
		alter the view that the relevant geographic market for all backhaul services is a single national market, consistent with the Commission's previous merger views.
2	Do you agree with the geographic classification for domestic backhaul services? Please explain any proposed changes.	We aren't clear on the purpose of the classification adopted by the Commission. We think that the essential question for the Commission is the extent of actual or potential competition for backhaul services, and more generally the degree of competitive pressure. This needs to be considered in the context of an orthodox approach to market definition. The classification adopted by the Commission doesn't appear to have that purpose, and risks obscuring the actual market (or markets) in which backhaul services are supplied: in our view, a national market.
3	Please comment on backhaul technologies. In particular, in your view: (i) have we overlooked any current or emerging backhaul transmission technologies at any layer? (ii) are there any material technological or geographical constraints on where the technologies could not be used to provide backhaul services? (iii) is Ethernet becoming the default technology of choice for backhaul services from main trunk to metropolitan? If so, why?	Backhaul can be provided over many technologies but we agree that Ethernet is the technology of choice due to its industry standard use and increasing capacity, with evolving speed increases, at lower prices per bit than legacy technologies. Higher capacity links, including new technologies, are almost exclusively Ethernet based. GPON is being used as a backhaul technology in other counties where smaller Ethernet pipes are required in remote locations for wireless and copper aggregation points. However support for converting legacy backhaul such as ATM interface, and PDH/SDH i used for PSTN backhaul, is increasingly expensive. Given there are not significant traffic growth demands on legacy, it is most cost effective to keep these running on legacy backhaul technologies. As the legacy technologies fail, it is generally most effective to migrate the services to new technology options, rather than providing expensive and limited workarounds to transport legacy services over modern infrastructure. As we said in our submission, the focus should be on incentivising migration from legacy services to new technologies (like Baseband IP) and meeting future growth in backhaul demand using modern technologies.
4	We invite comments on the regulated backhaul services. We are particularly interested in your view on whether the choice of backhaul transmission service depends in any way on the type of traffic that is to be conveyed ie, (i) whether transmission requirements for UCLL differ from those for UBA, whether transmission requirements for UCLL	Based on a market view, we don't think that ongoing regulation is necessary. However, if regulation continues we don't think there are grounds for amending the existing regulation. While UCLL backhaul and UBA backhaul could be combined, there are a technical issues which complicate combining the current regulated UCLL backhaul and UBA backhaul services because of the "tagging" of the frames. Tagging is used to mark which end user and which service provider traffic in the network is sent from and going to. UCLL is a service that allows RSPs to control their own network and allows them to tag their own traffic, control their own traffic end to end whereas EUBA traffic is tagged by us. So combining UCLL and UBA traffic leads to clashes in marking, with unpredictable switching of traffic. Technically it is possible to combine traffic and we provide

	Question	Chorus position
	differ from those required for mobile backhaul; and any other relevant potential application for domestic backhaul services; (ii) what bandwidth options are required to meet future demand?	commercial backhaul services that aggregate different types of traffic. However careful design is required to ensure things like quality of service requirements and frame tagging will work as expected. This will drive cost into any solution. As we offer these services commercially, it's difficult to see any justification for regulating them.
5	We are also interested in your view on whether there are backhaul services which are not subject to competition that should be regulated? Please explain how your view is consistent with the section 18 purpose statement.	For the reasons set out in our submission we don't believe that there is a need for regulation of backhaul services in New Zealand.
6	Have we adequately captured and described the local access nodes which are of interest to access seekers and network operators? If not, what additions, or alterations would you recommend?	For Chorus the local access nodes of cabinets, exchanges, and service handover points (UCLL, UCLF, FDS, RBI and UFB) are appropriate for the present. We assume the "Cabinets" described are active cabinets, i.e. powered cabinets, with copper lines terminating on electronic equipment, and backhauled over high capacity links. We note that we also have other powered facilities such as radio huts, and very small buildings, that could be categorised somewhere between a local exchange and a cabinet. It should also be considered that as a legacy of separation, 31 of the Chorus Local Exchange buildings, are actually Spark buildings, with space sharing commercial arrangements. These are major sites, and are often the first data switches, RBI and UFB handover locations. We plan to offer handover alternatives to RSPs at Chorus owned buildings, for example Mount Eden as an alternative to Mayoral Drive. Consideration should be given to eventual retirement of many/most cabinet based access nodes, as customers migrate from copper to fibre. Long term we expect to consolidate active electronics back to exchange buildings, and retire active cabinets in the field. We note that other providers' network nodes are also described.
7	We invite any comments on the existing suppliers of domestic backhaul services. We are particularly interested in the following: (i) the	(i) We think the Commission is best placed to seek information on the extent of self-supply from vertically integrated providers. As we note in our submission, our biggest backhaul customers are also backhaul providers. (ii) The Commission should seek information from others on

	Question	Chorus position
	extent to which existing suppliers self-supply backhaul services; and (ii) any major changes that recently occurred, or are expected to occur in the foreseeable future, in the provision of domestic backhaul services?	investment and changes to network since 2012. We explain in our submission some changes observed that are public. We also note that we expect greater growth in demand of traffic volumes and backhaul given New Zealanders demand for speed and data. We note that we are increasing our CRT backhaul services with an additional 100G step nationwide. Between now and the end of the year we'll complete an upgrade that will allow 100G on all CRT routes. We note that Kordia recently announced upgrades to its North Island backhaul networks too increasing its capacity.[33] We've also set out in our submission why more rural areas may rely on broadband services more in their day to day lives than other New Zealanders growing both traffic demand and also making backhaul more economic on remote/rural links.
8	We also invite comments on expansion conditions in the provision of domestic backhaul services. We are particularly interested in: (i) any factors that could impede expansion in the provision of domestic backhaul services; (ii) whether excess capacity is available, and where; (iii) whether there is a lack in capacity for backhaul services such as mobile backhaul services (iv) and how expansion to add capacity incrementally takes.	(i) For the reasons set out in our submission we think that regulation has the potential to negatively impact on expansion. Otherwise if the demand is there, then there should be commercial incentives for backhaul growth. (ii) Investment in backhaul is lumpy. It's like adding a "building block" of additional capacity. Investment in incremental capacity can often be more expensive than just adding "lumpy blocks" of capacity at natural physical interface speeds, such as 1, 10 and 100Gbps – there are not just hardware costs but also system costs involved in interim steps. We increase capacity in the network to meet expected demand and so initially there may be excess capacity but we would expect growth to meet the investment we make in time but we plan ahead for growth. We would expect other network operators to do the same. (iii) We don't think there is a lack of capacity for backhaul services. There is unlikely to be a problem provided the right commercial incentives exist to make the additional investment. In terms of mobile backhaul services, we note that Spark and Vodafone have their own backhaul networks. (iv) The time required to add capacity depends: ▪ Capacity (interfaces built) is less than a month in most cases; ▪ If additional electronics/optics are required it can require a 3

[33] http://www.computerworld.co.nz/article/print/606265/kordia-upgrades-north-island-backhaul-networks/. The article refers to: "The multimillion dollar investment in Ciena Networks' DWDM [dense wave division multiplexing] optical solutions takes Kordia's core infrastructure to a potential capacity of 9.6 terabits per second." And "Kordia said that upgrade would provide, initially, an additional 100Gbps of dedicated capacity between service nodes in Auckland, Hamilton, Tauranga, Napier, Palmerston North and Wellington, and 100Gbps per second links would be added to other towns as required."

	Question	Chorus position
		month lead time in some cases; and ▪ If of course additional fibre is required to be laid then that will take substantial time given (for example, RMA and Health and Safety requirements). However we manage our network for growth/future demand. We forecast about 2 years out, review demand quarterly, and our expansion plans are in place well before we run out of capacity. So capacity, barring an unusual/reasonably unanticipated event, generally shouldn't be an issue.
9	Please explain (i) to what extent are transmission services currently supplied on a link-by-link basis; and to what extent is transmission services supplied as a national service? (ii) what are the drivers to supply backhaul services as a national service rather than the traditional link-by-link basis?; and (iii) whether there is a developing trend towards supplying domestic backhaul on the basis of national service rather than on a link-by-link basis.	Customers may have different backhaul needs. Some may seek more limited backhaul from us, for example on a particular link or links. Other customers may be looking for a national backhaul service. Larger customers looking for national backhaul services appear to make a decision based on a total cost rather than a link by link basis. But in our experience they will also let us know if they think that our pricing on particular links isn't competitive. Customers would have the option if they perceived prices on particular links as being too expensive to self-supply/build, ask another backhaul provider to build or provide. We refer to the examples in our submission. Some RSPs do have multiple backhaul providers and may want multiple providers on some links to provide a form of diversity (e.g. the Cook Strait because they don't a single point of failure).
10	In the instance when a RSP requires a national deal from a non-Chorus provider, would that non-Chorus provider have to deal with Chorus to provide transmission capacity on a national level?	No, if the RSP doesn't have customers in areas where we are the only backhaul provider. If the RSP does have customers in areas where we're the only provider, they can buy capacity from us on a national basis and wholesale the capacity to others. It is also not unusual for a national non-Chorus provider to require capacity outside their network to provide the total coverage a customer may require and they may seek to buy the missing links from us. However we note that a number of backhaul providers have network of a similar length to ours.
11	In your view, what is the likely impact of RBI and UFB on backhaul services eg, demand, supply, capacity, coverage and price?	We expect the RBI and UFB will increase traffic and therefore increase the demand and supply of backhaul in those areas. We expect the impact of UFB2 and RBI2 to be positive from a backhaul competition perspective too. We set out in our submission particular areas of growth we expect in rural areas.
12	In your view, what non-price service attributes	We think that customers are interested in diversity, reliability and ease of use. They are interested in these attributes because

	Question	Chorus position
	are important to demand for domestic backhaul services? Please explain your reasons.	these directly impact the performance of the services they sell to their customers/consumers, which have backhaul as an input. The backhaul sizing or capacity must also reasonably align with the intended use for network efficiency. RSPs may not always want aggregation from us because they have the equipment to do it themselves (build/buy decision).
13	In your view, what are the major recent changes and expected changes in the foreseeable future in the demand for domestic backhaul services?	We expect demand in broadband traffic to continue to grow. New Zealanders love broadband and their high and increasing data use is evidence of this. We've set out in our submission why we expect regional/rural areas to rely on connecting with people, services and information in their day to day lives. Traffic in main cities is also expected to continue to grow. Traffic in larger cities will be increasingly dominated by datacentre interconnect as opposed to traffic from households/businesses to the internet. In addition there are smart city solutions like: ▪ Driverless cars; ▪ Public transport; ▪ Asset management; ▪ Security (CCTV); and ▪ Lighting. We would expect backhaul demand to continue to grow in parallel. As traffic volumes increase it should make further investment more economic.
14	For each of the options described, we invite comments, and evidence to support your comments, on: (i) whether you agree with our description of the options available to purchase domestic backhaul; (ii) in your view, what drives the choice of each option; (iii) the differences (if any) in the customers buying each of the options; (iv) in your view what relative share of the backhaul market is purchased under each of the above	**Build own capacity:** (i) We agree with the Commission's description of this option. (ii) It is primarily an investment/cost decision but there may also be a desire to control/own the supply chain. (iii) This is an option for larger RSPs with a sizeable customer base or network provider, either of which have large bandwidth requirements and have the required financial resources. (iv) We can't comment on the relative backhaul market share. **Build and share capacity:** (i) We agree with the Commission's description of this option. (ii) This is an investment/cost decision. The choice of this option can be driven by the reduced capex investment required to do this compared with a solo build. (iii) This is an option for a larger RSP with a sizeable customer base or network provider, either of which have bandwidth requirements and have the required financial resources.

	Question	Chorus position
	options?	They don't have sufficient demand on their own to support building their own capacity. (iv) We can't comment on the relative backhaul market share. **Buy a fixed amount of transmission capacity on a fixed term contract (long or short term):** (i) We agree with the Commission's description of this option but note an RSP or backhaul provider always has to purchase or provide capacity ahead of demand if they are to ensure service continuity at an acceptable level of performance. (ii) The choice of this option can be driven by price certainty and it's the second step on the investment ladder. (iii) This is an option for smaller RSPs and large corporates, but may also be used by network providers to fill gaps in their coverage on a short or long term basis. (iv) We can't comment on the relative backhaul market share. **Buy a variable amount of capacity on a "pay-as-you-go" or "pay-as-you-grow" basis:** (i) We agree with the Commission's description of this option. (ii) The choice of this option can be driven by a desire to have costs relative to usage and without needing to purchase and pay for capacity in advance or to build capacity. But there is no cost certainty and an RSP or corporate is reliant on the backhaul provider having capacity to meet demand as required. (iii) This is an option for smaller RSPs and large corporates. (iv) We can't comment on the relative backhaul market share. **IP transit and peering:** (i) We agree with the Commission's description of this option. (ii) The choice of this option is made by content providers, service providers or businesses wishing to "swap" traffic between their respective networks at a meet me point or through the use of bi-lateral links. (iii) This is an option for content providers to supply their service to consumers or where large RSPs (dependent on their business) or businesses wish to "swap" traffic between their respective networks, voice service providers and international transit providers. (iv) We can't comment on the relative backhaul market share.
15	Explain whether pricing structures are moving away from the traditional pricing model. If so, please explain in the new alternative pricing structure(s) and the	The traditional backhaul pricing models have been: ▪ IRU for dark fibre; ▪ Capacity and distance, either of a per kilometre or in steps with capacity set by access services in case of TES;

	Question	Chorus position
	rationale for adopting new pricing structures.	▪ Data carried; or ▪ A cloud based arrangement where you buy backhaul access on a capacity basis and transport across the cloud or either a capacity or traffic basis. These models continue to be the basis for most pricing with the majority of offerings choosing the second option.
16	In your view, what are the drivers of the significant drop in commercial backhaul prices in New Zealand?	References have been made to the drop in pricing of our backhaul services in 2015, which related to the CRT service. We note that: ▪ CRT was initially a trial, with a small part of the proposed footprint available and pricing based on low volume hardware purchases due to uncertain demand; and ▪ The decision was made in 2015 to increase the CRT footprint to cover all of the proposed areas of UFB coverage of both islands and Cook Strait and reduce the pricing based on higher volume hardware purchases and customer feedback and increasing certainty around demand. The change in pricing was part of a normal competitive market dynamics. The price drop was enabled by the increase in forecasted volumes and a reduction in equipment costs at what was emerging technology became more mainstream.
17	Are you concerned about any pricing behaviour in the provision of backhaul that may raise potential competition concerns?	For the reasons set out in our submission we believe that our pricing on remote/rural routes, although it hasn't dropped like some of our Capacity Backhaul Services, doesn't raise any concerns as they tend to be high cost/low volume areas with all pricing models applied nationally. But even where there is only a single backhaul provider on routes there is countervailing power and the real threat of contestability if there is sufficient demand.
18	Please provide evidence on any price differentials between routes that you would deem to be competitive and uncompetitive.	We explain the basis of the pricing of our commercial services in our submission. There is, within any of our backhaul services under the Capacity Backhaul Services category, a uniform national price (based on capacity and distance). For the Commercial Backhaul Service category of services, the price is based on the regulated services on remote/rural routes, set at the 2008 national average. Pricing differentials between our backhaul services reflect cost differences, not whether or not there is another backhaul provider present.
19	We invite views on the criteria for assessment of competition for domestic backhaul services. We are particularly interested in your view on (i) the most appropriate criteria	For the reasons set out in our submission we don't believe that there should be any change to the competition test to make it more onerous. If any changes are made we think it should be less restrictive in terms of how far is close enough to one of our exchanges to be a competitive constraint on us.

	Question	Chorus position
	that could be used in future competition test assessments, and also what criteria could remain intact; (ii) how far is close enough to a Chorus exchange to be a competitive constraint on Chorus?	