COMMERCE COMMISSION

Standard Terms Determination for the designated service Telecom's unbundled bitstream access backhaul

Decision 627

Determination under section 30K of the Telecommunications Act 2001

The Commission:	Dr Ross Patterson Donal Curtin Anita Mazzoleni

Date of Determination:	27 June 2008

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EXECUTIVE SUMMARY[1]

i.   The unbundled bitstream access backhaul service (**UBA Backhaul Service**) is a service that provides transmission capacity in Telecom's network between the trunk side of Telecom's first data switch (or equivalent facility), other than a DSLAM, and the access seeker's nearest available point of interconnection (**ASNAPOI**).

ii.   In this final STD, the Commission has determined the price and non-price terms for the UBA Backhaul Service. It contains sufficient terms to allow Telecom to make the service available to an Access Seeker without the need for the Access Seeker to enter into an agreement with Telecom for provision of the service. The key terms are summarised below.

Definitions of POI Site and ASNAPOI

iii.   The Commission has accepted the Telecommunications Carriers Forum (**TCF**) agreed 29 interconnection points. These 29 points are classified as POI Sites for the purposes of this STD.

iv.   The definition of ASNAPOI is a key term for the UBA Backhaul Service. The Commission considers that the approach outlined below will enable ASNAPOIs to be determined as a simple question of fact. The Commission has considered each of the elements of this term and concluded that the following applies:

    a. A POI Site is the ASNAPOI in respect of a first data switch (**FDS**) for an Access Seeker if:

        i. the POI Site is an available point of interconnection; and
        ii. the POI Site is the nearest, as measured by Telecom's network path, of the available points of interconnection to the FDS.

    b. A POI Site is an available point of interconnection for an Access Seeker if one of the following holds:

        i. the Access Seeker is physically interconnected using the Access Seeker's own equipment with Telecom's Network at that POI Site; or
        ii. the Access Seeker has an agreement with a backhaul provider (either Telecom or a third party provider) for the supply of a service that is equivalent to the UBA Backhaul Service from that POI Site to the Access Seeker's Network.

    c. The Access Seeker must establish an ASNAPOI at a minimum of one POI Site, but may establish an ASNAPOI at more than one POI Site.

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[1] This executive summary does not form part of the Commission's Standard Terms Determination.

Basic UBA backhaul services

v.   The UBA Backhaul Service in this STD is only for the purpose of providing access to the Enhanced UBA Service. In terms of the Basic UBA Service, a lower quality of backhaul service is likely to be appropriate. The Commission expects that Telecom will provide a commercial Basic UBA backhaul service on a per user basis.

vi.   The Commission will monitor the provision of any Basic UBA backhaul services. In the event that a backhaul service for the Basic UBA Service is not offered on a commercial basis on reasonable terms, the Commission will consider determining the price and non-price terms for such a service through the process set out in s 30R of the Act.

Price terms

vii.   The Commission has determined the following monthly rental rates for the UBA Backhaul Service:

Distance Step	Bandwidth			
	50 Mbps	**100 Mbps**	**200 Mbps**	**1 Gbps**
0 km < radial distance ≤ 5 km	$738	$964	$1,260	$2,344
5 km < radial distance ≤ 10 km	$1,288	$1,683	$2,199	$4,091
10 km < radial distance ≤ 15 km	$1,669	$2,181	$2,849	$5,301
15 km < radial distance ≤ 20 km	$1,979	$2,586	$3,379	$6,287
20 km < radial distance ≤ 25 km	$2,249	$2,938	$3,838	$7,142
distance > 25 km	price set according to: $price = \exp\{4.6300 + (0.5071 \times \ln(radial\ distance)) + (0.3858 \times \ln(bandwidth))\}*$			

* Where ln is the natural log.

viii.   The monthly rental rates apply separately to each Primary Link and Secondary Link. However, when the Primary Link and the Secondary Link are the same bandwidth then one monthly rental rate applies for both the Primary Link and the Secondary Link, based on the combined radial distance of both the Primary Link and the Secondary Link.

ix.   The Commission has determined that the new connection charge for the UBA Backhaul Service is $4,030 for a new connection at one end and $8,059 for a new connection at two ends.

x.   A number of other prices have also been determined for other core charges and sundry charges.

xi.   The Commission has also determined non-price terms. In determining the non-price terms, the Commission has generally adopted:

- those non-price terms that were unanimously recommended by the TCF and only making changes to those recommendations where there was a compelling reason to do so; and

- those non-price terms that relate to well established Telecom operational systems in place (eg fault prioritisation) which would be expensive to adjust prior to the applicable milestone dates set out in the Separation Undertakings.

Implementation plan

xii.   The Commission has determined that the implementation timeframe is 150 Working Days after the release of this determination.

Confidential information cited in this determination is subject to the confidentiality order made by the Commission under section 15(i) of the Act and section 100 of the Commerce Act 1986 ('the Order'). The Order in relation to the UBA Backhaul STD process is dated 10 October 2007.

Information in relation to Telecom's restricted information is denoted as [ ] **TNZRI**. Access seeker's restricted information is denoted in a similar way, for example, TelstraClear's restricted information is labelled [ ] **TCLRI**. Commission only information is denoted as [ ] **COI**.

All restricted and Commission only information is subject to the Order and has been extracted from the public version of this determination.

Key documents are available on the Commission's website at:
http://www.comcom.govt.nz/IndustryRegulation/Telecommunications/StandardTermsDeterminations/UnbundledLocalLoopBackhaulService/DecisionsList.aspx

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THE DETERMINATION FRAMEWORK

Purpose

1.   This standard terms determination (**STD**) for Telecom's unbundled bitstream access backhaul (**UBA Backhaul**) comprises this decision report and the appended:

- UBA Backhaul Terms comprising:
  a. UBA Backhaul General Terms
  b. Schedule 1 – UBA Backhaul Service Description
  c. Schedule 2 – UBA Backhaul Price List
  d. Schedule 3 – UBA Backhaul Service Level Terms (SLA)
  e. Schedule 4 – UBA Backhaul Operations Manual
  f. Schedule 5 – UBA Backhaul POI Site Related Information.
- Implementation Plan.

Purpose

2.   In making an STD, the Commission must consider the purpose set out in section 18 of the Telecommunications Act (the Act). Section 18 describes the purpose of Part 2 and Schedules 1, 3, and 3A as follows:

18 Purpose

(1)   The purpose of this Part and Schedules 1 to 3 is to promote competition in telecommunications markets for the long-term benefit of end-users of telecommunications services within New Zealand by regulating, and providing for the regulation of, the supply of certain telecommunications services between service providers.

(2)   In determining whether or not, or the extent to which, any act or omission will result, or will be likely to result, in competition in telecommunications markets for the long-term benefit of end-users of telecommunications services within New Zealand, the efficiencies that will result, or will be likely to result, from that act or omission must be considered.

(3)   Except as otherwise expressly provided, nothing in this Act limits the application of this section.

(4)   Subsection (3) is for the avoidance of doubt.

3.   Section 19 of the Act directs the Commission to consider, when making a determination under Part 2, to satisfy itself that the determination best gives, or is likely to best give, effect to the purpose set out in section 18. Section 19 states:

19 Commission and Minister must consider purpose set out in section 18 and additional matters

If the Commission or the Minister (as the case may be) is required under this Part or any of Schedules 1, 3, and 3A to make a recommendation, determination, or a decision, the Commission or the Minister must—

(a) consider the purpose set out in section 18; and

(b) if applicable, consider the additional matters set out in Schedule 1 regarding the application of section 18; and

(c) make the recommendation, determination, or decision that the Commission or Minister considers best gives, or is likely to best give, effect to the purpose set out in section 18.

Background to the determination process

4.   On 30 April 2007 the Commission initiated the STD process in relation to UBA Backhaul under section 30C of the Act.

5.   The Commission conducted a scoping workshop on 25 May 2007. The workshop was open to all parties to the STD. The purpose of the workshop was to provide the Commission with information to assist it in specifying:

- a reasonable period of time within which Telecom must submit a standard terms proposal (STP) under section 30F; and
- any additional requirements for that proposal under 30F(2).

6.   On 19 June 2007 the Commission gave written notice to Telecom requiring it to submit to the Commission, an STP by 28 September 2007 that complied with section 30G of the Act. In the notice (as amended), the Commission specified a number of additional requirements that Telecom was required to provide in its proposal.

7.   On 28 September Telecom submitted a STP for the UBA Backhaul Service. Public notice was given and interested parties were invited to make submissions.

8.   On 9 November 2007 three submissions on the UBA Backhaul STP were received from TelstraClear, Vodafone/ihug and Orcon/Kordia/CallPlus.

9.   On 8 February 2008 the Commission issued its draft UBA Backhaul STD in accordance with section 30K of the Act. Submissions were received on 7 March 2008 from Telecom, Vodafone, Orcon/Kordia/CallPlus, TelstraClear, Vector Communications, and CityLink. On 26 March 2008 cross-submissions were received from Telecom, Orcon/Kordia/CallPlus, TelstraClear, Vodafone/ihug, Vector Communications and FX Networks.

10.   On 10 and 11 April 2008 the Commission held a public conference, pursuant to section 30L of the Act, to seek additional information on particular aspects of the submissions and to provide interested parties with an opportunity to give a brief overview of their position, by presenting opening and closing submissions.

11.   Key documents (including transcripts) are available on the Commission's website at:

http://www.comcom.govt.nz/IndustryRegulation/Telecommunications/StandardTermsDeterminations/UnbundledLocalLoopBackhaulService/DecisionsList.aspx

The service description

12.   This STD relates to the UBA Backhaul Service as set out in subpart 1 of Part 2 of

Schedule 1 of the Act. This service is defined as follows:

Telecom's unbundled bitstream access backhaul

Description of service:	A service (and its associated functions, including the associated functions of Telecom's operational support systems) that provides transmission capacity in Telecom's network (whether the transmission capacity is copper, fibre, or anything else) between the trunk side of Telecom's first data switch (or equivalent facility), other than a digital subscriber line access multiplexer (**DSLAM**), that is connected to the end-user's building (or, where relevant, the building distribution frames) and the access seeker's nearest available point of interconnection
Conditions applicable before the expiry of 3 years from the date on which the Telecommunications Amendment Act (No 2) 2006 receives the Royal assent:	Any of the following: (a) an application for a determination by the access seeker of the service is pending in respect of Telecom's unbundled bitstream access; or (b) a standard terms development process has been initiated under subpart 2A of Part 2 in respect of Telecom's unbundled bitstream access; or (c) the access seeker of the service is a party to a determination under section 27 that has not expired, or is a party to a standard terms determination under section 30M, in respect of Telecom's unbundled bitstream access; or (d) an agreement for Telecom's unbundled bitstream access (or similar unbundled bitstream access service) is in force between the access seeker of the service and Telecom
Conditions applicable after the expiry of 3 years from the date on which the Telecommunications Amendment Act (No 2) 2006 receives the Royal assent:	Both of the following: (a) any of the following— (i) an application for a determination by the access seeker of the service is pending in respect of Telecom's unbundled bitstream access; or (ii) a standard terms development process has been initiated under subpart 2A of Part 2 in respect of Telecom's unbundled bitstream access; or (iii) the access seeker of the service is a party to a determination under section 27 that has not expired, or is a

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party to a standard terms determination under section 30M, in respect of Telecom's unbundled bitstream access; or

(iv) an agreement for Telecom's unbundled bitstream access (or similar unbundled bitstream access service) is in force between the access seeker of the service and Telecom; and

(b) either—

(i) Telecom faces limited, or is likely to face lessened, competition in a market for transmission capacity between Telecom's first data switch (or equivalent facility) and the access seeker's nearest available point of interconnection; or

(ii) Telecom does not face limited, or is not likely to face lessened, competition in a market for transmission capacity between Telecom's first data switch (or equivalent facility) and the access seeker's nearest available point of interconnection, and the Commission has decided to require Telecom's unbundled bitstream access backhaul to be wholesaled in that market

Access provider:	Telecom
Access seeker:	A service provider who seeks access to the service
Access principles:	The standard access principles set out in clause 5
Limits on access principles:	The limits set out in clause 6
Initial pricing principle:	Benchmarking against prices for similar services in comparable countries that use a forward-looking cost-based pricing method
Final pricing principle:	TSLRIC
Requirement referred to in section 45 for final pricing principle:	Nil
Additional matters that must be considered regarding the application of section 18:	Nil

The meaning of "access seeker's nearest available point of interconnection"

13.   This section addresses the interpretation of the phrase "access seeker's nearest available point of interconnection" (**ASNAPOI**) in the service description of the designated access service, UBA Backhaul.

14.   The key features of the Commission's interpretation of ASNAPOI in the draft UBA Backhaul STD were:

- The Telecommunications Carriers Forum (**TCF**) agreed 29 points of interconnection are classified as "POI Sites" for the purposes of this STD and the

Access Seeker may designate any one of those sites as an ASNAPOI for the purposes of UBA Backhaul;

- That an Access Seeker may interconnect at a single POI Site to obtain access to UBA Backhaul;

- Where the Access Seeker is interconnected at more than one POI Site, Telecom must handover transmission capacity for UBA Backhaul to the ASNAPOI that is geographically nearest to the first data switch from which the UBA Backhaul Service is supplied; and

- Each first data switch has a fixed association with a POI Site (ie its Parent POI Site) and Telecom must handover transmission capacity for UBA Backhaul in accordance with the Parent POI rules set out in the UBA Backhaul Service Description in Schedule 1.

Summary of submissions

15.   Telecom noted that the Commission accepted the TCF agreed 29 geographic interconnection points around New Zealand (**POI Sites**) but was concerned that the Commission considered the POI Site needed to be actually "in use" by the Access Seeker before it could be considered an ASNAPOI.[2] Telecom argued that it was not necessary to introduce the concept of "in use", and there is nothing in the Act which indicates a preference for actual physical interconnection at a POI Site over acquisition of a third party's backhaul services from that POI Site.[3]

16.   Telecom argued that the Commission's proposed definition was a significant departure from the industry agreed service description in Telecom's STP because:

- in a situation where the Access Seeker is interconnected with more than one of Telecom's POI Sites, the applicable ASNAPOI is the geographically closest to the Parent POI Site associated with the relevant exchange;[4] and

- the fact that some Access Seekers may choose to interconnect at only one POI Site, and therefore have traffic handed over only at this point, results in the regulation of all secondary link[5] markets, which is contrary to the intention of the Act.[6]

17.   Telecom argued that the Commission's proposed interpretation does not interpret "nearest" in a manner which minimises the impact that regulation would have on competitive backhaul markets. Further, they argued that "nearest" is a meaningful term even in the case of an Access Seeker with a single physical point of interconnection (**POI**)

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[2] Telecom, *Submissions on draft Standard Terms Determinations for Telecom's unbundled copper local loop backhaul and Telecom's unbundled bitstream access backhaul*, 7 March 2008, para 92.
[3] ibid paras 95-101.
[4] ibid para 96.
[5] Secondary links are links between Telecom's POI Sites and more specifically are links between Parent POI Sites and the ASNAPOI Handover Point.
[6] Telecom, *Submissions on draft Standard Terms Determinations for Telecom's unbundled copper local loop backhaul and Telecom's unbundled bitstream access backhaul*, 7 March 2008, para 98.

because a single POI Access Seeker would still have a number of POIs around the country where it could arrange commercial national transmission.[7]

18. At the conference Telecom argued that the Commission's jurisdiction does not extend to regulating secondary links which are competitive, because it would fail to promote competition in accordance with section 18.[8]

19. TelstraClear submitted that the Commission was constrained by a specific competition exemption, but concluded that UBA Backhaul should not be available in markets where there is competition.[9] They argued that the focus of the UBA Backhaul Service is on primary backhaul links and not secondary links.[10] They said that UBA Backhaul is not intended to be available on a national basis because the phrase "nearest available" appears to constrain the scope of the UBA Backhaul service description.[11]

20. CallPlus argued that the ASNAPOI must be one where the Access Seeker's network is located and is available for interconnection, rather than a point where the Access Seeker may extend its network to.[12] CallPlus submitted that an ASNAPOI is not a point that the Access Seeker could theoretically connect or build to.[13]

21. Orcon argued that it is not possible to imply a competition test into the definition of "ASNAPOI" because the competition test is referred to separately under the "conditions" of UBA Backhaul.[14] They argued that importing a competition test into the ASNAPOI phrase would involve applying the competition test twice which is not logical. Orcon submitted that "nearest available" in the context of UBA Backhaul means a point that is nearest and available within the Access Seeker's network.[15] Orcon, Kordia and Callplus were supportive of Access Seekers only having to interconnect at a single POI Site.[16]

22. Vodafone agreed with TelstraClear and Telecom that there should be no regulation where there is competition in the relevant markets.[17] However, Vodafone considered that there were two key competition issues in the backhaul markets: that legacy backhaul has been very low capacity; and the number of high capacity providers is currently quite limited.[18]

23. Vodafone submitted that it should not be required to interconnect to all of Telecom's 29 POI Sites.[19] It disagreed with Telecom that the ASNAPOI must be Telecom's site. It

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[7] ibid para 103-106.
[8] Conference Transcript, *Definition of ASNAPOI*, 10 April 2008, p 8-12, 17, 19, 20 and 21.
[9] ibid p 13 and 14.
[10] ibid p 21 and 22.
[11] ibid p 21 and 22.
[12] ibid p 16.
[13] ibid p 16.
[14] ibid p 24.
[15] ibid p 24.
[16] Orcon, Kordia and CallPlus, *Submission in response to the Draft Standard Terms Determinations for the Unbundled Copper Local Loop (UCLL) Backhaul Service and the Unbundled Bitstream Access (UBA) Backhaul Service*, 7 March 2008, para 18.
[17] Conference Transcript, *Definition of ASNAPOI*, 10 April 2008, p 14.
[18] ibid p 14.
[19] Vodafone, *Cross Submission on Draft Standard Terms Determinations for Unbundled Copper Local Loop and Unbundled Bitstream Access Backhaul Services*, 26 March 2008.

submitted that the ASNAPOI could be an Access Seeker's site and the Access Seeker must not be required to connect to more than one POI Site.[20]

24. Vector argued that Telecom's proposal that defined NAPOIs, iNAPOIs and VDPOIs, although complex, would ensure that more account is taken of changing competition dynamics in the backhaul market.[21] Vector supported Telecom's submission that UBA Backhaul should stop at the competitive boundary, especially in the case of UBA Backhaul where the competition test is deferred.[22]

Legal Framework for ASNAPOI

25. The description of service for UBA Backhaul in subpart 1 of Part 2 of Schedule 1 of the Act outlines the extent to which Telecom's network is regulated by the Act and provides as follows:

> A service (and its associated functions, including the associated functions of Telecom's operational support systems) that provides transmission capacity in Telecom's network (whether the transmission capacity is copper, fibre, or anything else) between the trunk side of Telecom's first data switch (or equivalent facility), other than a digital subscriber line access multiplexer (DSLAM), that is connected to the end-user's building (or, where relevant, the building distribution frames) and the access seeker's nearest available point of interconnection.

26. The Commission is required to ascertain the meaning of "access seeker's nearest available point of interconnection" in the context of both the immediate and general legislative context of the Act, including the purpose statement set out in section 18.[23]

27. The Commission has carefully considered the context and purpose of the Act, the definitions of "nearest" and "available" in the Oxford English Dictionary, the definition of "Access Seeker" in section 5 of the Act, and the parties' submissions, in order to ascertain the meaning of the term.

Access Seeker

28. The first element "Access Seeker", is defined in section 5 of the Act to mean:

> (a)   in relation to a designated service or specified service, the person named or described in Part 2, or Part 3, of Schedule 1 as the access seeker for the designated service or specified service…

Nearest

29. The second element "near", is defined as "close at hand, not distant in space or time;

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[20] ibid.

[21] Vector, *Cross submission on UCLL and UBA Backhaul*, 26 March.

[22] ibid.

[23] Section 5 of the Interpretation Act 1999 makes text and purpose the key drivers of statutory interpretation and requires that the meaning of an enactment must be ascertained from its text and in light of its purpose. In the Supreme Court case of *Commerce Commission v Fonterra Co-Operative Group Limited* [2007] NZSC 36 Justice Tipping observed that "the meaning of an enactment must be ascertained from its text and in the light of its purpose. Even if the meaning of the text may appear plain in isolation of purpose, that meaning should always be cross checked against purpose in order to observe the dual requirements of s. 5. In determining purpose the court must obviously have regard to both the immediate and the general legislative context. Of relevance too may be the social, commercial or other objective of the enactment."

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close.[24]

30. The Commission considers that "nearest" relates to the trunk side of Telecom's first data switch (**FDS**). This means that where interconnection is available at more than one point, the point nearest to the trunk side of Telecom's FDS from which the UBA Service is supplied is the relevant point.

31. Which of two interconnection points is "nearest" to the FDS must be calculated in network terms rather than radial physical distance.[25] This means that the actual distance of network between two points in Telecom's network must be used to determine which of two interconnection points is "nearest" to the FDS. The UBA Backhaul Service Description requires Telecom to provide a list of the distances in Telecom's network path between FDSs and POI Sites, and between POI Sites. This list must be made available to Access Seekers via a secure web portal.

Available

32. The third element "available" is defined in the Oxford English Dictionary as "capable of producing a desired result; effectual, valid; able to be used or turned to account; at one's disposal, within one's reach, obtainable".[26]

33. The UBA Backhaul Service requires transmission capacity between the trunk side of the first data switch and the access seeker's nearest available point of interconnection.

34. Telecom submitted that interconnection at any given ASNAPOI was available to Access Seekers in either of two ways:

   (a) the Access Seeker is physically interconnected using the Access Seeker's own equipment with Telecom's Network at that POI Site; or

   (b) the Access Seeker has an agreement with a backhaul provider (either Telecom or a third party provider) for the supply of a service that is equivalent to the UBA Backhaul Service from that POI Site to the Access Seeker's Network.

35. The Commission agrees with this submission, and is of the view that a point of interconnection is "available" where an Access Seeker has a commercial UBA backhaul arrangement with a third party backhaul provider from the POI Site to the Access Seeker's Network.

36. Telecom's submission went further to argue a point of interconnection was available where an Access Seeker was not physically interconnected or had commercial arrangements in place, but "could" do so, eg by negotiating a commercial arrangement with a third party provider who had capacity at a POI where the Access Seeker had no arrangements in place. In the Commission's view this takes the concept of availability too far. It would require the Commission to investigate at every POI the available third party

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[24] Shorter Oxford English Dictionary, (Oxford University Press, fifth edition, 2002)
[25] While the nearest interconnection point is assessed in terms of network distance, the price for Primary and Secondary Links is assessed in terms of radial distance.
[26] Shorter Oxford English Dictionary, (Oxford University Press, fifth edition, 2002)

capacity, and the reasons why an Access Seeker has not reached a commercial arrangement. This would in effect transform the availability requirement into a de facto competition test, which for the UBA Backhaul Service does not come into effect until December 2009.

37.   It follows from the Commission's view that the service description requires transmission capacity between the FDS and the ASNAPOI that there be a physical (or third party) connection, because data transmission is unable to occur through a POI Site that an Access Seeker is not connected to, but could connect to. When there is no connection (either physical or by commercial arrangement) the POI would not be "able to be used"; that is, it would not be available. In addition there would be a high degree of uncertainty as to the circumstances in which an Access Seeker "could" interconnect where it does not have existing arrangements in place. In the Commission's view the contention that the ASNAPOI is one that the Access Seeker *could* connect to is contrary to the requirements of the UBA Backhaul Service, and section 18 of the Act.

38.   The Commission's approach also has the benefit of simplicity and certainty for all parties. The identification of the ASNAPOI in any given case will be a simple question of fact – the POI to which the Access Seeker is physically connected or has in place third party backhaul arrangements which is nearest to the FDS from which the UBA Service is supplied.

Points of Interconnection

39.   The last element, "point of interconnection", describes the point on Telecom's network where Telecom hands over traffic to the Access Seeker's network.

40.   The Commission has decided to accept the TCF agreed 29 interconnection points for the purposes of this STD.

Statutory requirements for an STD

41.   The Commission makes this STD in accordance with sections 30M, 30O, 30P and 30Q of the Act.

42.   In this determination, section 30P(1)(a) and (b) do not apply and, therefore, the Commission has determined the prices in accordance with the applicable initial pricing principle for the designated UBA Backhaul Service (section 30P(1)(c)).

43.   Section 30O specifies the matters to be included in the final STD as follows:

> **30O Matters to be included in STD: general**
>
> (1) A STD must—
>
> (a)   specify sufficient terms to allow, without the need for the access seeker to enter into an agreement with the access provider, the designated access service or specified service to be made available within the time frames specified under paragraph (b); and

(b)   state the time frames within which the access provider must make the service available to—

(i)   every person who is already an access seeker when the STD is made; and

(ii)   every person who becomes an access seeker after the STD is made; and

(c)   specify the reasons for the STD; and

(d)   specify the terms and conditions (if any) on which the STD is made; and

(e)   specify the actions (if any) that a party to the STD must take or refrain from taking.

(2)   To avoid doubt, a STD may also include, without limitation, terms concerning any or all of the following matters:

(a)   dispute resolution procedures:

(b)   the consequences of a breach of the determination (including provision for set-off or withholding rights, or liquidated damages):

(c)   suspension and termination of the service:

(d)   procedures for, or restrictions on, assignment of the service.

(3)   The Commission must identify which of the terms (if any) specified in a STD are allowed to be varied, on an application made under section 30V by a party to that determination, under a residual terms determination.

Timeframe for supply to access seekers

44.   The Commission is required by section 30O(1)(b) to specify in the STD, the timeframes within which the access provider must make the service available to:

- every person who is already an access seeker at the time the STD is made; and
- every person who becomes an access seeker after the STD is made.

45.   The timeframes within which Telecom must make the service available are contained in the Implementation Plan in Appendix A.

Telecom as Access Seeker

46.   In its draft STD the Commission indicated its view that, in respect of Telecom[27] as the Access Provider of the UBA Backhaul Service, the Act does not contemplate that the Access Provider and Access Seeker are intended to be the same organisation. This view was consistent with the STDs for the UBA Service and UCLL Services.

47.   While the Commission notes that it is not required to give a view on this issue, the

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[27] Defined as Telecom Corporation of New Zealand and includes any of its subsidiaries, s5 of the Act.

Commission maintains its view and in the interests of clarity makes the following points:

- The Access Provider, in addition to Access Seekers has a 'voice' in respect of any changes to an STD. Telecom, defined broadly as the Telecom Corporation of New Zealand (which includes Telecom Wholesale), is the Access Provider in relation to UBA Backhaul.
- Operational Separation does not establish Telecom business units as separate legal entities. This would only be achieved by structural separation or subsequent sale of a business unit.
- The Commission consults interested parties if they are materially affected by a change and so if necessary may consult specifically with Telecom Wholesale.
- The scheme and purpose of the Act support the view that in respect of UBA Backhaul an Access Seeker and an Access Provider cannot concurrently be the same legal entity.

Access principles and limits on those principles

48. Clauses 5 and 6 of Schedule 1 to the Act apply in relation to the UBA Backhaul Service. They provide:

5 Standard access principles for designated access services and specified services

The following standard access principles apply to designated access services and specified services:

(a) *principle 1*: the access provider must provide the service to the access seeker in a timely manner:

(b) *principle 2*: the service must be supplied to a standard that is consistent with international best practice:

(c) *principle 3*: the access provider must provide the service on terms and conditions (excluding price) that are consistent with those terms and conditions on which the access provider provides the service to itself.

(d) *principle 4*: the access provider must, if requested, provide an access seeker with information about a designated access service or specified service at the same level of detail, and within the same time frame, that the access provider would provide that information had it been requested by one of its own business units.

6 Limits on application of standard access principles set out in clause 5

(1) Principles 1 to 4 set out in clause 5 are limited by the following factors:

(a) reasonable technical and operational practicability having regard to the access provider's network:

(b) network security and safety:

(c) existing legal duties on the access provider to provide a defined level of service to users of the service:

(d) the inability, or likely inability, of the access seeker to comply with any reasonable conditions on which the service is supplied:

(e) any request for a lesser standard of service from an access seeker.

(2) Principle 4 set out in clause 5 –

    (a) does not extend to any information about identifiable individual customers of the access provider; and

    (b) is subject to the requirement that any confidential information provided to the access seeker, in accordance with that principle, must be kept confidential to that access seeker.

Compliance with standard access principle 3

49.   Clause 2.3 of the UBA Backhaul General Terms incorporates the access principles and the limits on those access principles from clauses 5 and 6 of Schedule 1 to the Act.

50.   Access principle 3 requires that Telecom provide UBA Backhaul on terms and conditions (excluding price) that are consistent with those terms and conditions on which it provides the service to itself.

51.   Telecom provided a high level explanation in its submissions as to how it would ensure consistency under this principle.

52.   On 26 September 2007 the Minister of Communications and Information Technology (**Minister**) made the Telecommunications (Operational Separation) Determination 2007 (**Operational Separation Determination**).   This provides further requirements with which the separation plan under Part 2A of the Act must comply and are in addition to those requirements in section 69D of the Act. Clause 9 of the Operational Separation Determination states that:

> In this determination, unless the context otherwise requires, **equivalence of inputs** or **EOI**—
>
> (a)   means that, if Telecom is required to provide a relevant service to an access seeker,—
>
>   (i)   Telecom must provide the access seeker and Telecom itself with the same service; and
>
>   (ii)   Telecom must deliver that service to the access seeker and to Telecom itself on the same timescales and on the same terms and conditions(including price and service levels); and
>
>   (iii)   Telecom must deliver that service to the access seeker and to Telecom itself by means of the same systems and processes (including operational support processes); and
>
>   (iv)   Telecom must provide the access seeker and Telecom itself with the same commercial information about those services, systems, and processes; and
>
> (b)   includes, if Telecom is required to provide a relevant service to an access seeker, the use by Telecom of services, systems, and processes that access seekers must be able to use in the same way, and with the same degree of reliability and performance, as those services, systems, and processes are used by Telecom; and
>
> (c)   is subject to clause 8.

53.   On 31 March 2008 the Minister approved Telecom's Separation Undertakings (**Separation Undertakings**)[28], with the Separation Day defined as 31 March 2008. The Separation Undertakings define "Equivalence of Inputs" in clause 1.2.

54.   The Commission considers that the implementation of the Separation Undertakings including full equivalence of inputs (EOI) under Part 2A of the Act complements the operation of standard access principle 3. That is, when services are provided on an EOI basis Telecom must deliver the service to itself and the access seeker on the same time-scales and on the same terms and conditions (including price and service levels).[29] As the services are migrated towards equivalence, those services will be provided on the basis of consistent non-price terms.

55.   Prior to the implementation of EOI, Telecom's internal service provision can be compared at any time with the service provided to Access Seekers to check for consistency in the non-price terms and conditions, for example in relation to SLAs.

56.   The Commission therefore does not consider that arguments made by Telecom that there may be inconsistent application of the UBA Backhaul STD and operational separation are sound.

Information disclosure

57.   As clause 2.3 of the UBA Backhaul General Terms incorporates the access principles, the Commission may require Telecom, in accordance with section 69ZC, to prepare and disclose information about the operation and behaviour of any part of its business that provides prescribed designated or specified services.

58.   In addition, the Commission may require Telecom to adopt, in the preparation or compilation of that information, any methodology that the Commission requires. The Commission may also require other information disclosure as further set out in section 69ZC of the Act. The purpose of such disclosure is specified in section 69ZC(1)(b) as follows:

> (b)   for the purpose of enabling monitoring of , and facilitating compliance with, prescribed access principles –
> (i)   that are incorporated in any determination, approved code, or registered undertaking; and
> (ii)   with which the access provider is required to comply.

59.   At this stage the Commission does not intend to seek information disclosure pursuant to section 69ZC as part of this determination, but may do so in the future.

Amendments to an STD

60.   The Act provides a range of mechanisms to amend an STD including:
- a review under section 30R;

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[28] Telecom, *Telecom Separation Undertakings: As provided to the Minister of Communications on 25 March 2008 in accordance with section 69K(2)(c) of the Telecommunications Act 2001*, 25 March 2008.

[29] Refer to clause 1.2 of the Operational Separation Undertakings.

- a Residual Terms Determination (RTD) under section 30ZB;
- a pricing review determination under section 51;
- a clarification under section 58; and
- a reconsideration under section 59.

61.   Section 30R allows the Commission, on its own initiative, to commence a review at any time of all or any of the terms of an STD. After review, the Commission may replace an STD, or vary, add, or delete any of its terms, if it considers it necessary to do so. The review can also address aspects of a service not covered in an initial STD and update the terms of an STD to reflect regulatory or technological change.

62.   Apart from the requirements in section 30R, the Commission may conduct the review in a manner and within a timeframe as the Commission thinks fit. This enables the Commission to assess the appropriate form and degree of consultation on a case by case basis.[30] However, the Commission will give notice in the Government Gazette. The Commission expects that if there is unanimous agreement in the TCF for a particular change, the consultation process is likely to be very short and completed quickly.

Variation of terms under a residual terms determination

63.   The Commission is required by section 30O(3) of the Act to identify which of the terms (if any) specified in a STD are allowed to be varied on an application for a residual terms determination (**RTD**) made under section 30V. The purpose of a RTD is to allow the Commission to adjust the terms for the supply of a designated access service or specified service that are specified in the STD.[31]

64.   A RTD is another regulatory instrument that allows the Commission to address matters that were not addressed in the STD and vary any terms that the Commission has identified under section 30O(3) as being allowed to be varied.[32] An application for a RTD may only be made where an STD is in place and it may seek either or both of the following:

   (a)   a determination of matters that were not addressed in the STD; or
   (b)   a variation of any terms in the STD that the Commission has identified under section 30O(3) as being allowed to be varied.

65.   From a policy perspective, a RTD is a regulatory alternative to a private bilateral agreement in situations where an Access Seeker had made reasonable attempts to negotiate with the Access Provider on the terms in question but was unable to reach agreement on those matters.

66.   In addition, a RTD provides a mechanism for an Access Seeker to seek changes to the STD that may only apply on a bilateral basis between the Access Seeker and the Access Provider. Advantages of a RTD are that it may lead to a more urgent regulatory response to resolve disputes between parties on a bilateral basis and avoid the need for generic changes to an STD applying to all parties.[33]

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[30] This can be contrasted with the process under s59(3) of the Act which requires that a reconsideration determination follow the same process as followed for the initial determination.
[31] Section 30U(1) of the Telecommunications Act 2001.
[32] Section 30U(2) of the Telecommunications Act 2001.
[33] Other amendments to an STD can occur via other provisions such as pricing under s42 of the Act.

67. In the draft UBA Backhaul STD, the Commission proposed that a number of terms should not be able to be varied for the purposes of a RTD.[34]

68. The Commission has considered the application of section 30O(3) in the context of what variations (if any) are likely to give best effect to section 18 of the Act. The relevant starting point is that consumers would be best served with maximum flexibility, and accordingly all terms should be variable for the purposes of an RTD unless there is good reason otherwise.

69. However, in some areas certainty outweighs flexibility. The Commission considers that some terms of the UBA Backhaul STD must not be varied by a RTD. For example, as the Implementation Plan has immediate effect and then falls away after a period of time, it is appropriate that no regulated variation of bilateral arrangements via the RTD process take place during that stage. In addition, terms should not be variable if to do so would undermine the scheme and purpose of the Act. For example, the UBA Backhaul Price List requires certainty as to what the prices will be for core charges, and the process for updating those charges.

70. On this basis the Commission has determined that all terms may be varied for an RTD application made under section 30V by a party to the UBA Backhaul STD, apart from those listed below:

   UBA Backhaul General Terms
   a)   Section 2 – Guiding Principles
   b)   Clause 7.3 – Rights not excluded
   c)   Clause 7.4 – Amendment
   d)   Clause 9.1 – (in section 9 – Change Mechanism for UBA Backhaul Operations Manual and UBA Backhaul Service Level Terms)
   e)   Section 36 – Dispute Resolution

   Schedule 1 UBA Backhaul Service Description
   f)   Clauses 2.1 and 2.2 (in section 2 – The UBA Backhaul Service)

   Schedule 2 UBA Backhaul Price List
   g)   UBA Backhaul Service Transaction Charges, Service Components 1.1, 1.2 and 1.8
   h)   UBA Backhaul Service Recurring Charges, Service Components 2.1 to 2.24 , and 2.26

   Implementation Plan
   i)   All sections and clauses in the Implementation Plan

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[34] Commerce Commission, *Decision No. 627: Draft Standard Terms Determination for the designated services Telecom's unbundled bitstream access backhaul*, 8 February 2008, page 18, para 54.

Operational separation

71.   Telecom submitted[35] that its STP was prepared amidst significant uncertainty for
       Telecom and the industry given pending separation in accordance with Part 2A of the Act.
       This submission was made on the basis that the future Telecom organisational structure
       and operating environment within which the service (and its associated functions) will be
       provided, was unknown. Telecom's submissions noted that the pending operational
       separation undertakings will be legally binding on it. Accordingly, Telecom proposed
       that, if anything in the STD proves to be inconsistent with any requirement in either of
       those documents, Telecom will have no option but to seek amendment to the STD in order
       to give effect to the separation determination/plan and that it should not liable under the
       standard terms for such inconsistencies.

72.   In addition, Telecom requested that, if anything in the STD proved to be inconsistent with
       the Operational Separation Determination and Separation Undertakings, Telecom should
       not be liable under the STD for any inconsistencies under proposed clause 45 of the
       UCLL General Terms.[36]

73.   Following Telecom's submission of the STP the Minister has made the Operational
       Separation Determination. Following Telecom's submissions on the draft UCLL
       Backhaul STD the Separation Undertakings were approved by the Minister. The
       Commission has discussed the interaction of operational separation with this STD in
       paragraph 55.

74.   The Commission also notes that there are a range of established mechanisms under the
       Act to allow amendments to a STD should the need arise. On this basis, therefore, it is
       inappropriate to provide such a broad exclusion of liability as proposed by Telecom in its
       STP.

Breach of an STD

75.   The UBA Backhaul STD provides a range of dispute resolution procedures.[37] However,
       the STD does not prevent any party from seeking remedies available to it under the Act.[38]

76.   Under s 156N(b) of the Act, an STD is an enforceable matter. As such, Telecom and/or
       the Access Seeker may make a written complaint to the Commission alleging a breach of
       the STD. The Commission must then decide what action, if any, to take, including
       whether to take action in the High Court.[39] Telecom and/or the Access Seeker may also
       take action High Court under s 156P(1) of the Act.

77.   On the application of the Commission, the High Court may, in addition to any other
       remedies, order a pecuniary penalty if there has been a breach of the STD.

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[35] Telecom, *Standard Terms Proposal for Telecom's Unbundled Bitstream Access Backhaul Service*, 28 September
2007, paras 8 and 9.
[36] Ibid, *General Terms,* p64.
[37] See section 36 UCLL Backhaul General Terms.
[38] See clause 36.13 UCLL Backhaul General Terms.
[39] See ss 156O, 156P, 156Q and 156R of the Act.

SERVICE DESCRIPTION

78. The UBA Backhaul Service is described in Appendix A: Schedule 1 – UBA Backhaul Service Description as follows:

> Telecom's UBA Backhaul Service is a service (and its associated functions, including the associated functions of Telecom's operational support systems) that provides transmission capacity in Telecom's network (whether the transmission capacity is copper, fibre, or anything else) between the trunk side of FDS Handover Point that is connected to the End User's building (or, where relevant, the building distribution frames) and the ASNAPOI Handover Point.
>
> Transmission capacity is provided as an Ethernet connection.

79. The Handover Points for the UBA Backhaul Service are:
    - ASNAPOI Handover Point – the Access Seeker side of the OFDF in the ASNAPOI; and
    - FDS Handover Point – the Access Seeker side of the OFDF in the FDS.

80. The UBA Backhaul Service, where both a Primary Link and Secondary Link are purchased[40], is illustrated in the diagram below:
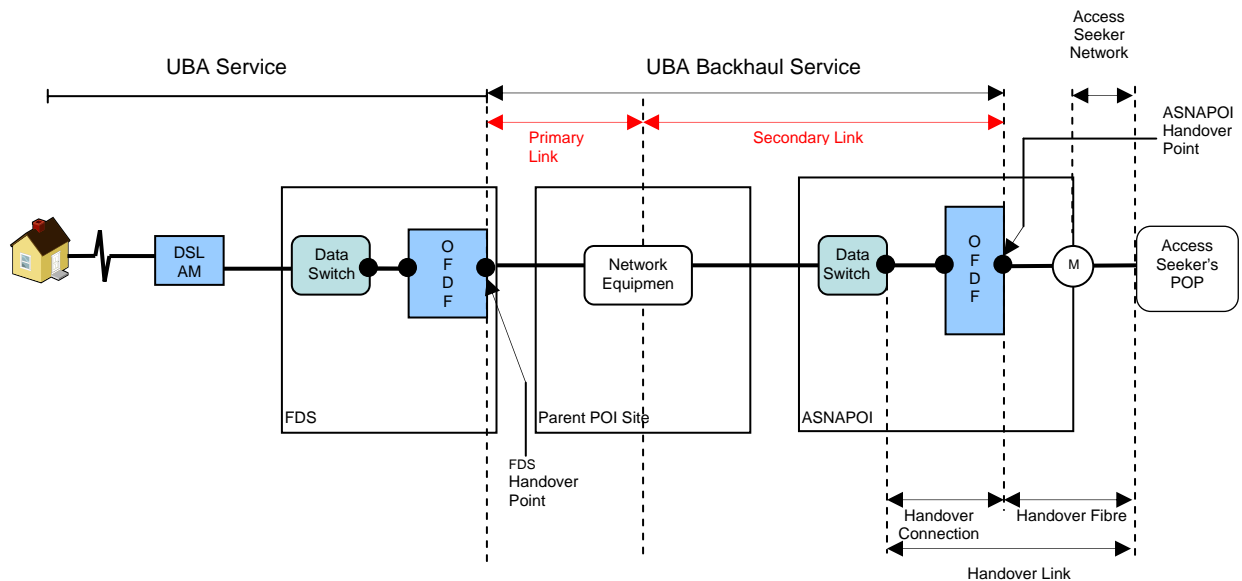
Key: M refers to the manhole at the ASNAPOI

81. Under this STD, the Commission has determined the price and non-price terms for the UBA Backhaul Service. This service is designed to support the Enhanced UBA Service, as it provides for dedicated capacity to the Access Seeker.

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[40] Additional diagrams illustrating the purchase of a Primary Link only and a Secondary Link only are included in Appendix A: Schedule 1 – UBA Backhaul Service Description: Appendix A. Note that the UBA regulated services are outlined in the diagram for illustrative purposes only. A more detailed diagram is found in the corresponding STD for this service.

82.   In terms of the Basic UBA Service, a lower quality of backhaul service is likely to be appropriate.[41] At the conference the Commission was informed that such a service was likely to be offered commercially by Telecom, and possibly by other backhaul providers.[42] At the conference there was significant discussion and consensus that the service description as agreed by the TCF, and the STP as submitted by Telecom[43], did not include backhaul service for the Basic UBA Service.[44] The Commission expects that a commercially available Basic UBA Service will be provided on a per user basis.

83.   The Commission does not anticipate that the regulated UBA Backhaul Service would be used for the Basic UBA Service. It is however open to Access Seekers to purchase the regulated UBA Backhaul Service, and on-sell the service to other service providers who use the Basic UBA Service. The Commission notes that Telecom accepted at the conference that there may be commercial offerings that would aggregate usage across multiple small providers.[45]

84.   In the event that a backhaul service for the Basic UBA Service is not offered on a commercial basis on reasonable terms, the Commission will consider determining the price and non-price terms for such a service by way of an s 30R Review.

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[41] The use of a dedicated backhaul service to support the Basic UBA Service is likely to result in higher retail prices for basic broadband services than would otherwise be the case. This will result in a reduction in allocative and productive efficiency.
[42] Conference transcript, pages 42-49.
[43] Telecom, *Standard Terms Proposal for Telecom's Unbundled Bitstream Access Backhaul Service*, 28 September 2007, paras 87-88.
[44] Conference Transcript, *Basic UBA Backhaul*, p68-75.
[45] Conference Transcript, *Service Description Proposals,* 10 April 2008, p 42-43.

PRICE TERMS – CORE CHARGES – THE DRAFT STD

Introduction

85. The Commission is required to determine the price terms for Telecom's UBA Backhaul Service. According to the initial pricing principle (IPP) set out in the Telecommunications Act, the price for the UBA Backhaul Service is

> *Benchmarking against prices for similar services in comparable countries that use a forward-looking cost-based pricing method.*

86. The following sections summarise the approach taken by the Commission in applying the IPP in the draft UBA Backhaul STD,[46] and the submissions[47] from parties on the draft STD.

87. Having considered submissions by the parties, the Commission then sets out the approach it has taken to benchmarking the price terms of the UBA Backhaul service in this determination.

Summary of the draft UBA backhaul STD

Recurring Monthly Rental Rates

88. In the draft STD, the Commission determined recurring monthly rental charges for the UBA Backhaul Service, based on the France Telecom (FT) DSL Collect IP service. The Commission also considered a number of other jurisdictions as possible benchmarks for the UBA Backhaul Service, including Ireland, Italy, Belgium, the UK, and Germany, although was not at that stage satisfied that these represented appropriate benchmarks, either because the services were not subject to regulation, or because the services were not sufficiently similar (in terms of the underlying technology, or the origination and/or termination points).

89. In the draft STD, the Commission noted that the FT DSL Collect IP service conveys data from the DSLAM to the access seeker's handover point, and that the access seeker can choose a handover point either at FT's premises or at the access seeker's premises. The Commission therefore used the difference between the DSL Collect IP service that interconnects at the FT site and the DSL Collect IP service that interconnects at the access seeker's site, as a benchmark for the UBA Backhaul Service in New Zealand.

90. The Commission directly benchmarked the 100Mbps and 1Gbps UBA Backhaul Services using the DSL Collect IP services that corresponded to those bandwidths. As the FT service does not include a 50Mbps and 200Mbps service, the Commission extrapolated the schedule of DSL Collect IP rates to determine a benchmark for the 50Mbps and 200Mbps UBA Backhaul Services. This resulted in the monthly rental charges summarised in Table 1.

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[46] Commerce Commission, *Decision No. 627: Draft Standard Terms Determination for the designated service Telecom's unbundled bitstream access backhaul*, 8 February 2008.
[47] These include submissions on the draft STD, cross-submissions, and presentations at the Conference.

Table 1: Draft UBA Backhaul Service Monthly Rental Charges (NZ$/month)

	Price per month
50Mbps	$4,778
100Mbps	$5,432
200Mbps	$6,740
1Gbps	$17,200

Non-recurring Connection Charge

91.   In the draft UBA Backhaul STD, the Commission derived a set of connection charges, based on the non-recurring installation charges associated with the FT DSL Collect IP service. The Commission used a similar approach as to determining the monthly rental charge, which produced the connection charges summarised in Table 2.

Table 2: Draft UBA Backhaul Service Connection Charges (NZ$)

	Connection charge
50Mbps	$6,940
100Mbps	$7,240
200Mbps	$7,845
1Gbps	$12,674

PRICE TERMS – UBA BACKHAUL MONTHLY RENTAL RATES

Introduction

92.   The IPP for the UBA Backhaul Service refers to benchmarking against prices for similar services in comparable countries that use a forward looking cost-based pricing method. As noted in paragraph 81 above, the prices determined by the Commission in this STD are for a backhaul service that is designed to support the Enhanced UBA Service.

93.   The Commission has found that there is considerable variation in the definition of backhaul services in other countries, and in the way in which backhaul services are priced. This has resulted in a relatively small number of countries identified as having similar services and that are priced according to a 'forward-looking cost-based' pricing method. As noted earlier, the Commission's draft STD determined a pricing structure for UBA Backhaul based on the FT DSL Collect IP backhaul service. In their submission on the draft STD, LECG identified five countries that they considered to be appropriate benchmarks.

94.   In light of the limited number of potential benchmark jurisdictions identified throughout the STD process, the Commission has not explicitly used comparability criteria for a number of reasons.

95.   First, while the strict application of comparability criteria is a useful way of restricting benchmarks to those jurisdictions that exhibit similar cost drivers to those in New Zealand, this only makes sense when a 'peer group' approach to benchmarking is being employed. In the current STD, the Commission has used a regression-based approach, which examines how the variation in cost drivers explains the variation in the price of the service. If only those jurisdictions with comparable operating conditions to New Zealand were used in the regression sample set, the reliability of the benchmarking results is likely to be undermined. In effect, by estimating the relationship between the cost drivers and cost-based prices in overseas jurisdictions, a New Zealand price for the backhaul service can be determined by placing the New Zealand values of the cost drivers into the estimated relationship.

96.   Second, the limited number of jurisdictions with backhaul services that are similar to the UBA Backhaul Service proposed for New Zealand, and that have cost-based prices, means that any attempt to further restrict this sample set is likely to reduce the reliability of the results. For example, in the UCLL STD, the Commission identified an initial set of 66 countries or US states in which UCLL services were available at forward-looking cost-based rates. Of those 66 jurisdictions, the Commission restricted its benchmarking analysis to 10 jurisdictions, based on a requirement that these jurisdictions exhibit similar cost drivers to New Zealand, such as population density and urbanisation. In terms of the UBA Backhaul Service, none of the jurisdictions either used by the Commission in the draft UBA Backhaul STD, or by LECG in its submissions, correspond to the 10 jurisdictions that were found to be comparable for the purposes of the UCLL STD. While the cost drivers for the UBA Backhaul Service may differ from those for the UCLL Service, the limited nature of the initial sample set of backhaul benchmarks suggests that some caution must be exercised in terms of any further restrictions.

97.   In light of the above considerations, the Commission has focused on identifying countries with similar backhaul services and with cost-based prices. This is discussed further below.

Submissions on the draft STD

98.   The following parties provided submissions on the price benchmarks used in the draft STD:

- Telecom (including analysis conducted by LECG);
- Vodafone;
- Orcon, Kordia and CallPlus (including a submission from Covec on behalf of Orcon/Kordia, and Vodafone/Ihug); and
- Vector Communications.

99.   Cross-submissions relating to price benchmarking were received from:

- Telecom;
- TelstraClear;
- Vodafone; and
- Orcon, Kordia and CallPlus (including a submission from Covec on behalf of Orcon/Kordia, Vodafone/Ihug, and CallPlus).

100.   Appendix C contains a detailed summary of the parties' submissions on the price terms contained in the draft STD.

Commission's Benchmarking Approach

101.   In submitting on the draft UBA Backhaul STD, most parties expressed some concern over the limited number of pricing benchmarks that were identified. For Telecom, LECG identified additional benchmark jurisdictions in which backhaul prices had been determined by regulators on a basis that reflects the underlying cost of provision. LECG then undertook an econometric analysis of those benchmarked prices, and derived a set of backhaul prices for New Zealand. On behalf of Access Seekers, Covec proposed that consideration be given to supplementing the benchmarking sample set by including commercial prices from competitive backhaul markets. At the conference Covec accepted that the use of commercial prices was not required, in light of the additional benchmarks identified by LECG.

102.   The Commission notes that while Covec subsequently commented on a number of assumptions made by LECG, and suggested a number of areas in which LECG's analysis could be improved, Covec did not challenge the underlying methodology proposed by LECG. Having considered the submissions and cross-submissions and the presentations at the conference, the Commission has based the benchmarking for this determination on the methodology proposed by LECG.[48]

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[48] This includes the approach taken to exchange rates, which follows the Commission's approach set out in the UCLL STD.

103. However, the Commission has a number of concerns around some of LECG's data selection and assumptions. As discussed below, the Commission has therefore made a number of amendments to LECG's benchmarking approach.

104. An important preliminary point relates to the treatment of both UCLL Backhaul and UBA Backhaul as similar services. As noted in Appendix C, both LECG and Covec submitted that the two backhaul services are similar, and are likely to have similar underlying cost structures. LECG acknowledged that the UCLL Backhaul Service commences at a Telecom local exchange, whereas the UBA Backhaul Service commences at the first data switch. However, this difference can be accounted for in setting prices that vary with distance.[49]

105. Both Covec and LECG were of the view that it was appropriate for the Commission's benchmarking exercise to regard the two backhaul services as equivalent, and the Commission agrees that this is an appropriate approach to take. For the purposes of benchmarking a price for these two backhaul services, the Commission has therefore treated UCLL Backhaul and UBA Backhaul as being equivalent services.

Distance as a backhaul cost driver

106. LECG submitted that distance and bandwidth are important cost drivers of a backhaul service. In submitting on behalf of a number of Access Seekers, Covec also noted that backhaul prices will generally vary with distance and bandwidth.[50]

107. The Commission agrees with LECG and Covec that for the purposes of benchmarking a price for backhaul services in this determination, it is reasonable to use distance and bandwidth as the relevant cost drivers of the provision of backhaul services.[51]

108. As noted by LECG, given the differences in the way distance is handled across the sample of jurisdictions identified by LECG, some "normalisation" of benchmarked rates for distance is required. To do this, LECG made a number of assumptions regarding the average distance over which backhaul services are provided in the various countries. In those countries where backhaul prices are set according to metropolitan, provincial, and/or regional bands, LECG generally assume that the average backhaul distances are:[52]

- 17.5 km for metropolitan areas (LECG's "rationale" for this is an assumption of an "average distance for a metropolitan service being the mid-point of 0-35 km");

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[49] For example, where the UBA Backhaul Service covers a shorter distance than the UCLL Backhaul Service, this would be reflected in a lower UBA Backhaul price.

[50] Covec, *Regulated Backhaul Pricing*, March 2008.

[51] However, the Commission notes (as does LECG) that the benchmarked jurisdictions tend to treat distance in a variety of ways. For example, in Canada, Holland, and Italy, there is a fixed monthly rental for backhaul, and this rental varies by region (eg Canada has three prices, for metropolitan, provincial, and regional steps; Italy has a metro and a regional price step). In France, the FT DSL Collect IP backhaul service has a single price which does not vary at all with distance. In other cases, such as in the UK and another FT service ("DSL Collect Ethernet"), the price structure includes a fixed charge plus an explicit per kilometre charge. In addition, the Commission notes Vector's comment at the Conference that its commercial preference is to offer a single backhaul price within a region, regardless of distance.

[52] LECG, *Price benchmarking of UCLL and UBA Backhaul Services*, 7 March 2008, p 17-18, table 11.

- 80 km for provincial areas ("average distance for a provincial service being the mid-point of 0-160 km"); and
- 150-250 km for regional areas ("average distance for a regional service in Canada (France) being the mid-point of 0-500 km (0-300 km)").

109.   However, LECG provide little justification for these assumptions, and indeed they acknowledge that considerable judgement was involved.[53]

110.   As Covec noted in their cross-submission, the results produced by LECG's benchmarking analysis are quite sensitive to the assumed distances to which backhaul rates apply in the benchmarked jurisdictions. According to LECG, they were not able to identify any information on the average distance of the backhaul links in the overseas jurisdictions, and therefore had to make an assumption regarding these distances.

111.   However, the Commission has identified additional information regarding the backhaul service in Canada, and in particular regarding the areas throughout which these services are provided. The Canadian backhaul services used by LECG are provided by Bell Canada, whose Ethernet Transport Service is available at various speeds, and within three distance bands: Metropolitan, Provincial, and Regional.[54] Bell Canada defines these dimensions as follows:

- a "Metro Network Path" is defined with reference to the urban areas of Toronto, Ottawa, and Montreal, and their respective Extended Area Service (EAS);
- a "Provincial Network Path" refers to transport within Quebec or Ontario; and
- a "Regional Network Path" refers to transport between Quebec and Ontario.

112.   In respect of the metro backhaul service, Bell Canada elsewhere defines an EAS as the addition of an exchange to a local-service area, where the distance between the exchanges is no greater than 40 miles (64 km).[55] LECG generally assume a distance band for metro backhaul of up to 35 km, and take a midpoint of 17.5 km. The Bell Canada definition of metro backhaul indicates that a distance band of up to 64 km applies to the Canadian metro backhaul service. The midpoint of this band is 32 km.

113.   The Commission has therefore used an average distance of 32 km for metropolitan backhaul in Canada. The Commission has also used this assumption in respect of metropolitan backhaul in the other jurisdictions[56], although in the case of the UK backhaul

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[53] ibid p 18.

[54] Bell Canada, *Access Services Tariff for Interconnection with Carriers and Other Service Providers, Access Arrangement*, p 47.7, Item 123.2(c) to (e), URL: http://ww.bce.ca/en/aboutbce/regulatoryinformation/tarrifs/index.php/ItemView.asp?Tariff=7516%20&Part=%20%20%202%20%20%20%20%20%20&Item=%20%20123%20%20%20%20%20.

[55] Bell Canada, *General Tariff, Exchange Service – General*, p 45A, Item 60.1(d), URL: http://www.bce.ca/en/aboutbce/regulatoryinformation/tarrifs/index.php/ItemView.asp?Tariff=GT%20%20%20&Part=%20%20%202%20%20%20%20%20%20%20&Item=%20%20%2060%20%20%20%20%20. It is not clear whether this refers to radial or route distance.

[56] This is based on an examination of whether the main metropolitan centres in the other benchmarked jurisdictions are sufficiently similar to the metropolitan centres in which Bell Canada offer backhaul services. For example, in the case of France, the Paris urban area covers approximately 2,700 km², which suggests a radial distance of around 30 km is appropriate (as the radius of a circular area of 2,700 km² is 29 km). For Italy, the urban area of Rome is 5,350 km², indicating a radial distance of around 40 km. This suggests that the use of the average metropolitan distance of 32 km in Canada is a reasonable approximation in other jurisdictions.

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services, the Commission has followed LECG's approach of using the maximum distances associated with the Openreach backhaul services.

114. For provincial and regional backhaul provided by Bell Canada, it is possible that backhaul could be provided over several thousand kilometres. However, it is relevant to note that the major population centres in both of the provinces served by Bell Canada backhaul services are Toronto and Ottawa (both in Ontario), and Montreal and Quebec City (Quebec). Table 3 summarises the distances between these cities.

Table 3: Route distances for Bell Canada Ethernet Transport Service (km)

	Toronto	Ottawa	Montreal	Quebec City
Toronto	n/a			
Ottawa	400	n/a		
Montreal	540	190	n/a	
Quebec City	810	460	270	n/a

Source: http://atlas.nrcan.gc.ca/site/english/learningresources/facts/tabledistances.html

115. The distances in the light-shaded cells represent routes that are defined by Bell Canada as being provincial routes, whereas the heavily-shaded distances are for routes defined by Bell Canada as regional. Assuming that most of the backhaul traffic is between these population centres, the average distance of the Bell Canada provincial Ethernet Transport Service would be between 270 km and 400 km, while the average regional distance would be between 190 km and 810 km. For the purposes of benchmarking against Canada, the Commission has assumed the average distance for the Bell Canada provincial backhaul service to be 350 km, and the average distance for the Bell Canada regional backhaul service to be 400 km.

116. The Commission has also taken the approach agreed by LECG and Covec, whereby the lower bound of each band is equated to the upper bound of the preceding band. The Commission has also taken the midpoint of the band, where no further information has been identified on the likely distance,[57] because the Commission considers that the midpoint is appropriate in the case of a point-to-point service such as backhaul.

Bandwidth as a backhaul cost driver

117. Both LECG and Covec submitted that backhaul costs are likely to vary with bandwidth. LECG initially used overseas backhaul services with bandwidths corresponding to the 50 Mbps, 100 Mbps, 200 Mbps, and 1 Gbps bandwidths of the UBA Backhaul Service, and examined how prices vary across those bandwidths. Covec submitted that additional bandwidths could be added for some countries, in order to provide a more balanced dataset. LECG responded by agreeing that additional bandwidths should be included, but disagreed with Covec's limitation of a more balanced dataset. LECG instead argued that all intermediate bandwidths between 50 Mbps and 1 Gbps should be added to the dataset.

118. The Commission agrees in principle that consideration should be given to all the bandwidths at which backhaul services are available in the benchmark jurisdictions. This is because under the regression-based benchmarking approach proposed by LECG, the

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[57] As noted above, such information has been found for the Bell Canada provincial and regional backhaul services.

intention is to estimate the relationship between cost-based backhaul prices and the relevant cost drivers, which are considered to be bandwidth and distance.[58]

119. The Commission has therefore included the intermediate backhaul services, as proposed by LECG in their presentation at the conference.[59] This increases the number of price observations in the dataset from 36 prices to 68 prices, varying by bandwidth and distance. The Commission further discusses the composition of the dataset below.

Backhaul services in France and the United Kingdom

120. LECG identified a number of backhaul services in France and the UK which they considered to be appropriate benchmarks. The other parties generally did not comment on the suitability of these services.

121. In the case of France, LECG used two France Telecom (FT) backhaul services, DSL Collect Ethernet, and DSL Collect IP:

- DSL Collect Ethernet is a transport service from a DSLAM located at a FT site, to the access seeker's POP within the same region.
- DSL Collect IP is a transport service from a DSLAM to either an FT regional node or to the access seeker's POP.

122. However, LECG has only included one variant of the DSL Collect IP service, specifically where the service terminates at the access seeker's POP. As noted earlier, the DSL Collect IP service can also be terminated at a regional FT site, at a considerably lower price. For example, the monthly price for a 100 Mbps service terminating at the access seeker's POP is €4,000, whereas the monthly charge for the same service terminating at the regional FT parent site is €1,000.

123. While the end-point of the DSL Collect IP service used by LECG may be consistent with the backhaul service definition in New Zealand, LECG has noted that the purpose of their approach is to estimate the relationship between distance and price, and so a precise match of the start points and end-points of the services is not required. The Commission does not consider that the DSL Collect IP service that terminates at the FT site should be ignored, and has therefore considered how to incorporate that service within the benchmarking exercise.

124. The Commission considers that some weight should be given to each of the DSL Collect IP services. However, it would not be appropriate to use the same distances for both services, given the different termination points. Instead, the Commission has used the difference between the two services[60], and applied the metro, provincial, and regional distances to that difference.

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[58] Under a 'peer group' benchmarking approach, only those backhaul services that corresponded to the services proposed for New Zealand (for example, 50 Mbps, 100 Mbps, 200 Mbps, and 1 Gbps) would be considered, and a benchmarked price would be based on some average (such as the median) of each subset. As discussed later, such an approach is used as a cross-check, although there are only a small number of observations in each subset.

[59] LECG, *Responses to benchmarking issues raised by Covec*, 10 April 2008, slide 11.

[60] The Commission used this difference in the draft UBA Backhaul STD.

125. LECG used two Openreach backhaul services in its benchmarking, the Backhaul Extension Service (BES) and the Openreach Network Backhaul Service (ONBS):

   • BES provides metropolitan point-to-point transport between BT exchange sites and an access seeker's POP (up to a maximum radial distance of 35 km); and
   • ONBS provides metropolitan point-to-point transport between access seeker equipment located at BT NGN or Metro sites (up to a maximum radial distance of 15 km).

126. Openreach also provide a Backhaul Network Service (BNS), which, according to Openreach, has been designed to fulfil the backhaul requirements of unbundled local loop operators.[61] BNS provides a link between an access seeker's equipment located in a BT local exchange, and the access seeker's POP via an aggregation point. The service is comprised of a number of components, including a spoke (1 Gbps) from the local exchange to an aggregation hub; the hub site; and a main link (10 Gbps) from the aggregation hub to the access seeker's POP. All of these components must be purchased as a bundle.

127. LECG submitted that the BNS comprises three components which must be purchased together (the main link, hub, and spoke components). LECG considered that the main link component of BNS is the closest match to the backhaul service in New Zealand, although they excluded the service on the basis that the 10 Gbps capacity of the main link component "falls outside the relevant transmission capacity range for our study."[62]

128. The Commission considers that BNS is a suitable benchmark for the UCLL Backhaul and UBA Backhaul services. LECG's exclusion of the service is on the basis that the capacity of one component of BNS falls outside the range of bandwidths being contemplated for New Zealand. However, the spoke component of BNS provides 1Gbps, and so the Commission has derived a per-spoke price for BNS, which aggregates the component prices of BNS and averages this total price over the maximum of eight spokes that can be accommodated on a single 10Gbps main link.[63]

Italian backhaul rates

129. The above amendments result in the dataset of backhaul prices summarised in Appendix D. This initial dataset includes prices from the five jurisdictions identified by LECG as having cost-oriented regulated backhaul services, with prices varying according to bandwidth and distance. The initial dataset comprises 70 price observations.

130. In most of the jurisdictions considered, the underlying backhaul prices exhibit a non-linear relationship with the bandwidth of the service, which is typically what would be

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[61] Openreach, *Product Description Backhaul Network Service*, 21 June 2007, p 9.
[62] LECG, *Response to questions from the Commerce Commission related to the UCLL & UBA backhaul conference of 10 – 11 April 2008*, 23 April 2008.
[63] According to Openreach, *Product Description Backhaul Network Service*, 21 June 2007, p 3. Following LECG's approach to distance for the UK services, the Commission has included a BNS price for the maximum distance allowed (35 km for a spoke and 35 km for a main link, or 70 km in aggregate), as well as a BNS price for the assumed metropolitan distance (32 km, which is divided equally between the spoke and main link components).

expected.[64] The exception to this is Italy, where backhaul prices are structured on a per Mbps basis. As a result, the average Italian backhaul price per Mbps is constant as bandwidth increases, whereas for the other services, the average price per Mbps declines. This is shown in Table 4 which summarises the average cost per Mbps derived from a number of benchmarked backhaul services.

Table 4: Average backhaul prices (NZ$ per Mbps per month)

	10	50	100	200	300	400	500	600	700	800	900	1000	10000
Canada (metro)	$329.89	$74.89	$43.64	$33.66	$26.58		$20.90					$16.65	
Canada (prov)	$349.18	$104.65	$73.40	$63.42	$56.33		$50.66					$46.41	
Canada (region)	$359.66	$110.85	$79.60	$69.62	$62.53		$56.86					$52.61	
FT DSL Collect IP	$181.07		$72.43		$36.21		$28.67					$21.73	
UK (BES)			$48.81									$6.97	$0.94
UK (ONBS)			$27.48									$4.82	$0.73
Holland (metro)			$17.76	$11.44	$8.94	$7.53	$6.61	$5.95	$5.44	$5.05	$4.72	$4.45	
Italy (metro)	$53.42	$53.42	$53.42	$53.42	$53.42	$53.42	$53.42	$53.42	$53.42	$53.42	$53.42	$53.42	
Italy (Prov)	$125.24	$125.24	$125.24	$125.24	$125.24	$125.24	$125.24	$125.24	$125.24	$125.24	$125.24	$125.24	

131. The effect of increasing bandwidth on the average backhaul price per Mbps is illustrated in Figure 1. This shows the expected reduction in the average price as bandwidth increases, for all countries except Italy, where the average prices for the metropolitan and provincial backhaul services are uniform across all bandwidths.

Figure 1: Average backhaul prices and bandwidth (NZ$ per Mbps per month)

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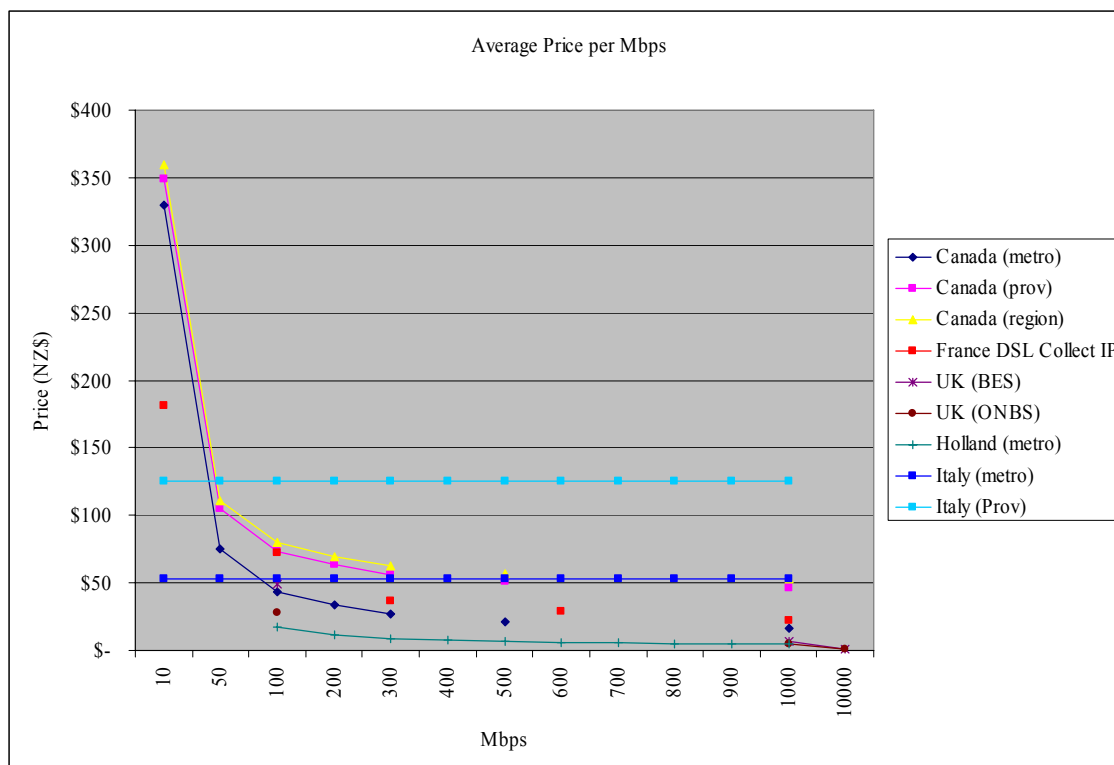
[64] For example, in Commerce Commission, *Decision No. 611: Standard Terms Determination for the designated service Telecom's unbundled bitstream access*, 12 December 2007, p 46 -50, the Commission used a non-linear relationship between price and capacity to set the price for the Enhanced UBA services. This relationship was evident in Telecom's retail One Office services.

132. In their initial submission, LECG also referred to the expected non-linear relationship between backhaul prices and bandwidth, and for this reason adopted a log-log regression model.[65]

133. One consequence of Italy's linear backhaul pricing is that the Italian prices are relatively high for the higher bandwidth services. This can be seen by comparing prices between countries for a given combination of bandwidth and distance. For example, of the set of backhaul prices shown in Appendix D, there are five prices for a 100 Mbps metropolitan (32 km) service. These are summarised in Table 5.

Table 5: 100 Mbps metropolitan backhaul

Jurisdiction	Price (NZ$ per month)
Holland	$1,776
Canada	$4,364
UK (BES)	$4,881
Italy	$5,342
France (DSL Collect IP)	$5,432
Median	$4,881

134. For the 100 Mbps metropolitan backhaul services, the Italian service has a price of $5,342 per month, which is within the range of the other prices for that service. The Italian price is 9% above the median price of $4,881 per month, but below the price for the FT service.

135. However, for a 1Gbps metropolitan service, the price observed for the Italian service is considerably higher than for other jurisdictions, as shown in Table 6. The Italian observation is more than triple the median observation.

Table 6: 1Gbps metropolitan backhaul

Jurisdiction	Price (NZ$ per month)
UK (BNS)	$3,665
Holland	$4,451
UK (BES)	$6,966
Canada	$16,652
France (DSL Collect IP)	$17,202
France (DSL Collect Ethernet)	$34,222
Italy	**$53,415**
Median	$16,652

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[65] LECG, *Price benchmarking of UCLL and UBA Backhaul Services*, 14 March 2008.

136. Similar results have also been identified for the provincial backhaul services, although there are typically fewer observations for any given combination of bandwidth and distance. For example, a 1 Gbps provincial backhaul service in Italy has a price of $125,239 per month, which is 72% above the median observation for that service.

137. Given that backhaul prices in Italy do not exhibit the expected relationship with bandwidth (ie increasing with bandwidth at a diminishing rate), the Commission has excluded the Italian backhaul prices for higher bandwidth services, where the effect of Italy's linear pricing is more pronounced. Specifically, the Commission has excluded the Italian backhaul prices for bandwidths of 300 Mbps and above.

Composition of final dataset

138. Having excluded the Italy prices for higher bandwidth backhaul services, the number of price observations is reduced from 70 prices, to 54 prices. Of these, seven prices are from the UK, eight prices are from each of France and Italy, 10 prices are from Holland, and 21 prices are from Canada.

139. Given the relatively high proportion of observations from Canada, the Commission has removed some of the Canadian backhaul price points in order to base its benchmarking on a more balanced dataset. Specifically, the Commission has omitted prices for the 150 Mbps, 300 Mbps, and 500 Mbps Canadian backhaul services, thereby reducing the number of Canadian observations from 21 prices to 12 prices. This is close to the remaining number of prices observed from the other benchmark jurisdictions. The effect of removing these Canadian prices is to slightly increase some of the longer haul prices, and to reduce some of the backhaul rates for shorter distances.

140. The Commission considers that the resulting dataset, which is set out in Appendix E, is a reasonable sample against which to apply a regression-based benchmarking methodology. The Commission would generally consider that a larger sample of suitable data that meets the relevant criteria would be preferable to a more restricted sample set. However, in this instance, the Commission has observed considerable variation in backhaul prices across countries, even when likely cost drivers have been normalized (ie for a given combination of bandwidth and distance). This suggests that other country-specific factors may also be determining prices, in addition to the cost drivers identified by both LECG and Covec. In order to mitigate this effect, the Commission has adopted a set of data that comprises approximately similar numbers of prices from each jurisdiction.

Benchmarking UBA Backhaul monthly rental rates

141. The Commission has used LECG's regression-based methodology in order to determine a set of monthly rental rates for the UBA Backhaul Service. This has involved estimating the following relationship between backhaul prices, bandwidth, and distance:

$$\ln(Price) = \beta_0 + \beta_1\ln(Distance) + \beta_2\ln(Bandwidth)^{[66]}$$

142. As noted by LECG and Covec[67], such a specification is consistent with the understanding that backhaul costs are likely to increase with bandwidth, although at a diminishing rate.

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[66] Where ln is the natural log. While LECG define their regression model in terms of the log function, their results are actually generated using natural logs (ln).

143.	The resulting estimated relationship and properties of the model are summarised in Table 7.

Table 7: Regression model results

	Coefficient	standard error
Constant	4.6300 ***	0.7243
ln(Distance)	0.5071 ***	0.0989
ln(Bandwidth)	0.3858 ***	0.0910
Adjusted R^2	0.44	

*** significant at 1%

Distance bands

144.	In its STP, Telecom proposed that prices for the UBA Backhaul Service be based on 20 distance bands.[68] A number of Access Seekers submitted that 20 bands are excessive. For example, Vodafone[69] submitted that Telecom used a smaller number of bands in Telecom's interim UCLL backhaul service, while Covec[70] submitted that five bands would be more appropriate and consistent with international practice.

145.	The Commission notes that the use of broader distance bands will involve a higher degree of averaging. For example, if a band of 0-100 km is used, all backhaul over distances within that range will be priced at a single point. This indicates that relatively narrow bands will more accurately reflect the estimated cost of providing the backhaul service. While Access Seekers expressed some concern over a large number of narrow bands, the Commission considers that even according to Covec's proposed structure, any backhaul distance in excess of 300 km would be priced on a bespoke basis.

146.	For the purposes of this determination, the Commission has therefore determined recurring monthly rentals for the UBA Backhaul Service, based on five radial distance bands:

- radial distance greater than 0 km and less than or equal to 5 km (0 km < distance ≤ 5 km);
- radial distance greater than 5 km and less than or equal to 10 km (5 km < distance ≤ 10 km);
- radial distance greater than 10 km and less than or equal to 15 km (10 km < distance ≤ 15 km);
- radial distance greater than 15 km and less than or equal to 20 km (15 km < distance ≤ 20 km); and

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[67] LECG, *Price benchmarking of UCLL and UBA Backhaul Services*, 14 March 2008, p 20. Covec, *Regulated Backhaul Pricing*, March 2008, p 8.

[68] Telecom, *Standard Terms Proposal for Telecom's unbundled bitstream access backhaul service*, 28 September 2007, p 48, para 152.

[69] Vodafone, *Cross Submission on Draft Standard Terms Determinations for Unbundled Copper Local Loop and Unbundled Bitstream Access Backhaul Services*, 26 March 2008, para 15.

[70] Covec, *UCLL and UBA Backhaul Cross Submission*, March 2008, p 15.

- radial distance greater than 20 km and less than or equal to 25 km (20 km < distance ≤ 25 km).

For UBA Backhaul Services over greater distances, the price is set according to the above estimated relationship.

Summary of benchmark results

147.	The Commission has used the above relationship to determine the monthly rental rates for the UBA Backhaul Service as summarised in Table 8.[71] These prices apply in respect of backhaul for the Enhanced UBA Service.

Table 8: UBA Backhaul monthly rental rates ($/month)

Distance Step	Bandwidth			
	50 Mbps	100 Mbps	200 Mbps	1 Gbps
0 km < radial distance ≤ 5 km	$738	$964	$1,260	$2,344
5 km < radial distance ≤ 10 km	$1,288	$1,683	$2,199	$4,091
10 km < radial distance ≤ 15 km	$1,669	$2,181	$2,849	$5,301
15 km < radial distance ≤ 20 km	$1,979	$2,586	$3,379	$6,287
20 km < radial distance ≤ 25 km	$2,249	$2,938	$3,838	$7,142
radial distance > 25 km	price set according to: $price = \exp\{4.6300 + (0.5071 \times \ln(\text{radial } distance)) + (0.3858 \times \ln(bandwidth))\}$*			

* Where ln is the natural log.[72]

148.	For example, for a 50Mbps UBA Backhaul Service over a distance of 40 kms, the monthly rental rate would be calculated as follows:

$$price = \exp\{4.6300 + (0.5071 \times \ln(40)) + (0.3858 \times \ln(50))\}$$

$$= \exp\{4.6300 + (0.5071 \times 3.6889) + (0.3858 \times 3.9120)\}$$

$$= \exp\{8.0098\}$$

$$= \$3,010 \text{ per month}$$

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[71] Appendix G contains several examples of how the benchmarked monthly rental rates for the UBA Backhaul Service apply.

[72] The above pricing formula can be calculated in Excel, using the exp() function with the ln(x) values of distance and bandwidth.

PRICE TERMS – UBA BACKHAUL CONNECTION RATES

Benchmarking approach

149.   In its initial submission[73], LECG used a regression-based methodology to estimate a set of non-recurring connection charges for the UCLL Backhaul and UBA Backhaul services. LECG used a model that estimated backhaul connection charges as a function of bandwidth, and obtained the results summarised in Table 9.

Table 9: LECG initial result for connection charges (non-recurring)

	Connection Charge
50 Mbps	$8,160
100 Mbps	$9,923
200 Mbps	$12,067
1 Gbps	$19,033

150.   LECG's initial results were derived from a dataset that represented a subset of the backhaul services that LECG used for estimating the recurring monthly rental rate. For example, LECG noted that it had insufficient information on connection charges in Holland, and therefore omitted Holland from its initial benchmarking of connection charges.

151.   On behalf of Orcon/Kordia and Vodafone/Ihug, Covec noted the omission of Holland, but otherwise did not comment on LECG's benchmarking of connection charges.[74]

152.   In response to some questions raised during the conference LECG subsequently provided some additional analysis of connection charges[75], including some further information relating to the connection charges associated with the backhaul service in Holland. LECG noted that the connection charge in Holland (NZ$846) does not vary with the three density categories of the backhaul service, and also referred to a one-off construction cost (NZ$846) per service link. LECG submitted that the connection charge for the backhaul service in Holland should be 2 x $846, across all bandwidths.

153.   LECG also submitted that for consistency purposes, connection charges associated with ATM-based services should be excluded, as such services were excluded from the dataset of recurring charges. LECG also included connection charges associated with those bandwidths that LECG added in response to Covec's cross-submission.

154.   LECG then examined the use of a regression-based approach for the purposes of estimating a bandwidth-based connection charge. However, LECG submitted that such an approach was now inappropriate, as the ability of the models they considered to explain variations in connection charges were low (with R^2 values of around 0.02), and there was

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[73] LECG, *Price benchmarking of UCLL and UBA Backhaul Services*, 7 March 2008.

[74] Covec, *Regulated Backhaul Pricing*, March 2008.

[75] LECG, *Response to questions from the Commerce Commission related to the UCLL & UBA backhaul conference of 10 – 11 April 2008*, 23 April 2008. Parties were notified of this additional analysis, which was placed on the Commission's website. No responses from other parties were made on this analysis.

no longer a statistically significant relationship between bandwidth and connection charges.

155. LECG concluded that a more appropriate approach is to use techniques that do not attempt to relate connection charges to bandwidth. LECG noted that the median value of their set of benchmarked connection charges is $14,486, and the mean value is $10,742. LECG recommended using the median value, as the connection charge dataset encompasses a relatively wide range of values.

156. The Commission has considered using a regression-based approach, applied to the Commission's dataset used to determine recurring monthly rentals for the UBA Backhaul Service. The set of connection charges is summarised in Appendix F[76]. However, the Commission also found that variations in bandwidth account for a very low proportion of variation in connection charges, and the regression model produces statistically insignificant results, as shown in Table 10.

Table 10: Regression model results: connection charges

	Coefficient	Standard error
Constant	8.7395 ***	0.7784
ln(Bandwidth)	0.0451	0.1358
Adjusted R^2	0.0	

*** significant at 1%

157. The Commission has therefore determined a connection charge for the UBA Backhaul Service by taking the median value of the connection charges of those services used to determine the recurring charges.[77] The Commission considers that the use of the median value of this dataset is appropriate for a number of reasons:

- it provides for some consistency in determining non-recurring and recurring backhaul charges (and thus minimises distortion to any relationship between non-recurring and recurring charges). For example, if instead a non-recurring charge that was higher (lower) than the median was used, it may be appropriate to reduce (increase) the corresponding recurring charge.
- the median value is likely to best promote competition and efficiency for the long-term benefits of end-users. A higher non-recurring charge could reduce competition and efficiency, as UBA-based entry into downstream markets could be deterred by the higher cost of purchasing backhaul services, and also as potential suppliers of backhaul services could be deterred from entering as the high connection charges for the UBA Backhaul Service could reduce the willingness of Access Seekers to switch away from Telecom. A lower connection charge could under-compensate Telecom in respect of connection costs for the UBA Backhaul Service, and could result in inefficiently high levels of customer churn.

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[76] The FT DSL Collect IP service connection charge has been adjusted in a manner consistent with the recurring charge.

[77] Using the median value is consistent with the Commission's approach in the UCLL STD. The Commission is not aware of any factors that would justify taking a different approach.

- the connection charges summarised in Appendix E range from $1,691 to $68,738. As LECG noted, given the wide range of connection charges, with clusters of charges at the extreme ends of this range, the median value (rather than the mean) is appropriate, as this does not give undue weight to extreme observations.

158. The median value of the benchmarked connection charges is $8,059. The connection charges included in LECG's benchmarking appear to relate to a point-to-point backhaul service with two ends.[78] Therefore, the Commission determines that the New Connection charge for the UBA Backhaul Service is $4,030 for a new connection at one end and $8,059 for a new connection at two ends.[79]

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[78] For example, the median connection charge in the Commission's benchmarking sample is for the Canadian backhaul service (NZ$8,059). In applying the Canadian backhaul rates, LECG (with the assistance of Bell Canada) indicated that it used two Ethernet ports. LECG, *Price benchmarking of UCLL and UBA Backhaul Services*, 14 March 2008, p 31.

[79] Appendix F contains several examples of how the benchmarked connection charge for the UBA Backhaul Service applies.

PRICE LIST – OTHER CORE CHARGES

Transfer of UBA backhaul connection from Telecom's interim UBA backhaul service to the UBA Backhaul Service

159.   In the draft STD, the Commission considered that the transfer of a UBA backhaul connection from Telecom's interim UBA backhaul service to the UBA Backhaul Service should be at no charge.

160.   Telecom submitted that they did not oppose the Commission's approach provided the Commission adopted the TCF agreed service description that Telecom submitted in its STP. However, if there was any material divergence from the UBA Backhaul Service as outlined in their STP Telecom submitted that this could cause Telecom to encounter significant costs in transferring Access Seekers which would then need to be recovered.[80]

161.   Orcon, Kordia and CallPlus cross-submitted that the interim service was designed to be transferred to a regulated service following the STD. Therefore, Telecom should not be able to charge Access Seekers for transferring from the interim service.[81]

162.   Vodafone cross-submitted that Telecom does not say which possible changes might cause Telecom to 'encounter significant costs in transferring Access Seekers'. Given that the services are likely to be very similar, and there is no evidence given to support Telecom's claim, Vodafone considers that the Commission's proposed approach of no charge for transfer from the interim service should remain.[82]

163.   The Commission has determined that because the interim service is not a regulated service the Commission is not responsible for determining what Telecom charges for transfer from the interim service to the UBA Backhaul Service. Therefore, the Commission has removed this charge from the UBA Backhaul Price List. However, the Commission has also determined that when an Access Seeker transfers from the interim UBA backhaul service to the UBA Backhaul Service, no connection charges for the UBA Backhaul Service will be payable because the Access Seeker will have already paid for any connection costs when purchasing the interim service.

Service relinquishment charge

164.   In the draft STD the Commission proposed that the relinquishment of a UBA Backhaul Service connection be at no charge on the basis that this is consistent with the approach taken in the UCLL STD.[83]

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[80] Telecom, *Submissions on draft Standard Terms Determinations for Telecom's unbundled copper local loop backhaul and Telecom's unbundled bitstream access backhaul*, 7 March 2008, p 45, paras 245-246.
[81] Orcon, Kordia and CallPlus, *Submission in response to the Draft Standard Terms Determinations for the Unbundled Copper Local Loop (UCLL) Backhaul Service and the Unbundled Bitstream Access (UBA) Backhaul Service*, 7 March 2008, p 8, para 41.
[82] Vodafone, *Cross Submission on Draft Standard Terms Determinations for Unbundled Copper Local Loop and Unbundled Bitstream Access Backhaul Services*, 26 March 2008, para 18.
[83] Commerce Commission, *Decision No. 627: Draft Standard Terms Determination for the designated service Telecom's unbundled bitstream access backhaul*, 8 February 2008, paras 88-89.

165.   Telecom submitted that there are fundamental differences between relinquishment of the UCLL service and UBA Backhaul Service. When an end-user relinquishes a service relying on the UCLL Service there is a fair chance they will connect onto another service relying on the same MPF. However, this is not likely to be the case with the UBA Backhaul Service as capacity is likely to be stranded if relinquished by a particular Access Seeker. A basic tenet of the provision of cost-based services is the recovery of sunk costs – in the relinquishment context this means sunk costs not already recovered by way of connection costs/recurring charges. Associated costs such as service design will also need to be recovered.[84]

166.   Telecom submitted a number of options for how to recover costs in these situations:

   • high connection charges reflecting the true costs of installation and relatively low recurring charges;
   • low connection charges with higher recurring charges and a longer contract term; or
   • an ability for Telecom to "claw-back" via a relinquishment charge the costs of install where these costs are not recovered via the combination of the connection charge and the recurring charges.[85]

167.   Telecom went on to say that Telecom was left completely exposed to under-recovery of costs as the Commission has:

   • excluded high benchmarked connection charges (Openreach in favour of Telekom Austria) even though they form part of potentially different pricing structures in the benchmarked jurisdictions; and
   • not provided a relinquishment charge.[86]

168.   At the conference Orcon submitted that the connection charges for the UBA Backhaul Service and for backhaul services provided by other providers are enough of a barrier to stop Access Seekers switching services often. In addition, the connection charge for the UBA Backhaul Service is significant so a relinquishment charge is not so relevant.[87]

169.   Telecom further submitted at the conference that they were asking for recovery of actual labour costs and not any sort of equipment costs which are recovered by the connection charge. Telecom anticipated that the actual relinquishment charge would be approximately $800 for four hours of labour.[88]

170.   The Commission considers that Telecom is no longer left exposed to under-recovery of costs as the Commission has taken the median of a range of connection charges, including high benchmarked connection charges from Openreach. Any labour costs faced by Telecom when an Access Seeker relinquishes are likely to be covered by the connection charge. Any additional connection charge is likely to deter Access Seekers from

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[84] Telecom, *Submissions on draft Standard Terms Determinations for Telecom's unbundled copper local loop backhaul and Telecom's unbundled bitstream access backhaul*, 7 March 2008, p 46, para 248.
[85] ibid para 249.
[86] ibid para 250.
[87] Conference Transcript, *Service Relinquishment Charge*, 11 April 2008, p 219-221.
[88] ibid p221.

switching services. Therefore, the Commission considers that there is no need for a minimum contract term or relinquishment charge.

PRICE LIST - SUNDRY CHARGES

171. This section provides reasons for the sundry prices determined. Any changes themselves are provided in the UBA Backhaul Price List in Appendix A.

License fees for OO&T and OFM – Price List items 3.4 and 3.5

172. In the draft UBA Backhaul STD the Commission's preliminary view was that the per-user costs to Telecom of providing OO&T and OFM software are reduced in cases where multiple services are provided to an Access Seeker on the same platform and that the reduced cost should be reflected in reduced license fees.[89]

173. Telecom submitted that the 2008/09 capex for OO&T and OFM is budgeted to be $7 million and that the opex and support costs for maintaining the software amount to $1.1 million for 2008/09. The proposed $24 per Access Seeker per month charge per service will only recover a miniscule proportion of the annual costs to maintain the software. It is therefore inappropriate for any discounting of the proposed charges to occur as this will further reduce the recovered amount. Moreover, Telecom submitted that there is no cost saving to Telecom for providing multiple services to a single Access Seeker.[90]

174. Orcon, Kordia and CallPlus submitted that they supported the Commission's view expressed in the draft UBA Backhaul STD that where there are multiple services provided on the same platform there are reduced per-user costs to Telecom of providing the service and that the reduced costs should be reflected in reduced licence fees. Orcon, Kordia and CallPlus also submitted that a level of accountability by Telecom should be involved in the passing of the costs of providing that support service. They believe that the cost should be shared between Telecom and all of the Access Seekers and not just be directly passed through to the Access Seekers.[91]

175. At the conference Telecom argued further that the licence fees for OO&T and OFM were not cost-based. They argued that automation is good for both Telecom and the industry as a whole, and that they had deliberately set the price to be low to encourage uptake. They reiterated that $24 per Access Seeker per month per service will only ever recover a miniscule amount of the cost of providing the service.[92]

176. The Commission considers that Telecom has shown evidence of the costs of developing the OO&T and OFM systems and that the charges proposed by Telecom are small and unlikely to fully cover the cost of providing the OO&T and OFM systems. The Commission has determined that where an Access Seeker is receiving the UBA Backhaul Service, they are required to pay OO&T and OFM licence fees, irrespective of whether they are also paying OO&T and OFM licence fees for other regulated services.

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[89] Commerce Commission, *Decision No. 627: Draft Standard Terms Determination for the designated service Telecom's unbundled bitstream access backhaul*, 8 February 2008, p 28, para 98.
[90] Telecom, *Submissions on draft Standard Terms Determinations for Telecom's unbundled copper local loop backhaul and Telecom's unbundled bitstream access backhaul*, 7 March 2008, p 47, para 253.
[91] Orcon, Kordia and CallPlus, *Submission in response to the Draft Standard Terms Determinations for the Unbundled Copper Local Loop (UCLL) Backhaul Service and the Unbundled Bitstream Access (UBA) Backhaul Service*, 7 March 2008, p 8, paras 30.1-30.2.
[92] Conference Transcript, *OO&T and OFM licence fees*, 11 April 2008, p224-225.

Distinction between "administrative cost" and "direct front office costs"

177. In the draft UBA Backhaul STD, the Commission requested that Telecom explain the distinction between its administrative costs and its direct front office costs, and why it considers these charges are necessary in this instance.[93]

178. Telecom submitted that the administrative costs encapsulate the costs associated with receiving, managing and implementing a service order. Direct front office costs encapsulate service solution, design, operational capability, provisioning and acquisition costs.[94]

179. Orcon, Kordia and CallPlus submitted that administration costs and direct front office costs should be readily accountable for and that there should be a degree of transparency for how the costs are attributed to Telecom or any Access Seeker. Orcon, Kordia and CallPlus challenged whether any administration and direct front office charges should be borne by Access Seekers without further disclosures made.[95]

180. The Commission considers that there is a distinction between Telecom's administrative costs and direct front office costs and believes that both an administrative charge and direct front office charge should apply.

181. Telecom also submitted that the administrative cost and direct front office cost included in the draft UBA Backhaul STD were based on administrative costs and direct front office costs submitted as part of the draft UBA STD and that this was not appropriate. Telecom argued that the UBA Service is characterised as a high volume standardised service, whereas the UBA Backhaul Service is likely to be low volume and moderate standardisation given that Access Seeker requirements will vary.[96]

182. Telecom stated that they had investigated further the estimated administrative and direct front office costs for the relevant sundry charges. Telecom submitted that the administrative cost should be changed from a flat charge of [   ] **TNZCOI** to a charge of [   ] **TNZCOI** per hour, where 20 minutes would be required for each of the relevant sundry charges. Telecom submitted that the direct front office costs should be [   ] **TNZCOI** per hour, with a range of between 20 minutes and four hours required for each of the relevant sundry charges, rather than a flat charge of [   ] **TNZCOI**. No parties cross-submitted on Telecom's proposed charges.

183. The Commission does not consider Telecom has provided sufficient information to support their submission that the UBA Backhaul Service is likely to be low volume with moderate standardisation and therefore will have higher administrative costs and direct front office costs than the UBA Service. Further, the Commission is concerned by the

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[93] Commerce Commission, *Decision No. 627: Draft Standard Terms Determination for the designated service Telecom's unbundled bitstream access backhaul*, 8 February 2008, p 29, para 105.
[94] Telecom, *Submissions on draft Standard Terms Determinations for Telecom's unbundled copper local loop backhaul and Telecom's unbundled bitstream access backhaul*, 7 March 2008, p 47, para 257.
[95] Orcon, Kordia and CallPlus, *Submission in response to the Draft Standard Terms Determinations for the Unbundled Copper Local Loop (UCLL) Backhaul Service and the Unbundled Bitstream Access (UBA) Backhaul Service*, 7 March 2008, p 9-10, para 31.
[96] Telecom, *Submissions on draft Standard Terms Determinations for Telecom's unbundled copper local loop backhaul and Telecom's unbundled bitstream access backhaul*, 7 March 2008, p 47, para 257-258.

significant differences in the quantum between the flat charges for administrative costs and direct office costs in the draft UBA Backhaul STD and the revised administrative cost and direct front office costs submitted in Telecom's submission on the draft STD. Therefore, the Commission determines that administrative costs should remain a flat charge of [   ] **TNZCOI** and direct front office costs should remain a flat charge of [   ] **TNZCOI**, as provided in the draft STD.

NON-PRICE TERMS

Introduction

184. In determining the non-price terms, the Commission has generally adopted:

- those non-price terms that were unanimously recommended by the TCF and only making changes to those recommendations where there was a compelling reason to do so; and
- those non-price terms that relate to well established Telecom operational systems in place (eg fault prioritisation) which would be expensive to adjust prior to the applicable milestone dates set out in the Separation Undertakings.

185. In addition, the Commission has considered:

- the purpose in section 18 of the Act;
- whether the terms represent a balance of Access Seekers' and the Access Provider's interests;
- whether the terms are certain, clear and practically workable; and
- whether the terms are consistent with general commercial practice or whether it is necessary for terms to be consistent with general commercial practice.

186. The Commission took into account submissions from Telecom and the Access Seekers when considering the UBA Backhaul Terms. In some instances the Commission may agree with the general submission but does not consider the proposed alternative wording to be appropriate, in which case the Commission has made amendments using its own wording.

187. Many of the provisions in the UBA Backhaul Terms are common to both the UBA Backhaul and the UCLL Backhaul services. In addition, many of the parties' submissions on the draft UBA Backhaul STD mirrored submissions made in respect of the draft UCLL, Co-location and UBA STDs.

188. The Commission has considered these submissions in the context of the UBA Backhaul service and has determined that where appropriate, the terms should mirror those of the UCLL, Co-location and UBA STDs. In the interests of brevity, parties are referred to the reasons provided in the final UCLL, Co-location and UBA STDs in respect of these common terms.

189. The following sections provide reasons for those substantial changes made to the Commission's draft UBA Backhaul Terms.

General Terms

Reference to the Local Loop Network (Section 8)

190.   In its submission on the draft STD[97], Telecom submitted that the Local Loop Network is not the relevant reference in Section 8 of the General Terms as the UCLL Backhaul Service is provided over Telecom's Network rather than the Local Loop Network.

191.   The Commission agrees with Telecom's submission and considers that the UBA Backhaul Service is provided over Telecom's Network and not just the Local Loop Network.

Section 6.2 - Security requirements

192.   In their joint submission[98], Orcon, Kordia and CallPlus queried the need to provide additional security as a prerequisite for Telecom making available the UBA Backhaul Service. They argued that if an Access Seeker uses both UBA and UCLL services, the aggregation of all the security prerequisites for the various service components becomes a hurdle to competitive entry. Hence, Orcon, Kordia and CallPlus submitted that as there are already significant security requirements in respect of the UBA Service (which has to be taken by the Access Seeker to use the UBA Backhaul Service), the security requirement for the UBA Backhaul Service should be deleted.

193.   Telecom explained at the conference that it looked at each service in isolation when setting the security requirements. However, Telecom highlighted that should two or more services be purchased, the Access Seeker may be allowed some degree of flexibility wherein a single stipulated amount may be regarded as sufficient coverage across all of the services purchased.

194.   The Commission has decided that security requirements will remain separate for each service on the basis that it relates to the risk of default in payment for each service taken by the Access Seeker. Therefore, the Commission has retained the security requirements in the UBA Backhaul STD. However, the Commission encourages Telecom to consider providing flexibility to Access Seekers by requiring a single security requirement that provides sufficient coverage across all the services purchased by that Access Seeker. The Commission believes that such flexibility accorded by Telecom will work towards serving the interest of both parties.

Confidential Customer Information – clauses 31.1.5 and 31.1.6

195.   Clause 31 of the UBA Backhaul General Terms requires Access Seekers to safeguard Confidential Information used or disclosed in connection with the UBA Backhaul Terms. Clause 31.1.5 defines Confidential Information and excludes a range of information from qualifying as Confidential Information.

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[97] Telecom, *Submissions on draft Standard Terms Determinations for Telecom's unbundled copper local loop backhaul and Telecom's unbundled bitstream access backhaul*, 7 March 2008, Schedule 1 – General Terms Amendments section.

[98] Orcon, Kordia and CallPlus, *Submission in response to the Draft Standard Terms Determinations for the Unbundled Copper Local Loop (UCLL) Backhaul Service and the Unbundled Bitstream Access (UBA) Backhaul Service*, 7 March 2008, p 16, para 61.

196.	Telecom's STP included an exclusion in clause 31.1.5(h), the effect of which was that Confidential Customer Information did not qualify as Confidential Information and therefore the protections relating to Confidential Information did not apply to Customer Confidential Information. Clause 31.1.5(h) provided that Confidential Customer Information is governed by separate provisions relating to Confidential Customer Information as set out in clause 31.1.7.

197.	In the draft STD, the Commission removed the exclusion for Confidential Customer Information (as set out in clause 31.1.7) from the definition of Confidential Information in clause 31.1.5.

198.	Telecom submitted[99] that removing the exclusion for Confidential Customer Information meant that two standards would need to be applied to Customer Confidential Information – the "Confidential Information" provisions in clause 31.1.5 and the "Customer Confidential Information" provisions in clause 31.1.6. Telecom submitted that it was unworkable for both of these standards to apply at the same time to the same information.

199.	The Commission remains of the view that Customer Confidential Information must be subject to the obligations in the UBA General Terms relating to "Confidential Information" and must not be excluded from qualifying as "Confidential Information". Customer Confidential Information" requires the protection afforded by the classification of Confidential Information because it relates to information about end-users and other parties with contractual relationships with Telecom or the Access Seeker.

200.	Furthermore, the Commission considers that this outcome is consistent with the UCLL, UCLL Co-location and UBA STDs. Consequently, it gives certainty to Telecom and Access Seekers about the application of the confidentiality terms across the STDs.

Service Description (Schedule 1)

ASNAPOIs

201.	The Commission's view on the definition of ASNAPOI is discussed in the Determination Framework section. Accordingly, for the purposes of the service description, the Commission's view is that the following applies:

    a.	A POI Site is the ASNAPOI in respect of an FDS for an Access Seeker if:

        i.	the POI Site is an available point of interconnection; and
        ii.	the POI Site is the nearest, as measured by Telecom's network path[100], of the available points of interconnection to the FDS.

    b.	A POI Site is an available point of interconnection for an Access Seeker if one of

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[99] Telecom, *Submissions on draft Standard Terms Determinations for Telecom's unbundled copper local loop backhaul and Telecom's unbundled bitstream access backhaul*, 7 March 2008, Schedule 1 – General Terms Amendments section.

[100] A list of the distances in Telecom's network path between POI Sites is available to access seekers via a secure web portal and must be updated as necessary by Telecom.

the following holds:

    i. the Access Seeker is physically interconnected using the Access Seeker's own equipment with Telecom's Network at that POI Site; or

    ii. the Access Seeker has an agreement with a backhaul provider (either Telecom or a third party provider) for the supply of a service that is equivalent to the UBA Backhaul Service from that POI Site to the Access Seeker's Network.

    c. The Access Seeker must establish an ASNAPOI at a minimum of one POI Site, but may establish an ASNAPOI at more than one POI Site.

202.   Further terms relating to the ASNAPOI are set out in the UBA Backhaul Service Description in Schedule 1 of the UBA Backhaul General Terms.

Basic UBA

203.   In the draft STD the Commission's preliminary view was that the UBA Backhaul Service was not required for the Basic UBA Service.[101]

204.   Telecom submitted that the Basic UBA Service encompasses Primary Links, but does not include Secondary Links and if it did this would be the equivalent of free UBR backhaul. If the Commission regulated Secondary Links, Telecom submitted that a completely new benchmarking exercise would be required, as a Basic UBA backhaul service would not be comparable to the other regulated backhaul products. Telecom's view was that the existing UBR backhaul service could be adapted for a Basic UBA backhaul service.[102] However, Telecom felt that the existence of the UBR backhaul service is likely to be the reason why Access Seekers have not expressed any genuine desire for a Basic UBA backhaul service.[103]

205.   At the conference Telecom agreed that if the Parent POI Site where Basic UBA was handed over was not competitive, then Telecom will take the Basic UBA Service to the nearest competitive POI Site.[104]

206.   Vodafone, Orcon, Kordia and CallPlus supported the Commission's position in the draft STD that the Basic UBA Service did not require the UBA Backhaul Service.[105]

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[101] Commerce Commission, *Decision No. 627: Draft Standard Terms Determination for the designated service Telecom's unbundled bitstream access backhaul*, 8 February 2008, p 33, paras 124-125.

[102] Telecom, *Submissions on draft Standard Terms Determinations for Telecom's unbundled copper local loop backhaul and Telecom's unbundled bitstream access backhaul*, 7 March 2008, p 12, paras 53-57.

[103] Telecom, *Submissions on draft Standard Terms Determinations for Telecom's unbundled copper local loop backhaul and Telecom's unbundled bitstream access backhaul*, 7 March 2008, p 12-13, paras 59-61.

[104] Conference transcript, *Service description proposals*, 10 April 2008, p 68.

[105] Vodafone, *Submission on Draft Standard Terms Determinations for Unbundled Copper Local Loop and Unbundled Bitstream Access Backhaul Services*, 7 March 2008, p 2, para 5. Orcon, Kordia and CallPlus, *Submission in response to the Draft Standard Terms Determinations for the Unbundled Copper Local Loop (UCLL) Backhaul Service and the Unbundled Bitstream Access (UBA) Backhaul Service*, 7 March 2008, p 4, para 10.

207. Orcon submitted at the conference that they had expressed concern at the TCF Backhaul Working Party regarding whether a backhaul service was required for Basic UBA. However, Orcon stated that they were advised constantly that the UBA Backhaul Service did not apply to the Basic UBA Service because the Basic UBA Service went all the way to the ASNAPOI.[106]

208. The Commission considers that parties have not expressed a strong desire for a regulated Basic UBA backhaul service. Therefore, this STD only includes a UBA Backhaul Service that is for the purpose of providing access to the Enhanced UBA Service. However, in some cases Access Seekers may require a Basic UBA backhaul service, and therefore the Commission expects that Telecom will provide a commercial Basic UBA backhaul service on a per-end-user basis.

209. The Commission will monitor the provision of backhaul services for the purpose of providing access to the Basic UBA Service. As noted at paragraph 84, if, at any time, the Commission considers that no Basic UBA backhaul service that meets the requirements of the Act is being made available to Access Seekers, the Commission will consider determining the price and non-price terms for such a service, such as through the process set out in s 30R of the Act.

Service Specifications

210. Prior to the conference the Commission was concerned that the service description in Telecom's STP had some subtle differences to what was agreed at the TCF Working Party. The Commission distributed four slides to parties, for discussion at the conference, illustrating the Commission's interpretation of the following UBA Backhaul service descriptions:[107]

- the service description agreed by the TCF on 31 August 2007;
- the service description contained in Telecom's STP;
- the service description contained in the Commission's draft STD; and
- a proposed service description by the Commission (which was only a preliminary view).

211. At the conference the Commission asked Telecom to explain why there seemed to be a difference between the TCF agreement and what Telecom had in the STP. In particular, the Commission noted that the TCF agreement talked about an aggregated service on the data switch and the STP talked about the service being on a shared handover link.[108]

212. Telecom presented some slides at the conference in response to the slides the Commission had distributed.[109] Telecom submitted that the shared handover link was a point of clarification that Telecom made in the STP because Access Seekers requested there be a shared handover link rather than each dedicated link having a separate handover.

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[106] Conference transcript, *Service description proposals*, 10 April 2008, p 68.
[107] Commerce Commission, *UCLL Backhaul and UBA Backhaul Conference – Key issues*, 4 April 2008.
[108] Conference transcript, *Service description proposals*, 10 April 2008, p 43-44.
[109] Telecom, *Telecom presentation – service descriptions*, 10 April 2008, URL: http://www.comcom.govt.nz/IndustryRegulation/Telecommunications/StandardTermsDeterminations/UnbundledBitstreamBackhaulService/DecisionsList.aspx

Telecom submitted that other than this point of clarification, Telecom's position and the TCF agreed position were basically the same.[110]

213.   Vodafone stated that what Telecom presented at the conference fitted in with their expectations.[111]

214.   TelstraClear submitted that this was the kind of service they wanted in terms of control over contention.[112]

215.   CallPlus submitted that the reason why a lot of the TCF discussion focussed on having more control is because historically there had been a "one size fits all" backhaul and for a number of years ISPs had been asking for variance.[113]

216.   Following the conference the Commission went through a process of clarifying the meaning of the service specifications, in conjunction with Telecom. During this process the Commission became concerned that the service specifications as drafted, failed to give "real-time" priority to certain real-time packets over other packets throughout the entire packet network in which they travel. The Commission was concerned that:

- While real-time traffic will get priority up to the FDS, it will not get priority at the Parent POI Site. The impact would appear to be that if the sum of best-efforts plus real-time traffic exceeds capacity from the Parent POI Site up to the ASNAPOI, then real-time traffic will not receive priority over best-efforts from the FDS at the Parent POI Site.
- Priority for downstream traffic is not planned to be managed at any point in the UBA Backhaul Service. The effect would appear to be that traffic from the ASNAPOI will not be managed if it meets a bottleneck at the Parent POI Site.
- Traffic that has a Class of Service (**CoS**) that does not match 0 or 6 (as defined in IEEE Standard 802.1p) will be dropped. An assumption that there are only two classes is not in line with the Commission's view that the service should be consistent with the IEEE Standard 802.1p.[114]

217.   Telecom responded to these concerns in letter to the Commission on 20 May 2008.[115] Telecom noted that:

- IP Networking best practice is to drop any excess traffic at the ingress points to the network (upstream and downstream) and not to carry traffic part way through the network and then drop it. This approach avoids inefficient network use by carrying traffic which will later be discarded.

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[110] Conference transcript, *Service description proposals*, 10 April 2008, p 44.
[111] ibid p 46.
[112] ibid p 46.
[113] ibid p 48.
[114] Commerce Commission, *The EUBA Backhaul Service Description*, 7 May 2008, URL: http://www.comcom.govt.nz/IndustryRegulation/Telecommunications/StandardTermsDeterminations/UnbundledBitstreamBackhaulService/DecisionsList.aspx
[115] Telecom, *UBA Backhaul Service Description*, 20 May 2008, URL: http://www.comcom.govt.nz/IndustryRegulation/Telecommunications/StandardTermsDeterminations/UnbundledBitstreamBackhaulService/DecisionsList.aspx

- Upstream traffic leaving the FDS has already been prioritised (ie the real-time traffic has priority over the best efforts) before entering the UBA Backhaul Service. Because the UBA Backhaul Service is a single class connection, once this initial prioritisation has occurred, all traffic will be treated under a single forwarding class as high priority.
- The Access Seeker has the ability to ensure that there is no negative effect on either the real-time or the best efforts traffic collected at the Parent POI Site simply by purchasing sufficient capacity to handle both.
- The Access Seeker is the only one who can provide effective downstream traffic management by not sending volumes larger than the capacity purchased.
- Telecom is building the UBA Backhaul Service to meet the requirements of the EUBA Service and the EUBA Service will support two CoS in accordance with the service description in the UBA STD. The CoS tags of 0 (best efforts) and 6 (real-time) are the only 2 tags that are supported under the EUBA Service's specifications in its Operations Manual, as agreed at the TCF last year.

218. On 21 May 2008, the Commission asked parties to submit on whether the service specifications developed by the Commission and Telecom accurately reflect the service specifications agreed at the TCF Backhaul Working Party.[116] No parties submitted that the service specifications were inconsistent with what was agreed at the TCF Working Party.

219. The Commission considers that Telecom's response on 20 May 2008 has addressed the concerns that the Commission had. When using the UBA Backhaul Service, Access Seekers must ensure that they purchase sufficient transmission capacity to ensure that there is no negative effect on either real-time or best efforts traffic.

220. Appendix B to the UBA Backhaul Service Description in Schedule 1 of the UBA Backhaul General Terms sets out the technical specification for the UBA Backhaul Service. It specifies the characteristics of the UBA Backhaul Service relating to:

- The Handover Interface;
- Maximum supported frame size;
- Upstream traffic management – FDS;
- Traffic treatment with the UBA Backhaul Service;
- Upstream traffic management – Parent POI Site;
- Downstream traffic policing – Handover Link;
- Downstream traffic policing – UBA Backhaul Service;
- Priority;
- Transmission capacity;
- VLAN tagging;
- Latency;
- Jitter; and
- Availability.

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[116] Commerce Commission, *UBA Backhaul service specifications – request for submissions*, 21 May 2008, URL: http://www.comcom.govt.nz/IndustryRegulation/Telecommunications/StandardTermsDeterminations/UnbundledBitstreamBackhaulService/DecisionsList.aspx

Transmission medium

221.   In the draft STD the Commission questioned whether limiting the transmission medium to fibre only was adequate and appropriate.[117]

222.   Telecom submitted that the transmission medium should be at Telecom's discretion, as long as the required performance standards are met and the specified interfaces are provided. Telecom further submitted that fibre is currently the only practical solution for the transmission capacities and distances required.[118]

223.   Vodafone submitted that copper would not allow backhaul-type bandwidths to be carried over several kilometres. However, where a fibre transmission link was not available Vodafone would expect to have access to the same transmission link as Telecom would use for its own customers.[119]

224.   Orcon, Kordia and CallPlus submitted that while fibre is the transmission medium that was agreed by the TCF, perhaps where there is no capacity for a fibre service Telecom should be obligated to provide capacity over other infrastructure that is available.[120]

225.   The Commission considers that there is no reason to limit the transmission medium to fibre. Provided that Telecom meets the required performance standards and the specified interfaces it does not matter what the transmission medium is. Therefore, the Commission has determined that the UBA Backhaul transmission medium will be at Telecom's discretion subject to satisfaction of the required performance standards set out in the UBA Backhaul Service Description in Schedule 1 to the UBA Backhaul General Terms.

Optical and electrical interfaces

226.   The draft STD included an Optical Gigabit Ethernet interface. In the draft STD the Commission invited submissions on the type of interfaces that are required for all of the transmission capacity options available for the UBA Backhaul Service.[121]

227.   Telecom submitted that if the UBA Backhaul Service meets the Service Specifications, the way in which it is delivered should be at Telecom's discretion.[122]

228.   Vodafone submitted that their preferred option was that all transmission capacities are delivered over an Optical Gigabit Ethernet interface which is rate limited without using a media converter.[123]

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[117] Commerce Commission, *Decision No. 627: Draft Standard Terms Determination for the designated service Telecom's unbundled bitstream access backhaul*, 8 February 2008, p 37, para 149.

[118] Telecom, *Submissions on draft Standard Terms Determinations for Telecom's unbundled copper local loop backhaul and Telecom's unbundled bitstream access backhaul*, 7 March 2008, p 31, paras 168-169.

[119] Vodafone, *Submission on Draft Standard Terms Determinations for Unbundled Copper Local Loop and Unbundled Bitstream Access Backhaul Services*, 7 March 2008, p 9.

[120] Orcon, Kordia and CallPlus, *Submission in response to the Draft Standard Terms Determinations for the Unbundled Copper Local Loop (UCLL) Backhaul Service and the Unbundled Bitstream Access (UBA) Backhaul Service*, 7 March 2008, p 11, para 39.

[121] Commerce Commission, *Decision No. 627: Draft Standard Terms Determination for the designated service Telecom's unbundled bitstream access backhaul*, 8 February 2008, p 36, para 141.

[122] Telecom, *Cross-submissions on draft Standard Terms Determinations for Telecom's unbundled copper local loop backhaul and Telecom's unbundled bitstream access backhaul*, 26 March 2008, p 27.

229.   At the conference Telecom submitted that the interface defines the handover points and therefore it's important for Telecom and probably the Access Seekers to know what the interface is. Therefore, Telecom submitted that the interface needed to be specified.[124]

230.   The Commission agrees with Telecom that the interface needs to be specified. In addition, the Commission notes that no party has expressed concern with having an Optical Gigabit Ethernet interface. Therefore, the Commission has determined that the interface for the UBA Backhaul Service is Optical Gigabit Ethernet.

Capacity/geographic availability

231.   In the draft STD, the Commission considered that Telecom should not be able to withhold the supply of the UBA Backhaul Service on the basis that it has not made adequate provision for transmission capacity in its network.[125]

232.   Telecom submitted that the draft STD forced Telecom to provide capacity wherever Access Seekers request it, which could include areas where capacity could only be provided at great expense. Telecom argued that any expectation by the Commission that Telecom should invest in rolling out network to provide a regulated service extends the power of the regulator far beyond what is envisaged in the Act.[126]

233.   Orcon, Kordia and CallPlus submitted that Telecom should not be forced to invest in infrastructure where it does not currently provide capacity. However, they argued that where Telecom provides some capacity to an Access Seeker or Telecom Wholesale, Telecom should be obliged to provide capacity for all Access Seekers.[127]

234.   Vector submitted that the objective of regulation is to ensure Access Seekers have non-discriminatory access to existing bottleneck assets, not to assets that do not yet exist. Vector supported Telecom's arguments that any requirement for Telecom to invest in network expansion at the request of an Access Seeker is neither reasonable nor practical and goes further than the intent of the regulation.[128]

235.   Vodafone submitted that it accepted Telecom's position that Telecom should not be forced to invest. However, Vodafone also submitted that where capacity is constrained, Access Seekers' requests for further capacity should be treated on an equivalent basis and that Telecom must not be allowed to keep all existing backhaul capacity to itself and refuse to provide to Access Seekers.[129]

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[123] Vodafone, *Submission on Draft Standard Terms Determinations for Unbundled Copper Local Loop and Unbundled Bitstream Access Backhaul Services*, 7 March 2008, p 9.

[124] Conference transcript, *Technical specifications*, 11 April 2008, p 85.

[125] Commerce Commission, *Decision No. 627: Draft Standard Terms Determination for the designated service Telecom's unbundled bitstream access backhaul*, 8 February 2008, p 36, para 138.

[126] Telecom, *Submissions on draft Standard Terms Determinations for Telecom's unbundled copper local loop backhaul and Telecom's unbundled bitstream access backhaul*, 7 March 2008, p 24-25, paras 121-128.

[127] Orcon, Kordia and CallPlus, *Submission in response to Submissions on the Draft Standard Terms Determinations for the Unbundled Copper Local Loop (UCLL) Backhaul Service and the Unbundled Bitstream Access (UBA) Backhaul Service*, 26 March 2008, p 3, para 8, and p 6, paras 27 and 29.

[128] Vector, *Cross submission on UCLL and UBA Backhaul*, 26 March, p 2.

[129] Vodafone, *Cross Submission on Draft Standard Terms Determinations for Unbundled Copper Local Loop and Unbundled Bitstream Access Backhaul Services*, 26 March 2008, para 14.

236. At the conference Telecom submitted that Chorus would be required to deal with all its customers, including Telecom Wholesale, on an equivalent basis under the Operational Separation Undertakings. This meant that Chorus could not favour Access Seekers over Telecom Wholesale and vice versa. Telecom also noted that there are quite stringent rules in place that provide the protection Access Seekers need.[130]

237. Orcon submitted at the conference that even if there is protection for Access Seekers in the Separation Undertakings, it should also be included in the STD.[131]

238. The Commission has added a requirement to the UCLL Backhaul Service Description which states that Telecom must not discriminate between requests for transmission capacity from an Access Seeker and any request for transmission capacity from a division of Telecom. The Commission considers that this term is likely to best give effect to s18 and reaches an appropriate balance between the competing positions of the parties.

239. In the long term, the Commission considers that the equivalence of inputs requirements in the Separation Undertakings will ensure that Telecom does not discriminate between Telecom Wholesale and Access Seekers.

Aggregation of UBA and UCLL traffic on the same backhaul

240. At the conference Vodafone asked whether Telecom would allow aggregation of UBA and UCLL traffic onto the same backhaul. Vodafone submitted that allowing one backhaul purchase to cover both UBA and UCLL traffic would enable Access Seekers to more effectively use the infrastructure.[132]

241. Telecom responded that there were technical reasons why it was not possible to aggregate UBA and UCLL traffic onto one backhaul service. Telecom submitted that the EUBA Service is a Telecom service where Telecom tags the traffic, while the UCLL Service allowed Access Seekers to control their own network, including tagging their own traffic and controlling their own traffic end-to-end, and thus combining the two services would be problematic. In addition, Telecom submitted that if the legislation thought there needed to be a regulated service to provide an aggregated backhaul service, there would be a definition of that service in the Act; in the absence of such a definition Telecom considered that aggregated backhaul should be provided on a commercial basis and noted that this was already occurring.[133]

242. The Commission considers that aggregation is technically possible, for example by tagging EUBA traffic, so that EUBA traffic can be aggregated with UCLL traffic. Economic efficiency and logic suggest that aggregation should occur, however the Commission accepts that it is not able to provide for an aggregated service due to the requirements of the UBA Backhaul Service Descriptions set out in Schedule 1 of the UBA Backhaul General Terms. The Commission does however expect that where an Access Seeker is purchasing UCLL, UCLL backhaul and UBA services, then Telecom will make an aggregated backhaul service available on a commercial basis.

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[130] Conference transcript, *Capacity/refusal to supply*, 11 April 2008, p 82.
[131] Conference transcript, *Capacity/refusal to supply*, 11 April 2008, p 82-83.
[132] ibid p 50.
[133] ibid p 50-52.

Use of an ASNAPOI for both UBA Backhaul and UCLL Backhaul

243.   Orcon, Kordia and CallPlus submitted that it was not clear in the draft STD that if an
        Access Seeker built an ASNAPOI for the purposes of UBA Backhaul that this would be
        the same ASNAPOI for the purposes of interconnecting with the UCLL Backhaul Service.
        Orcon, Kordia and CallPlus submitted that an Access Seeker should not be obliged to use
        an existing ASNAPOI in use for one of the backhaul services for the other backhaul
        service.[134]

244.   The UBA Backhaul Service Description outlines the conditions under which a POI Site
        becomes an ASNAPOI for an Access Seeker for the UBA Backhaul Service. If these
        conditions hold then the POI Site will be an ASNAPOI for the UBA Backhaul Service.
        Whether that POI Site is also an ASNAPOI for the Access Seeker for the UCLL Backhaul
        Service will be determined separately under the conditions outlined in the UCLL
        Backhaul Service Description.

Parent POI Selection

245.   Orcon, Kordia and CallPlus submitted that an Access Seeker should be able to select the
        Parent POI Site for an FDS in cities where there is more than one POI Site. In addition,
        Orcon, Kordia and CallPlus submitted that in cities where there is more than one POI Site,
        and an Access Seeker has an ASNAPOI, the Access Seeker should not be charged for
        both a Primary Link and Secondary Link.[135]

246.   The Parent POI Sites have been chosen by Telecom to optimise network efficiency in
        Telecom's Network. Therefore, the Commission has determined that the Access Seeker
        should not be able to select the Parent POI Site.

247.   The Commission's interpretation of ASNAPOI, discussed at paragraphs 13 to 40 above,
        and in particular the element "nearest", means that it is not possible for the Access Seeker
        to select Parent POI Sites for first data switches. Rather the Parent POI Site is defined for
        each first data switch and the list of Parent POI Sites and associated data switches is set
        out in Schedule 5 to the UBA Backhaul General Terms.

Measurement of backhaul distances

248.   In the draft STD the Commission considered that the measurement of Primary and
        Secondary Links of the UBA Backhaul Service for the purpose of pricing should be based
        on radial distances rather than on the basis of Telecom's network path.[136]

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[134] Orcon, Kordia and CallPlus, *Submission in response to the Draft Standard Terms Determinations for the Unbundled Copper Local Loop (UCLL) Backhaul Service and the Unbundled Bitstream Access (UBA) Backhaul Service*, 7 March 2008, p 52, para 19.

[135] Orcon, Kordia and CallPlus, *Submission in response to the Draft Standard Terms Determinations for the Unbundled Copper Local Loop (UCLL) Backhaul Service and the Unbundled Bitstream Access (UBA) Backhaul Service*, 7 March 2008, p 17, paras 65, and p 11, para 38.

[136] Commerce Commission, *Decision No. 627: Draft Standard Terms Determination for the designated service Telecom's unbundled bitstream access backhaul*, 8 February 2008, p 36, para 145.

249. Telecom submitted that their current costs are not based on radial distances but on the length of the route along which the fibre is laid. However, in the context of a benchmarked IPP, it is important that there is consistency between the distance metric for the benchmarked services and the distance metric for the service being priced.[137]

250. At the conference Access Seekers did not raise any concerns with using radial distances to measure backhaul distances.[138]

251. The Commission has determined that when calculating which available POI Site is nearest to an FDS, for the purposes of determining the ASNAPOI, the actual distance should be measured using Telecom's network path. However, the measurement of backhaul distances for the monthly charges will be calculated using radial distances. Both the radial distances and the network distances required for the ASNAPOI must be published on Telecom's secure web portal and must be updated as necessary

Service Level Terms (Schedule 3)

Access Seeker Forecasts – Section 5

252. In the draft STD, the Commission was seeking to be explicit as to which Service Levels comprise provisioning services, and therefore, will be adversely affected by inaccurate Access Seeker BAU Forecasts.

253. Telecom submitted that the Service Level reporting regime requires Telecom to indicate where they have relied on exclusions, and therefore, any concerns that Telecom would be able to apply blanket exclusions are unfounded.[139]

254. The Commission notes that the clauses 7.1.5 and 7.4 of the Operations Manual set out the consequences for Access Seekers failing to provide BAU Forecasts, or failing to provide accurate BAU Forecasts.

255. The Commission agrees with Telecom's submission and considers that the consequences as set out in the Operations Manual place sufficient limitations on the extent to which Service Level exclusions can be applied.

Manual Speed Changes

256. In its STP, Telecom proposed service levels relating to speed change orders that were based on the assumption that speed changes would be configured remotely, without the need for a truck roll.

257. In order to cover off the situation where a speed change requires a truck roll, Telecom submitted that a longer lead-time is necessary. Consequently, Telecom proposed separate lead-times depending on whether or not a truck roll is required.[140]

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[137] Telecom, *Submissions on draft Standard Terms Determinations for Telecom's unbundled copper local loop backhaul and Telecom's unbundled bitstream access backhaul*, 7 March 2008, p 49, para 266.
[138] Conference Transcript, *Radial distances*, 11 April 2008, p 223-224.
[139] Telecom, *Submissions on draft Standard Terms Determinations for Telecom's unbundled copper local loop backhaul and Telecom's unbundled bitstream access backhaul*, 7 March 2008, p 50, para 272.
[140] Telecom, *Submissions on draft Standard Terms Determinations for Telecom's unbundled copper local loop backhaul and Telecom's unbundled bitstream access backhaul*, 7 March 2008, p 52-53, paras 274-277.

258. The Commission agrees that a longer lead-time is appropriate where a truck roll is required, and considers that Telecom's proposed amendments are reasonable. The relevant service levels and standard lead-times have been amended accordingly.

Performance Penalties for Fault Restoration - Appendix 3, Item 14

259. In the draft STD, the Performance Penalty for Telecom failing to meet a notified expected fault restoration time was to be calculated in respect of each fault falling below the tolerance level in accordance with the following formula:

Performance Penalty = A x B

Where:
A =   the applicable Penalty Rate x the UBA Backhaul Monthly Charge; and

B =   the number of UBA Backhaul services detrimentally affected by the fault.

260. However, the recurring monthly charges for the UBA Backhaul Service vary by link, depending on radial distance and bandwidth. As a result, it is not clear what 'UBA Backhaul Service Monthly Charge' is to be used when applying this formula.

261. Accordingly, the Commission has amended the formula in Item 14 of Appendix 3 to read as follows:

Performance Penalty = A x B

Where:
A =   the applicable Penalty Rate; and

B =   the sum of the Charges for all Primary Links and Secondary Links (as defined in the UBA Backhaul Service Description) detrimentally affected by the fault.

262. The Commission considers that a fault that detrimentally affects a Secondary Link will also detrimentally affect associated Primary Links. Examples illustrating how Performance Penalties relating to fault restoration are to be applied are included below:

Figure 2: Performance Penalty Example
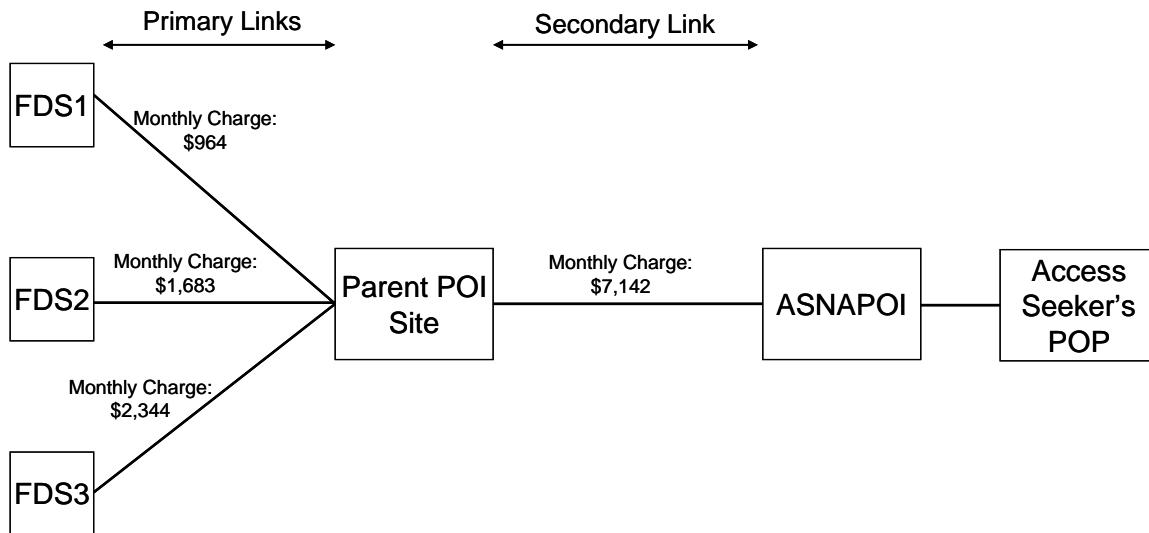
Example 1

263.   There is a fault that detrimentally affects the Primary Link between First Data Switch 1 ('FDS1') and the Parent POI Site (and therefore, end-users served by FDS1 will be affected). If Telecom fails to restore this fault within the notified expected restoration time (and falls below the specified Tolerance Level), then the Performance Penalty will be calculated as follows:

> Performance Penalty =   the applicable Penalty Rate[141] x the UBA Backhaul Service monthly Charge for the Primary Link detrimentally affected by the fault
> =   7% x $964
> = $67.48

Example 2

264.   There is a fault that detrimentally affects the link between the Parent POI Site and the ASNAPOI (the Secondary Link). This fault also detrimentally affects all three Primary Links because traffic from the First Data Switches is routed through the Parent POI Site and then along the Secondary Link.

265.   If Telecom fails to restore this fault within the notified expected restoration time (and falls below the specified Tolerance Level), then the Performance Penalty for this fault will be calculated as follows:

> Performance Penalty =   the applicable Penalty Rate[142] x the sum of the UBA Backhaul Service monthly Charges for all Primary Links and Secondary Links detrimentally affected by the fault
> =   7% x ($7,142 + $964 + $1,683 + $2,344)
> =   7% x $12,133

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[141] Calculation of the Penalty Rate is explained in Appendix 3 of the Service Level Terms. For the purposes of this example the applicable Penalty Rate is assumed to be 7%.

[142] Calculation of the Penalty Rate is explained in Appendix 3 of the Service Level Terms. For the purposes of this example the applicable Penalty Rate is assumed to be 7%.

$$= \$849.31$$

266.   In accordance with Example 1 of Appendix G to this STD, where an Access Seeker requires the same capacity on a Primary Link and an associated Secondary Link, the UCLL Backhaul Service is priced as a single link. For the purposes of calculating Performance Penalties for fault restoration, this would also be treated as a single link.

Operations Manual (Schedule 4)

BAU Forecasting – Section 7

267.   Telecom plans to undertake BAU provisioning on the basis of 'firm' Forecasts, with the exception of transmission capacity, which will be allocated once Access Seeker Orders are accepted.

268.   The Commission understands the equipment required to provision the UBA Backhaul Service will be subject to Telecom supplier lead times, and therefore believes Telecom's proposal to rely on Access Seeker's 'firm' Forecasts[143] will improve the timeliness of Service delivery.

269.   In its STP, Telecom proposed that, in the event that an Access Seeker Overforecasts (ie their 'firm' Forecast exceeds actual Order), the Access Seeker will reimburse Telecom for Capital Carrying Costs and related administrative costs.

270.   The Commission maintains its view from the draft STD that in this situation a capital holding cost is appropriate, and that a weighted average cost of capital (**WACC**) of 9.5% is suitable. However, as Telecom noted at the conference, the Capital Carrying Cost formula proposed by the Commission in the draft STD would provide Telecom with a return on capital, but would not provide a return of capital (ie depreciation).[144]

271.   The Commission considers that under cost-based regulation, where Telecom holds capital equipment in inventory as a consequence of an overestimate by the Access Seeker, it would be appropriate for the Access Seeker to provide Telecom with some form of compensation. This compensation should provide Telecom with recovery of any costs incurred from providing access, and provide the right incentives for Access Seekers to accurately estimate their future capital requirements allowing Telecom to efficiently manage its network.

272.   The Commission believes it is appropriate for Telecom in these circumstances to recover any lost rental value associated with the period of the time when the equipment was not being deployed, and any decrease in the cost of the equipment that occurs over the time period when the asset is held in inventory. This outcome is consistent with allowing for a return of and on the capital that is held in inventory as a result of the over-forecast by Access Seekers.

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[143] Firm forecasts are provided three months, two months, and one month before the month in which an actual Order is placed.

[144] Conference Transcript, *Operations Manual – Capital Carrying Costs*, 11 April 2008, p 230.

273. The Commission considers that the following formula will appropriately compensate Telecom:

$$r \times K_0 + (K_0 - K_1)$$

Where:

r is the weighted average cost of capital over the time period when the equipment is held in inventory. For example, where there is an annual weighted average cost of capital denoted by R, and the equipment is held in inventory for t months, r will be estimated using $r = (1 + R)^{(t/12)} - 1$

K_0 is the actual purchase cost of the capital equipment

K_1 is the cost of purchasing new equipment at the completion of the period where the asset is in inventory

274. The Commission considers that this equation ensures Telecom recovers an appropriate return of and return on capital. The Commission notes that Telecom will be able to redeploy this capital in due course and has financial incentives to do so.

275. The Commission notes that this equation also allows for the possibility of an increase in the price of equipment over the period for which the asset is held in inventory. In this case, K_1 will be greater than K_0, and the return on capital term ($r \times K_0$) is offset by the return of capital term ($K_0 - K_1$). The Commission notes that it is possible that the appreciation in the asset value could be so great that it leads to a negative Capital Carrying Cost. To ensure a symmetrical treatment in such circumstances, the use of this formula means that Telecom will be required to compensate the Access Seeker for any of the benefit Telecom accrues from having purchased lower cost equipment.

276. However, TelstraClear submitted that if a long lead-time would apply if Telecom waited for an actual Order, rather than relying on firm Forecasts, then Telecom could provide a quote to the Access Seeker of the cost involved in any pre-work.[145] The Access Seeker would then have the option of accepting or rejecting this cost.

277. The Commission notes that Telecom supported this idea in principle at the conference[146], and suggested that in most cases it would be practical to incorporate a feedback loop.[147]

278. The Commission agrees that, where possible, the Access Seeker should have visibility regarding Telecom's intentions to purchase equipment or perform preliminary work on the basis of Forecasts. The Commission considers that, given the relatively low expected volume of Orders for backhaul services, it is practical to incorporate a feedback loop into the process.

279. Consequently, under clause 7.4.7 of the Operations Manual, the Access Seeker will have the opportunity to reject preliminary work being performed on the basis of Forecasts in

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[145] TelstraClear, *Cross-Submission on Draft Standard Terms Determinations for Unbundled Copper Local Loop and Unbundled Bitstream Access Backhaul Services*, 26 March 2008, p 6, para 16.
[146] Conference Transcript, *Operations Manual – Capital Carrying Costs*, 11 April 2008, p 232.
[147] ibid, p 233.

favour of increased lead-times for delivery of the service. If an Access Seeker confirms that it wishes Telecom to complete preliminary work based on its Forecasted volume of Orders, and this volume turns out to be an Overforecast, then Telecom will be able to seek compensation in accordance with clause 7.4.4 of the Operations Manual.

Waiters – Clause 9.8.1

280.   Telecom introduced the 'waiter' concept in the UBA STD to accommodate orders that are subject to infrastructure capacity constraints. For consistency, the Commission included the waiter provisions in the draft UBA Backhaul STD.

281.   Telecom submitted that, although they are happy to accept this change, the concept of waiters was not included in the STP as the regulated backhaul services are not expected to be high volume, unlike the UBA Service.[148]

282.   The Commission agrees that the waiter provisions are unnecessary for the UBA Backhaul Service. Clause 9.8.1 has been updated to reflect this.

Network Changes – Clause 14.1

283.   In the draft STD the Commission increased the notice period for Network Changes from six months to 12 months.

284.   Telecom submitted that this 12 month notice period could result in a perverse outcome, because an Access Seeker would theoretically have to wait 12 months in order to start taking the service.[149] Telecom further clarified this submission at the conference by suggesting that 12 months is reasonable for deletions, moves and changes to network mapping, but 12 months may be too long for increased geographic availability or coverage.[150]

285.   The Commission retains its view that 12 months notice is appropriate for the addition of a new POI Site. However, the Commission has amended clause 14.1.5, allowing Telecom and affected Access Seekers the ability to agree a shorter notice period if desired.

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[148] Telecom, *Submissions on draft Standard Terms Determinations for Telecom's unbundled copper local loop backhaul and Telecom's unbundled bitstream access backhaul*, 7 March 2008, p 50, para 268.
[149] Telecom, *Submissions on draft Standard Terms Determinations for Telecom's unbundled copper local loop backhaul and Telecom's unbundled bitstream access backhaul*, 7 March 2008, p 33 para 181.
[150] Conference Transcript, *Operations Manual – Network Changes*, 11 April 2008, p 238 – 239.

IMPLEMENTATION PLAN

Introduction

286. The Implementation Plan sets out the timeline for the implementation of the UBA Backhaul Service and includes key milestones, reporting requirements, Key Performance Indicators, service levels for the Implementation Period, and Soft Launch requirements.

Timelines for delivery of the UBA Backhaul Service

287. Telecom submitted[151] that when considering the appropriateness of the timeframes in the Implementation Plan, it is important to take into account the need for Telecom to build to the specific requirements of the STD, which are completely different products from the commercial UBA backhaul service.

288. Orcon, Kordia and CallPlus were of the view that the implementation period of 210 Working Days are rather long and may slow Access Seekers development of competing products using regulated services.[152]

289. Vodafone submitted[153] that the implementation period of 210 Working Days is still too long given the similarities between the UCLL and UBA backhaul Service. In its submission[154], TelstraClear disagreed with the implementation date being brought forward from 210 Working Days, if that would adversely affect Telecom's ability to deliver Enhanced UBA services in accordance with the regulated timeframes.

290. At the conference, Telecom mentioned that the implementation period relied heavily on the Service Description for the UBA Backhaul Service, although it expects to have the commercial UBA backhaul service ready by October 2008. In addition, Telecom mentioned that assuming that there is a general agreement on the Service Description, sufficient time is required to put in place all necessary processes to meet the requirements of the STD.

291. The Commission has reduced the implementation timeframe to 150 Working Days. Given that a commercial UBA backhaul service will be ready for rollout by October 2008, the Commission considers a shortened implementation timeline is reasonable. The Commission does not consider a lengthy implementation period between the commercial UBA backhaul service and the regulated UBA Backhaul Service as being desirable to end users.

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[151] Telecom, *Submissions on draft Standard Terms Determinations for Telecom's unbundled copper local loop backhaul and Telecom's unbundled bitstream access backhaul*, 7 March 2008, p 56, para 290.

[152] Orcon, Kordia and CallPlus, *Submission in response to the Draft Standard Terms Determinations for the Unbundled Copper Local Loop (UCLL) Backhaul Service and the Unbundled Bitstream Access (UBA) Backhaul Service*, 7 March 2008, p 21, para 95.

[153] Vodafone, *Submission on Draft Standard Terms Determinations for Unbundled Copper Local Loop and Unbundled Bitstream Access Backhaul Services*, 7 March 2008, p 4, para 15.

[154] TelstraClear Limited, *Submission on Draft Standard Terms Determinations for Telecom's Unbundled Copper Local Loop and Unbundled Bitstream Access Backhaul,* 7 March 2008, p 10, para 32.

Bow Wave period

292. Telecom submitted[155] that the Bow Wave Period was proposed because of the risk of having a large influx of orders. During the Bow Wave Period there would be an exemption from standard lead times and no Performance Penalties.

293. Orcon, Kordia and CallPlus submitted[156] that the difference in demand from the period of the Soft Launch to the final delivery date is not expected to be significant. Accordingly, Telecom should be exposed to performance penalties after the Soft Launch.

294. Vodafone's submitted[157] that there is no need for a Bow Wave Period as it is not expected that there will be backed up demand to be processed all at once.

295. The Commission has removed the provision for a Bow Wave Period. The Commission considers that the Soft Launch already provides an exemption to Telecom with regards to compliance with service level terms and sees no necessity for a further exemption. This approach is consistent with UCLL and UBA STDs which have no provision for a Bow Wave Period. In addition, the Commission does not expect there to be an influx of orders. The Commission may reconsider the inclusion of a Bow Wave period at a later stage if Access Seekers or Telecom informs the Commission of an influx of orders.

296. As a consequence of removing the Bow Wave Period, the section on prioritisation has also been removed as prioritisation only applies during the Bow Wave Period.

297. The Commission has also removed the 231[158] Working Day period for Telecom to make available the UBA Backhaul Service in the first data switches as set out in Schedule 5 of the UBA Backhaul General Terms.

Dated this 27th day of June 2008

Dr Ross Patterson
Telecommunications Commissioner

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[155] Telecom, *Submissions on draft Standard Terms Determinations for Telecom's unbundled copper local loop backhaul and Telecom's unbundled bitstream access backhaul*, 7 March 2008, Schedule 5 - Implementation Plan Amendments.
[156] Orcon, Kordia and CallPlus, *Submission in response to the Draft Standard Terms Determinations for the Unbundled Copper Local Loop (UCLL) Backhaul Service and the Unbundled Bitstream Access (UBA) Backhaul Service*, 7 March 2008, p 13, para 45.2.
[157] Vodafone, *Submission on Draft Standard Terms Determinations for Unbundled Copper Local Loop and Unbundled Bitstream Access Backhaul Services*, 7 March 2008, p 11 – Issues Table.
[158] Section 3.11 – UBA Backhaul Timeline.

APPENDIX A: UBA BACKHAUL TERMS

Appendix A comprises the following documents:

UBA Backhaul General Terms

Schedule 1: UBA Backhaul Service Description

Schedule 2: UBA Backhaul Price List

Schedule 3: UBA Backhaul Service Level Terms

Schedule 4: UBA Backhaul Operations Manual

Schedule 5: UBA Backhaul POI Site Related Information

UBA Backhaul Implementation Plan

APPENDIX B: GLOSSARY OF TERMS

Access Seeker	means an access seeker under the Act that has made a request in writing pursuant to section 30S(1) of the Act.
Access Seeker's POP	means an Access Seeker's Point of Presence
Act	means the Telecommunications Act 2001
ASNAPOI	means the Access Seeker's nearest available point of interconnection that is located at a POI Site and is the point at which the Access Seeker is interconnected with Telecom's Network
ASNAPOI Handover Point	means the Access Seeker side of the OFDF in the ASNAPOI
Co-location STD	means the standard terms determination in relation to the UCLL co-location service
Commission	means the Commerce Commission in the course of performing its functions under the Act
Conference	means the conference held by the Commission on 10-11 April 2008 in respect of the UCLL Backhaul STD and UBA Backhaul STD under section 30L of the Act
Determination Date	means the date on which the Commission's determination relating to the UBA Backhaul Service comes into force
DSLAM	means Digital Subscriber Line Access Multiplexer which is a device that connects many digital subscriber lines to a network by multiplexing the DSL traffic onto one or more network trunk lines
End-User	means an end-user as defined in the UBA Backhaul General Terms or the Act as the context requires
FDS	means the UBA Service first data switch (or equivalent facility) in Telecom's Network other than a DSLAM
FDS Handover Point	means the Access Seeker side of the OFDF in the FDS
Handover Connection	means the Telecom Owned Equipment that includes: (a) the trunk port on the FDS or ASNAPOI data switch (as the case may be); (b) the optical fibre from the port to Telecom's OFDF; and (c) the OFDF.
Handover Fibre	means the Handover Fibre interconnected with the Handover Connection that provides physical interconnection with the Access Seeker's Network

Standard terms determination for Telecom's unbundled bitstream access backhaul

Handover Link	means the link comprising a Handover Fibre and a Handover Connection between the ASNAPOI Handover Point and the Access Seeker's remotely located equipment, used for the purpose of handing over traffic for the UBA Backhaul Service
Handover Point	means either a FDS or a ASNAPOI Handover Point or both (as described in the UBA Backhaul Service Description as the context requires
Implementation Plan	means the Implementation Plan that forms part of the UBA Backhaul Standard Terms Determination.
KPIs	means the key performance indicators set out in the Implementation Plan
OFDF	means Telecom's Optical Fibre Distribution Frame
OSS	means Telecom's Operational Support Systems
Parent POI Site	means, in relation to a FDS, the POI Site to which that FDS is connected for the purposes of routing the UBA Backhaul Service. For the avoidance of doubt, the Parent POI Site may sometimes be the same as the ASNAPOI.
POI Site	means a point in Telecom's Network at which the Access Seeker may interconnect for the purposes of the UBA Backhaul Service.
Primary Link	means that part of the UBA Backhaul Service between the FDS Handover Point and the Parent POI Site
RFS Date	means ready for service date
Secondary Link	means that part of the UBA Backhaul Service between the Parent POI Site and the ASNAPOI Handover Point
Service Specifications	means the service specifications set out in the UBA Backhaul Service Description
Soft Launch	means the supply of the UBA Backhaul Service on a small scale for the purposes of testing and bedding down prior to delivery of the relevant service
STD	means a standard terms determination made by the Commission under section 30M of the Act
STP	means Telecom's standard terms proposal for the UBA Backhaul Service
TCF	means the New Zealand Telecommunications Carriers' Forum or its successor body
Telecom	has the meaning given in section 5 of the Act.
UBA Backhaul General Terms	means the document General Terms that is part of the UBA Backhaul Standard Terms Determination
UBA Backhaul Operations	means the manual set out in schedule 4 to the UBA Backhaul General

Standard terms determination for Telecom's unbundled bitstream access backhaul

Manual	Terms
UBA Backhaul Price List	means the list set out in schedule 2 to the UBA Backhaul General Terms
UBA Backhaul Service	means Telecom's unbundled bitstream access backhaul service as described in the UBA Backhaul Service Description (or any part of that service) or the service as described in the Act, as the context requires.
UBA Backhaul Service Description	means the service description set out in Schedule 1 to the UBA Backhaul General Terms
UBA Backhaul Service Level Terms	means the service level terms set out in schedule 3 to the UBA Backhaul General Terms
UBA Backhaul Standard Terms Determination or STD	means the standard terms determination made by the Commission under section 30M of the Act in relation to Telecom's unbundled bitstream access backhaul service, including the Commission's decision report, the Implementation Plan and the UBA Backhaul Terms.
UBA Backhaul Standard Terms Proposal or STP	means Telecom's standard terms proposal for the UBA Backhaul Service
UBA Backhaul Terms	means, collectively, the UBA Backhaul General Terms and all of the schedules to the UBA Backhaul General Terms
UBA Service	means Telecom's unbundled bitstream access service as described in the Act
UBA STD	means the standard terms determination in relation to the UBA Service
UCLL	means unbundled copper local loop
UCLL Backhaul Service	means Telecom's unbundled copper local loop network backhaul (telephone exchange to interconnect point) service as described in the Act
UCLL Service	means Telecom's unbundled copper local loop network service as described in the Act
UCLL STD	means the standard terms determination in relation to the UCLL Service

APPENDIX C: SUMMARY OF SUBMISSIONS ON PRICE TERMS IN THE DRAFT UBA BACKHAUL STD

1.   This Appendix summarises the submissions[159] made by parties on the price terms in the draft STD.

Telecom submission

2.   Telecom's submission on the draft UBA Backhaul STD included a report by LECG[160], in which LECG commented on the Commission's benchmarking approach. LECG then proposed an alternative benchmarking approach, and derived benchmarked prices based on an econometric analysis of backhaul rates in five countries.

Summary of LECG comments on draft UBA Backhaul STD

3.   In relation to the draft STD, LECG noted that the Commission based its benchmark price for the UBA Backhaul Service on a single FT backhaul service, despite other potentially useful pricing data being available. LECG also argued that the Commission's benchmark is based on two different prices, one where the FT backhaul service terminates at the entrant's site and one where the FT service terminates at the FT site. LECG submitted that this approach relies on the assumption that the FT site corresponds to the Telecom First Data Switch, which may or may not be the case.

4.   According to LECG, the Commission's resulting benchmarked price for the UBA Backhaul Service does not take account of distance, even though that price could apply to links over distances of up to 1,200 kms.

5.   LECG noted that the benchmarking approaches used by the Commission for the UCLL Backhaul Service and the UBA Backhaul Service resulted in very different pricing structures and price levels for backhaul services that LECG considered to be similar.

Summary of LECG's benchmarking approach

6.   Having commented on the Commission's benchmarking approach in the draft STD, LECG proposed an alternative approach to setting benchmarked prices for backhaul services.

7.   LECG characterised both the UCLL Backhaul Service and the UBA Backhaul Service as layer 2, point-to-point Ethernet transport services. LECG used the following diagram to illustrate and compare the two backhaul services.

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[159] Including cross-submissions and conference presentations.
[160] LECG, *Price benchmarking of UCLL and UBA Backhaul Services*, 14 March 2008. The LECG report incorporates a correction to its 7 March 2008 report that was included as part of Telecom's submission on the draft STD. The correction (relating to an incorrect cell reference in the original report) produces a set of recurring charges that are generally lower (by between approximately -5% to -20%) than in the original report.

Figure 3: LECG's illustration of UCLL Backhaul and UBA Backhaul Services
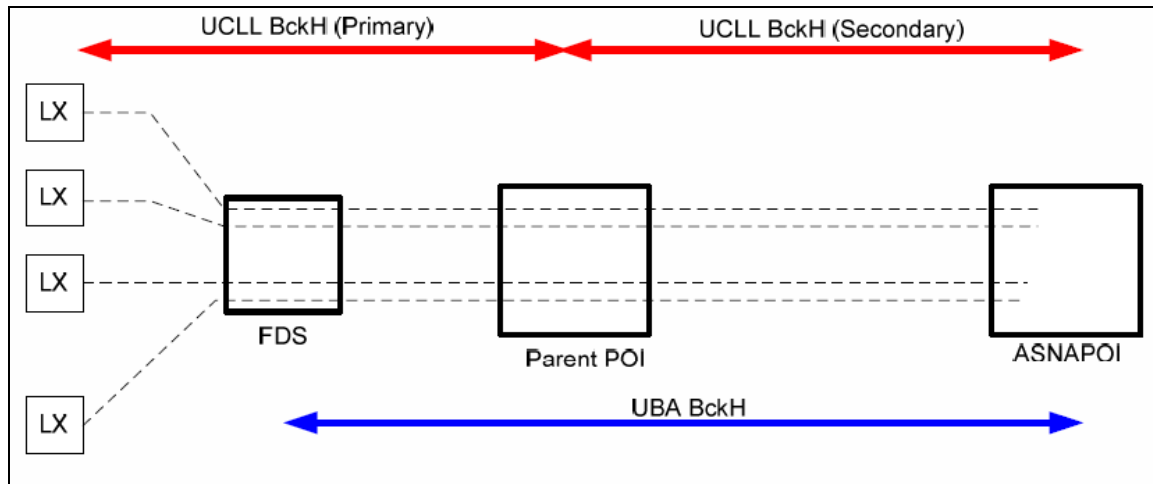
8. LECG noted that the two backhaul services are similar, although the UCLL Backhaul Service commences at a Local Exchange (LX) whereas the UBA Backhaul Service commences at the First Data Switch (FDS). According to LECG,[161]

> this difference leads to possible differences in the distance over which each backhaul service is offered, which can be addressed with a distance-based pricing structure, and we derive a distance-based pricing below.

9. In the remainder of their submission, LECG treated the UCLL Backhaul and UBA Backhaul services as equivalent services, and derived a single set of backhaul prices that did not distinguish between UCLL Backhaul and UBA Backhaul.

10. LECG derived a set of distance- and bandwidth-based backhaul prices, using an econometric approach to estimate the relationship between price, distance, and bandwidth for backhaul services in 5 countries: Canada, France, Italy, the United Kingdom, and Holland. According to LECG, these five countries have backhaul services which are similar to the backhaul service description in New Zealand, and which are regulated at cost-oriented prices.[162]

11. Having identified what they considered to be appropriate benchmarks, LECG noted that the recurring charges vary in the way in which they accommodate distance, which requires some 'normalisation' in order to generate a distance-based backhaul price. In order to do this, LECG made the following assumptions regarding the average distance covered by metropolitan, provincial, and regional backhaul services in the 5 benchmarked jurisdictions:

    - metropolitan backhaul: average distance is assumed to be 17.5 km (based on the average distance for a metropolitan service being the mid-point of a range of 0-35 km)

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[161] ibid, p 14.
[162] LECG state that they initially restricted their review of backhaul services to those jurisdictions with "similar services", and found 54 jurisdictions including 48 US states, Canada, UK, Italy, France, Austria, and Holland. LECG excluded the US states and Austria on the basis that backhaul prices in those jurisdictions are not subject to regulation.

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- provincial backhaul: average distance is assumed to be 80 km (based on the average distance for a provincial service being the mid-point of a range of 0-160 km)[163]
- regional backhaul: average distance is assumed to be 250 km for Canada, 150 km for France (based on the average distance for a regional service being the mid-point of a range of 0-500 km in Canada, and 0-300 km in France).

12. For the UK, LECG used a range of metropolitan distances[164], to reflect the service definitions of the various Openreach backhaul services.

13. LECG stated that:[165]

> We recognise the above estimates of distance reflect considerable judgement. We have provided maps (with distance keys) of Canada, France and Italy in the Appendices to provide some information on the reasonableness of the provincial and regional distances used for those countries. In the absence of information on the weighted average distances of the links for each service (which we do not have), we consider the above is a reasonable approximation.

14. LECG used the exchange rates derived by the Commission in the UCLL STD ie a 50/50 blend of the 10-year average nominal exchange rate and PPP rate.

15. LECG then compiled a set of benchmarks from the five countries they have identified, by price, bandwidth, and distance. This initial dataset is comprised of 36 price points, each reflecting a particular combination of bandwidth (50/100/200/1000 Mbps) and distance (such as 17.5/80/150/250 km).[166] The resulting price dataset is used to estimate a relationship between price, distance, and bandwidth with the form:

$$\log(\text{Price}) = \beta_0 + \beta_1 \log(\text{Distance}) + \beta_2 \log(\text{Bandwidth})$$

16. According to LECG, this specification has the best statistical properties of any of the models they considered, and the coefficients are highly significant with the expected signs. The log specification was also considered by LECG to be attractive, as it is consistent with costs increasing with respect to bandwidth and distance, but at a decreasing rate.[167]

17. The results of LECG's regression analysis are summarised in Table 11.

Table 11: LECG results (recurring charges)

	Coefficient
Constant	4.2057 ***
log(Distance)	0.4663 ***

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[163] There appears to be a minor error in LECG's spreadsheet relating to backhaul in France. Under the "France" worksheet, the distances recorded for the DSL Collect Ethernet service are 17.5 km (metro) and 75 km (provincial), whereas LECG state in their report that they have used distances of 17.5 km and 80 km respectively. Using a provincial distance of 80 km for the DSL Collect Ethernet service changes the results slightly from those reported in the LECG submission.

[164] Specifically, 15, 17.5 and 35 km.

[165] LECG, above n 160, p 18.

[166] As discussed below, LECG subsequently expand this dataset to include other bandwidths.

[167] LECG, above n 160, p 20.

log(Bandwidth)	0.5867 ***
Adjusted R^2	0.5953

*** significant at 1%

18.   Using these estimates, LECG derived a set of backhaul prices, based on the bandwidth and distance features proposed by Telecom in their STP. These are set out in Table 12.

Table 12: LECG benchmarked backhaul prices for New Zealand (recurring charges)

Distance step	Mid-point	Recurring charge (NZ$ per month)			
(km)	(km)	50 Mbps	100 Mbps	200 Mbps	1 Gbps
0 to 5	2.5	$1,020	$1,532	$2,301	$5,916
5 to 10	7.5	$1,703	$2,558	$3,841	$9,874
10 to 15	12.5	$2,161	$3,246	$4,874	$12,530
15 to 20	17.5	$2,528	$3,797	$5,702	$14,658
20 to 25	22.5	$2,843	$4,269	$6,411	$16,481
25 to 30	27.5	$3,121	$4,687	$7,040	$18,097
30 to 40	35.0	$3,493	$5,245	$7,877	$20,251
40 to 50	45.0	$3,927	$5,897	$8,857	$22,768
50 to 60	55.0	$4,312	$6,476	$9,725	$25,001
60 to 70	65.0	$4,661	$7,000	$10,513	$27,026
70 to 80	75.0	$4,983	$7,483	$11,238	$28,891
80 to 90	85.0	$5,283	$7,933	$11,914	$30,627
90 to 100	95.0	$5,564	$8,355	$12,548	$32,257
100 to 125	112.5	$6,020	$9,041	$13,577	$34,903
125 to 150	137.5	$6,610	$9,927	$14,909	$38,327
150 to 175	162.5	$7,146	$10,732	$16,116	$41,431
175 to 200	187.5	$7,639	$11,472	$17,228	$44,290
200 to 225	212.5	$8,098	$12,161	$18,264	$46,951
225 to 250	237.5	$8,529	$12,809	$19,236	$49,450
250 & above		Priced according to distance			

19.   LECG undertook a similar analysis in respect of non-recurring charges (where price is modelled as a function of bandwidth). LECG's model results, and resulting benchmarked connection charges, are summarised in Table 13 and Table 14 respectively.

Table 13: LECG results (non-recurring charges)

	Coefficient
Constant	7.9032 ***
log(Bandwidth)	0.2822 ***
Adjusted R^2	0.3433

*** significant at 1%

Table 14: LECG benchmarked backhaul connection (non-recurring charges)

	Non-recurring charge per link (NZ$)
50 Mbps	$8,160
100 Mbps	$9,923
200 Mbps	$12,067
1 Gbps	$19,003

Vodafone submission

20. Vodafone submitted that the proposed monthly and connection charges in the draft STD are prohibitively expensive, and that as a result Access Seekers would be unlikely to purchase the UBA Backhaul Service.[168]

Orcon, Kordia and CallPlus submission[169]

21. Orcon, Kordia and CallPlus submitted that the prices in the draft UBA Backhaul STD would represent a significant increase in backhaul costs for Access Seekers using the regulated services, compared to existing commercial charges for these services, and would discourage competition in broadband markets. Orcon, Kordia and CallPlus submitted that a per-user option be made available to provide Access Seekers with cost-effective alternatives.

22. They also noted that connection charges are one-off costs, and that such costs should not vary according to bandwidth.

Covec submission[170]

23. Covec's submission on behalf of Orcon/Kordia and Vodafone/Ihug expressed concern over the reliability of the price benchmarks contained in the draft STD. Covec noted that the prices in the draft STD were based on a single benchmark. According to Covec, this contrasts with previous benchmarking exercises, in which a considerable amount of data had been available, allowing the Commission to filter out some data points. Covec noted that it had been unable to identify additional regulated backhaul services.

24. Covec also noted that the draft STDs for UCLL Backhaul and UBA Backhaul ended up setting quite different pricing structures. For example, the UBA Backhaul Service had an installation charge that varied with bandwidth, whereas the UCLL Backhaul Service had a flat connection fee, irrespective of bandwidth. The structure of the recurring charges also differed for the two backhaul services.

25. Covec submitted that the UCLL Backhaul and UBA Backhaul services are likely to have similar underlying cost structures. In particular, Covec considered that the cost of

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[168] Vodafone, *Submission on Draft Standard Terms Determinations for Unbundled Copper Local Loop and Unbundled Bitstream Access Backhaul Services*, 7 March 2008, paras 5 and 6.

[169] Orcon, Kordia and CallPlus, *Submission in response to the Draft Standard Terms Determinations for the Unbundled Copper Local Loop (UCLL) Backhaul Service and the Unbundled Bitstream Access (UBA) Backhaul Service*, 7 March 2008.

[170] Covec, *Regulated Backhaul Pricing*, March 2008.

backhaul would generally vary with bandwidth and distance, and that for any given combination of bandwidth and distance, the cost of providing backhaul for UCLL purposes should be approximately the same as the cost of providing backhaul for UBA.

26.   Given the lack of regulated backhaul services against which to benchmark, Covec submitted that it may be appropriate to look at competitive commercial prices for data transport services. They said that in competitive markets, prices are competed down to a level that reflects the cost of supply, and so the use of commercial prices from a market with effective competition would be consistent with the requirement to benchmark against cost-based prices.

27.   Covec's submission referred to examples of competitive data transport routes. In New Zealand, Covec referred to the Auckland-Wellington route, where Telecom, TelstraClear, Kordia, and FX Networks provide data transport services. Covec also included some information on commercial backhaul prices in Australia, where access disputes can be referred to the ACCC for arbitration.[171]

28.   For example, Covec submitted that urban backhaul prices sourced from Pipe Networks in Australia are broadly in line with the Primary Link charges in the draft STD. However, Covec found that inter-city transmission prices in Australia are significantly lower than the Secondary Link charge in the draft STD.

Vector Communications submission[172]

29.   Vector's submission on the draft STD cautioned that a conservative approach to price benchmarking should be taken, given the limited number of benchmarks and the variation in the way in which backhaul services are specified.

30.   Vector noted that if an Access Seeker was allowed to purchase a high bandwidth connection and on-sell that capacity to other Access Seekers, that would reduce the number of customers and services over which a backhaul provider could recover its costs.

Covec cross-submission[173]

31.   In its cross-submission, Covec commented on the benchmarking approach proposed by LECG. According to Covec:

*   the econometric results should be cross-checked using 'peer-group' methods;
*   the distance measures used by LECG could be improved;[174]
*   LECG's modelling is sensitive to the number of data points, which is a modelling choice; and
*   fewer distance bands would be better.

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[171] Covec suggested that although arbitration outcomes are confidential, the existence of commercial prices in Australia suggests that the prices are acceptable to access seekers, and provide adequate compensation for backhaul providers.

[172] Vector, *Submission on the Telecommunications Commission's draft Standard Terms Determinations for UCLL and UBA Backhaul*, 7 March 2008.

[173] Covec, *UCLL and UBA Backhaul Cross Submission*, March 2008.

[174] In addition, Covec noted that the LECG dataset included the provincial DSL Collect Ethernet service in France, with a distance of 75 km. Covec amended this to 80 km, to be consistent with the body of the LECG report.

Peer group cross-checking

32.   Covec compared the results of the econometric approach with the median prices of
        backhaul services for given combinations of bandwidth (100 Mbps, 1 Gbps) and distance
        (17.5 km). Covec found that for the 100 Mbps service, the predicted price using the
        econometric results ($3,789 per month) is close to the median actual price of backhaul
        services ($3,764 per month), while for the 1 Gbps service, the predicted price ($14,659
        per month) is 18% above the median actual price ($12,426 per month).

33.   As a result, Covec suggested that LECG's econometric results may be less reliable for the
        higher bandwidth services.

Distance measures

34.   Covec noted that LECG's results were sensitive to the assumption made about the average
        distance for the backhaul service. Covec proposed two adjustments to the LECG average
        distances.

35.   First, Covec submitted that whereas LECG took the midpoint from 0 km to a maximum
        distance for each distance band, a more appropriate approach would be for each band to
        start at the upper limit of the previous band. For example, LECG use bands of 0-35 km
        for metropolitan backhaul, and 0-160 km for provincial backhaul. Under the Covec
        proposal, the metropolitan band would be 0-35 km, and the provincial band would be 35-
        160 km. Covec justified this approach on the basis that the points of interconnection are
        likely to be located in metropolitan areas, and so the provincial band should start where
        the metropolitan band finishes, and similarly for the regional band.

36.   Covec's other comment on distance related to LECG's use of the midpoint to derive the
        average distance in each band. According to Covec, a 'sum of squares' approach is more
        appropriate, as it equates the areas between the upper and lower limits in each band; in
        other words, it creates an equal probability of the actual distance lying above or below the
        point estimate.

37.   Covec's proposed adjustments to the distance measures results in an increase in the
        average distance for metropolitan backhaul from 17.5 km to 24.7 km; for provincial
        backhaul from 80 km to 115.8 km; and for regional backhaul from 150 km to 240.4 km
        for France; and from 250 km to 371.2 km for Canada. Covec noted that these increases in
        average distances result in lower prices across all distance steps with the exception of
        LECG's 0-5 km step.

Number of observations

38.   Covec submitted that LECG's dataset is disproportionately influenced by jurisdictions that
        have relatively high backhaul prices. Covec included the following table, in which the
        median percentage difference between the actual price and the predicted price for each
        jurisdiction is presented. The number of observations from each jurisdiction in the
        original LECG dataset was also included.

Table 15: Number of observations and median price differential by jurisdiction

Jurisdiction	Observations	Median
Canada	12	6%
France	8	21%
Holland	3	-60%
Italy	8	75%
UK	5	-60%

39.   Covec submitted that actual backhaul prices in Holland and the UK are relatively low, compared to the prices predicted using LECG's model, while actual prices in Italy are relatively high. Holland and the UK also have relatively few observations (3 and 5 respectively). As a result, Covec submitted that the jurisdictions with higher prices tended to have more influence than those with relatively low prices.

40.   In order to provide a more balanced dataset, Covec proposed the addition of other bandwidths for Holland (5 additional observations) and the UK (2 additional observations).

Summary of Covec's proposed benchmarking amendments

41.   Covec presented the results of expanding the LECG dataset, and amending the distance assumptions. The combined effect of the amendments proposed by Covec leads to a reduction in the monthly charges of between 5% and 39%, with the most significant price effects occurring at low distances and high bandwidths.

42.   Covec also proposed that the number of distance bands in the backhaul price structure be reduced, from the 20 bands proposed by Telecom, to five bands. According to Covec, a smaller number of bands is consistent with the steps used by LECG in its regression, as well as international practice.

43.   The results of Covec's proposed adjustments are summarised in Table 16.

Table 16: Covec's proposed backhaul charges

Distance step	Average	Recurring charge (NZ$ per month)			
(km)	(km)	50 Mbps	100 Mbps	200 Mbps	1 Gbps
0 to 10	7.07	$1,161	$1,676	$2,420	$5,676
10 to 35	25.74	$2,376	$3,430	$4,951	$11,613
35 to 160	115.81	$5,467	$7,891	$11,392	$26,719
160 to 300	240.42	$8,193	$11,828	$17,075	$40,047
300+		priced according to distance			

Vodafone cross-submission[175]

44.   In its cross-submission, Vodafone supported the use of distance-based pricing for UCLL Backhaul and UBA Backhaul. However, Vodafone argued that the number of distance

[175] Vodafone, *Cross Submission on Draft Standard Terms Determinations for Unbundled Copper Local Loop and Unbundled Bitstream Access Backhaul Services*, 26 March 2008.

bands proposed by Telecom is excessive. Vodafone noted that Telecom's interim UCLL Backhaul Service has distance-based pricing, with 0-15 km, 15-35 km, and 35 km+ bands.

TelstraClear cross-submission[176]

45. TelstraClear's cross-submission included some comment on the possible inclusion of commercial prices for backhaul services that are supplied in competitive markets. According to TelstraClear, there would be practical difficulties in benchmarking against competitive commercial prices. For example, commercial backhaul rates may not be publically available, and are likely to reflect commercial outcomes rather than the TSLRIC of backhaul provision.

46. TelstraClear noted that any party could seek a pricing review of the Commission's initial determination, and that the price determined under such a review would be backdated to the date of the initial determination. TelstraClear argued that this minimises the risk that the initial price set by the Commission through benchmarking will be above or below the efficient costs of supplying the backhaul services.

Telecom cross-submission[177]

47. In commenting on the Orcon, Kordia and CallPlus submission, Telecom agreed that the benchmarking set out in the draft STD needed to be revisited. Further, according to Telecom, reference to commercial prices is not contemplated by the Act, nor is it required in light of the additional cost-based benchmarks identified by LECG. Telecom also submitted that the LECG benchmarking results are comparable to commercial pricing.[178]

48. At the conference LECG commented on Covec's proposed amendments to the LECG benchmarking approach. LECG agreed in principle with Covec's proposal that the regression results be cross-checked against actual prices for given combinations of distance and bandwidth, although noted that there are limitations, particularly given the small numbers of actual prices for some combinations.[179]

49. In respect of Covec's proposed distance assumptions, LECG agreed that the bounds of the distance bands should be defined in a contiguous manner, with the lower bound of a band equal to the upper bound of the preceding band. However, LECG argued that the midpoint of each band was appropriate, rather than the 'sum of squares' approach proposed by Covec. According to LECG, in the absence of information on the actual distribution of distances within each band, a reasonable assumption is that the distances are distributed symmetrically around the mean. LECG also noted that while Covec's approach might be appropriate for a distribution network in which coverage is important, it is not appropriate for a point-to-point transmission service.

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[176] TelstraClear Limited, *Cross-Submission on Draft Standard Terms Determinations for Unbundled Copper Local Loop and Unbundled Bitstream Access Backhaul Services*, 26 March 2008.

[177] Telecom, *Cross-submissions on draft Standard Terms Determinations for Telecom's unbundled copper local loop backhaul and Telecom's unbundled bitstream access backhaul*, 26 March 2008. Conference Transcript, *Price terms*, 11 April 2008, p 160-196.

[178] Telecom, *Cross-submissions on draft Standard Terms Determinations for Telecom's unbundled copper local loop backhaul and Telecom's unbundled bitstream access backhaul*, 26 March 2008, Schedule 4.

[179] LECG, *Responses to benchmarking issues raised by Covec*, 10 April 2008, slide 7.

50.   LECG agreed with Covec that consideration should be given to additional bandwidths. According to LECG, all pricing data that complies with the cost-based criteria of the benchmarking study should be included, as the regression method estimates a relationship between price and bandwidth. However, Covec proposed to include only a subset of the additional bandwidths that are available. In addition, the UK observations that Covec proposed to include are for 155 Mbps and 622 Mbps services, which appear to relate to ATM services. LECG noted that the Commission had excluded ATM services in the draft UBA Backhaul STD.

51.   LECG therefore included additional bandwidths for Holland, Italy, and Canada.

52.   The updated benchmarking results produced by LECG at the conference represented an increase in the price of higher bandwidth backhaul services of up to 26% (compared to LECG's previous results), while the price of the lower bandwidth backhaul (50 Mbps, and some of the 100 Mbps prices) decline by up to 13%.[180]

53.   In terms of the number of bands to include in the pricing structure of the backhaul service, LECG noted that Covec provided no evidence as to why five bands were better than Telecom's proposed 20 bands. However, LECG noted that they do not have a firm view on the appropriate number, and that their model is capable of calculating benchmarked prices for any number of bands.

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[180] LECG, *Responses to benchmarking issues raised by Covec*, 10 April 2008, slide 12.

APPENDIX D: INITIAL BENCHMARKING DATASET – RECURRING MONTHLY RENTAL RATES

	Service	Distance km	BW Mbps	Price NZD
Canada	metro	32	50	$ 3,745
Canada	provincial	350	50	$ 5,232
Canada	regional	400	50	$ 5,542
Italy	metro	32	50	$ 2,671
Italy	provincial	112	50	$ 6,262
Canada	metro	32	100	$ 4,364
Canada	provincial	350	100	$ 7,340
Canada	regional	400	100	$ 7,960
UK	ONBS	15	100	$ 2,748
UK	BES	32	100	$ 4,881
Holland	metro	32	100	$ 1,776
Italy	metro	32	100	$ 5,342
Italy	provincial	112	100	$ 12,524
France	DSL Collect IP	32	100	$ 5,432
France	DSL Collect IP	112	100	$ 5,432
France	DSL Collect IP	230	100	$ 5,432
Canada	metro	32	150	$ 6,113
Canada	provincial	350	150	$ 10,576
Canada	regional	400	150	$ 11,506
Italy	metro	32	150	$ 8,012
Italy	provincial	112	150	$ 18,786
Canada	metro	32	200	$ 6,733
Canada	provincial	350	200	$ 12,684
Canada	regional	400	200	$ 13,924
Italy	metro	32	200	$ 10,683
Italy	provincial	112	200	$ 25,048
Holland	metro	32	200	$ 2,289
Canada	metro	32	300	$ 7,973
Canada	provincial	350	300	$ 16,900
Canada	regional	400	300	$ 18,760
Italy	metro	32	300	$ 16,025
Italy	provincial	112	300	$ 37,572
Holland	metro	32	300	$ 2,682
Italy	metro	32	400	$ 21,366
Italy	provincial	112	400	$ 50,096
Holland	metro	32	400	$ 3,013
Canada	metro	32	500	$ 10,452
Canada	provincial	350	500	$ 25,331
Canada	regional	400	500	$ 28,431
Italy	metro	32	500	$ 26,708
Italy	provincial	112	500	$ 62,620
Holland	metro	32	500	$ 3,305
Italy	metro	32	600	$ 32,049
Italy	provincial	112	600	$ 75,144
Holland	metro	32	600	$ 3,569
Italy	metro	32	700	$ 37,391
Italy	provincial	112	700	$ 87,667
Holland	metro	32	700	$ 3,811
Italy	metro	32	800	$ 42,732
Italy	provincial	112	800	$ 100,191
Holland	metro	32	800	$ 4,038

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	Service	**Distance km**	**BW Mbps**	**Price NZD**
Italy	metro	32	900	$ 48,074
Italy	provincial	112	900	$ 112,715
Holland	metro	32	900	$ 4,250
UK	BNS	32	1000	$ 3,665
UK	BNS (max distance)	70	1000	$ 6,563
Canada	metro	32	1000	$ 16,652
Canada	provincial	350	1000	$ 46,410
Canada	regional	400	1000	$ 52,610
France	DSL Collect Ethernet	32	1000	$ 34,222
France	DSL Collect Ethernet	112	1000	$ 99,407
UK	ONBS	15	1000	$ 4,815
UK	BES	32	1000	$ 6,966
UK	BES (max distance)	35	1000	$ 8,200
Holland	metro	32	1000	$ 4,451
Italy	metro	32	1000	$ 53,415
Italy	provincial	112	1000	$ 125,239
France	DSL Collect IP	32	1000	$ 17,202
France	DSL Collect IP	112	1000	$ 17,202
France	DSL Collect IP	230	1000	$ 17,202

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APPENDIX E: FINAL BENCHMARKING DATASET – RECURRING MONTHLY RENTAL RATES

		Distance	BW	Price	
		km	Mbps	NZD	
Canada	metro	32	50	$	3,745
Canada	provincial	350	50	$	5,232
Canada	regional	400	50	$	5,542
Italy	metro	32	50	$	2,671
Italy	provincial	112	50	$	6,262
Canada	metro	32	100	$	4,364
Canada	provincial	350	100	$	7,340
Canada	regional	400	100	$	7,960
UK	ONBS	15	100	$	2,748
UK	BES	32	100	$	4,881
Holland	metro	32	100	$	1,776
Italy	metro	32	100	$	5,342
Italy	provincial	112	100	$	12,524
France	DSL Collect IP	32	100	$	5,432
France	DSL Collect IP	112	100	$	5,432
France	DSL Collect IP	230	100	$	5,432
Italy	metro	32	150	$	8,012
Italy	provincial	112	150	$	18,786
Canada	metro	32	200	$	6,733
Canada	provincial	350	200	$	12,684
Canada	regional	400	200	$	13,924
Italy	metro	32	200	$	10,683
Italy	provincial	112	200	$	25,048
Holland	metro	32	200	$	2,289
Holland	metro	32	300	$	2,682
Holland	metro	32	400	$	3,013
Holland	metro	32	500	$	3,305
Holland	metro	32	600	$	3,569
Holland	metro	32	700	$	3,811
Holland	metro	32	800	$	4,038
Holland	metro	32	900	$	4,250
UK	BNS	32	1000	$	3,665
UK	BNS (max distance)	70	1000	$	6,563
Canada	metro	32	1000	$	16,652
Canada	provincial	350	1000	$	46,410
Canada	regional	400	1000	$	52,610
France	DSL Collect Ethernet	32	1000	$	34,222
France	DSL Collect Ethernet	112	1000	$	99,407
UK	ONBS	15	1000	$	4,815
UK	BES	32	1000	$	6,966
UK	BES (max distance)	35	1000	$	8,200
Holland	metro	32	1000	$	4,451
France	DSL Collect IP	32	1000	$	17,202
France	DSL Collect IP	112	1000	$	17,202
France	DSL Collect IP	230	1000	$	17,202

APPENDIX F: FINAL BENCHMARKING DATASET – NON-RECURRING CONNECTION RATES

	service	Connection charge
Canada	metro	$ 6,820
Canada	provincial	$ 6,820
Canada	regional	$ 6,820
Italy	metro	$ 14,636
Italy	provincial	$ 14,636
Canada	metro	$ 6,820
Canada	provincial	$ 6,820
Canada	regional	$ 6,820
UK	ONBS	$ 14,486
UK	BES	$ 14,486
Holland	metro	$ 1,691
Italy	metro	$ 14,636
Italy	provincial	$ 14,636
France	DSL Collect IP	$ 7,243
France	DSL Collect IP	$ 7,243
France	DSL Collect IP	$ 7,243
Italy	metro	$ 14,636
Italy	provincial	$ 14,636
Canada	metro	$ 8,059
Canada	provincial	$ 8,059
Canada	regional	$ 8,059
Italy	metro	$ 14,636
Italy	provincial	$ 14,636
Holland	metro	$ 1,691
Holland	metro	$ 1,691
Holland	metro	$ 1,691
Holland	metro	$ 1,691
Holland	metro	$ 1,691
Holland	metro	$ 1,691
Holland	metro	$ 1,691
Holland	metro	$ 1,691
UK	BNS	$ 68,738
UK	BNS (max distance)	$ 68,738
Canada	metro	$ 8,059
Canada	provincial	$ 8,059
Canada	regional	$ 8,059
France	DSL Collect Ethernet	$ 18,107
France	DSL Collect Ethernet	$ 18,107
UK	ONBS	$ 27,391
UK	BES	$ 27,391
UK	BES (max distance)	$ 27,391
Holland	metro	$ 1,691
France	DSL Collect IP	$ 12,675
France	DSL Collect IP	$ 12,675
France	DSL Collect IP	$ 12,675

Standard terms determination for Telecom's unbundled bitstream access backhaul

APPENDIX G: APPLICATION OF CHARGES

This Appendix provides a number of examples of how the monthly rental (service components 2.1 to 2.24 of the UBA Backhaul Price List) and non-recurring connection charges (service components 1.1 and 1.2 of the UBA Backhaul Price List) are to be applied under this STD.

Example 1:

Where the Access Seeker requires the same capacity on both the Primary and Secondary Links of the UBA Backhaul Service, the monthly rental rate (and connection charge) is determined as follows.
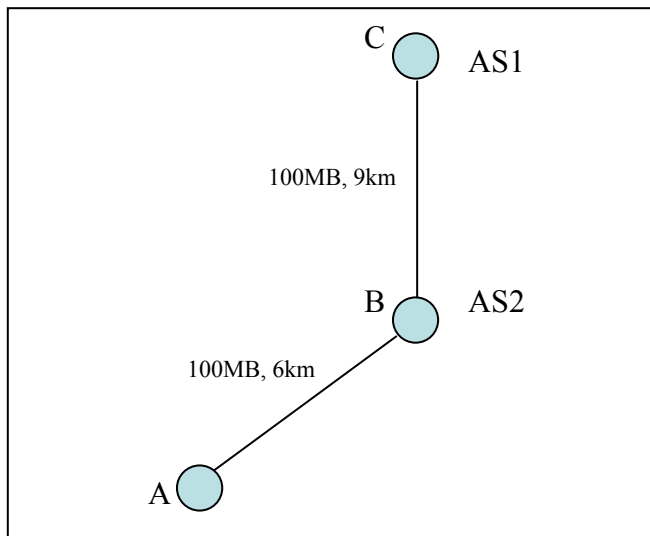
Access Seeker 1

Access Seeker 1 (AS1) takes its UBA backhaul traffic from the FDS located at A. The Parent POI is at B, and AS1 is located near C (ie C is the ASNAPOI for AS1). The UBA Backhaul Service required by AS1 would have the following prices:

Monthly Rental Rate A-C (100Mbps, 15kms): $2,181 per month
Total Connection Charge (A, C): $8,059 (one-off)

Access Seeker 2

Access Seeker 2 (AS2) takes its UBA backhaul traffic from the FDS located at A. The Parent POI is at B, and AS2 is also located near B (ie B is the ASNAPOI for AS2). The UBA Backhaul Service required by AS2 would have the following prices:

Monthly Rental Rate A-B (100Mbps, 6kms): $1,683 per month
Total Connection Charge (A, B): $8,059 (one-off)

In the above example, AS1 pays a higher monthly rental than AS2, as AS1 requires the UBA Backhaul Service over a greater distance. The connection charge is the same, as both Access Seekers require connection at two ends, and the connection charge is not distance-related.

Example 2:

Where the Access Seeker requires differing capacity on the Primary and Secondary Links of the UBA Backhaul Service, the monthly rental rate (and connection charge) is determined as follows.
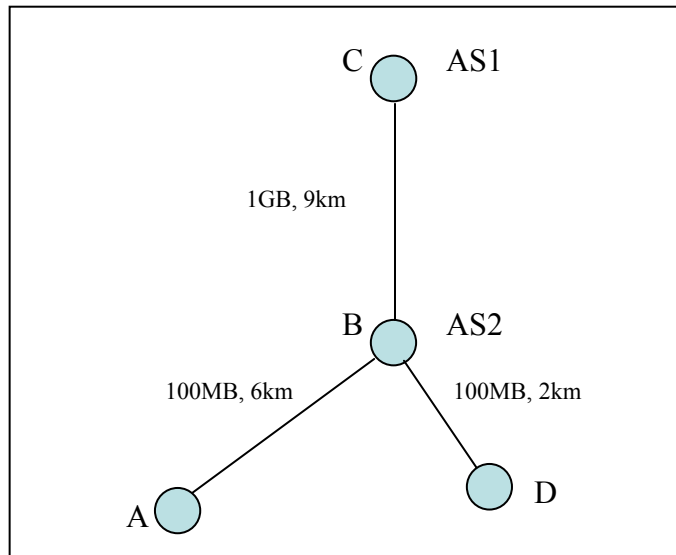
Access Seeker 1

Access Seeker 1 (AS1) takes its UBA backhaul traffic from the FDSs located at A and D. The Parent POI is at B, and AS1 is located near C (ie C is the ASNAPOI for AS1). Where AS1 chooses to purchase a 1GB service on the secondary link, in anticipation of additional primary links being added in the future, the UBA Backhaul Service required by AS1 would have the following prices:

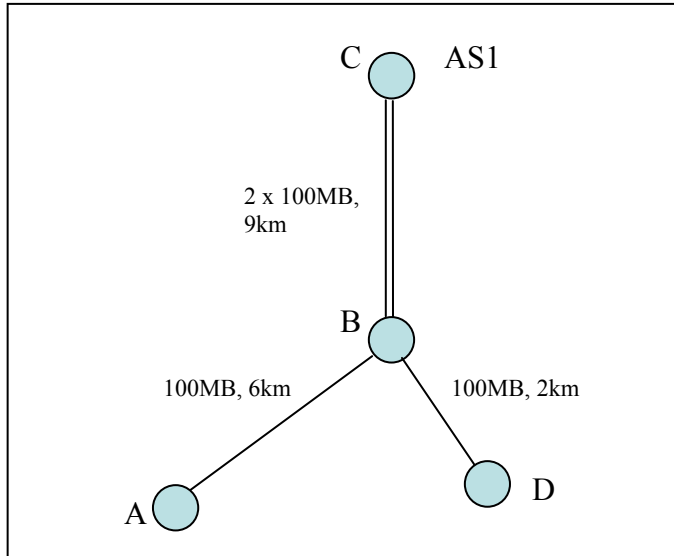|	
Monthly Rental Rate A-B (100Mbps, 6kms):	$1,683 per month
Monthly Rental Rate D-B (100Mbps, 2kms):	$ 964 per month
Monthly Rental Rate B-C (1Gbps, 9kms):	$4,091 per month
Total Monthly Rental Rate:	$6,738 per month
Total Connection Charge (A, D, C):	$12,089 (one-off)

Access Seeker 2

Access Seeker 2 (AS2) takes its UBA backhaul traffic from the FDSs located at A and D. The Parent POI is at B, and AS2 is also located near B (ie B is the ASNAPOI for AS2). The UBA Backhaul Service required by AS2 would have the following prices:

Monthly Rental Rate A-B (100Mbps, 6kms):	$1,683 per month
Monthly Rental Rate D-B (100Mbps, 2kms):	$ 964 per month
Total Monthly Rental Rate:	$2,647 per month
Total Connection Charge (A, B, D):	$12,089 (one-off)

In example 2, AS1 pays a higher monthly rental than AS2, as AS1 requires the UBA Backhaul Service over a greater distance. The connection charge is the same but is higher than under example 1, as both Access Seekers require connection at three ends.

Example 3:

Access Seeker 1

Access Seeker 1 (AS1) takes its UBA backhaul traffic from the FDSs located at A and D. The Parent POI is at B, and AS1 is located near C (ie C is the ASNAPOI for AS1). In this example, AS1 purchases two UBA Backhaul Services (A-C and D-C), which would have the following prices:

    Monthly Rental Rate A-C (100Mbps, 15kms): $2,181 per month
    Monthly Rental Rate D-C (100Mbps, 11kms): $2,181 per month
    Total Monthly Rental Rate: $4,362 per month
    Total Connection Charge (A, C, D, C): $16,118 (one-off ie 2 x $8,059)

Compared to example 2, AS1 pays a lower monthly rental of $4,362 per month, and a higher connection charge of $16,118. AS1 will face a trade-off between incurring the higher monthly rental associated with the higher capacity 1Gbps Secondary Link in example 2, and the higher connection charges associated with smaller multiple Secondary Links in example 3. AS1's expectations about the amount of capacity required at B (ie the number of unbundled exchanges it will serve from that Parent POI) will determine the optimal configuration of Primary and Secondary Links.