Ofcom
OFFICE OF COMMUNICATIONS

Valuing copper access

Final statement

Date of publication: 18 August 2005

Contents

Section 1

Summary

1.1 This is the final statement to Ofcom's review into valuing BT's copper access network (i.e. the network assets BT uses between the telephone exchange and each user of telecommunications services). There are two elements to this: the valuation and the operational costs. BT recovers the costs associated with these assets through the charges it makes for their use. The valuation provides an element of the cost called the return on capital employed which is calculated as a percentage (the cost of capital) of the value of the assets and drives the amount of depreciation. The operational costs comprise all other costs such as maintenance and overheads.

1.2 The determination of the costs associated with the network is important because it forms part of the cost of some products provided by BT to other communications companies to enable them to provide services to their customers. These products include wholesale line rental (WLR) and local loop unbundling (LLU). WLR is used to provide telephone services and LLU is used mainly to provide broadband services. Clearly if the value of the network is not correct, then the amount BT charges communications companies for using the network may lead it to over-recover or under-recover against its costs, neither of which is in the interests of consumers. This statement is concerned with the method by which the value of the assets and the depreciation charges are calculated whilst a separate review has examined the cost of capital[1]. The operational costs are allocated on the basis of the detailed attribution methods documented by BT[2].

1.3 Ofcom began this review in May 2004 in response to its belief, as a result of its strategic review of telecommunications[3], that it is now unlikely that within the near future any new operator will enter the UK communications industry and build a nationwide access network able to perform the same function as that owned and operated by BT. Although the cable companies have built large networks and are able to offer telephone and broadband services – as well as other services such as TV – in direct competition with BT, they only cover around half of UK homes. Ofcom does not believe the cable companies will significantly increase their coverage in the near future. This means that for a large number of UK homes and businesses BT is the only provider of local access to them and that this is unlikely to change in the near future. This lack of effective competition means that it is important to ensure that the price that other companies, and ultimately consumers, pay for using BT's network is not too high.

1.4 At the outset this review was concerned with verifying that the method used to value BT's network was accurate. With the exception of the way BT counts the amount of network equipment it has – discussed further below – Ofcom was satisfied that the method used by BT produced an answer for the value of the network which was as accurate as could reasonably be expected. However, in the course of this work Ofcom became concerned that, if certain changes were not made to reflect past changes in the path of cost recovery,

[1] http://www.ofcom.org.uk/consult/condocs/cost_capital2/statement/
[2] http://www.btplc.com/Thegroup/Regulatoryinformation/Financialstatements/index.htm
[3] http://www.ofcom.org.uk/static/telecoms_review/index.htm

there was the potential for BT in the future to recover more than the costs it had actually incurred. Ofcom has decided to make these changes to limit this over-recovery. It is expected that these changes will only be required once in order to correct the path of cost recovery, on a forward-looking basis, for the change in accounting treatment in 1997 to some access network assets.

1.5 In 1997 Ofcom's predecessor, Oftel, changed the way BT accounts for its network assets in its regulatory accounts. These accounts are different to the statutory accounts BT presents to the City and are used by the regulator to understand BT's costs. Oftel chose to value BT's network assets based on how much it would cost to replace them at today's prices (known as 'current cost accounting' or CCA) rather than how much BT spent on them when it bought them (known as 'historical cost accounting' or HCA). The reason for the change is that it allowed regulated prices to be set based on what it would cost to replace the network or for somebody else to build the same thing. Thus, if somebody could do it cheaper than BT then they should be encouraged to build their own network and under-cut BT's prices. Ofcom still believes that this is the right way to do things where, as in most cases, entry signals are a major consideration.

1.6 At the time Oftel's analysis showed that this change in accounting treatment would not result in BT over- or under-recovering its costs during the next price control period, which lasted until 2001. However, no analysis was performed to see what would happen after that as it was expected that competition would emerge as the main constraint on prices. In this review, Ofcom has looked again at cost recovery by BT and has determined that if nothing is done the current prices, as set by Ofcom, that BT charges competitors for access to its network will result in BT recovering more than its costs for all the copper access network assets that were already deployed at the time the change in accounting treatment was made, that is 1 August 1997. There should be no systematic over- or under-recovery of cost related to network assets purchased after 1997 as these have been consistently treated under current cost accounting.

1.7 Ofcom has therefore decided to create a regulatory asset value, or RAV, to represent the remaining value of the pre-1997 copper access network assets rather than continuing to value those assets at their current cost. The value of the RAV is set to equal the closing historical cost accounting value for the pre 1 August 1997 assets for the 2004/5 financial year and its value will be increased each year by the Retail Price Index to ensure it is not eroded by inflation. Over time the RAV will gradually disappear as the pre-1997 assets are gradually replaced with new ones.

1.8 Some responses to Part 2 of this review[4] queried why Ofcom was not calculating whether and, if so, by how much BT had over-recovered in the past and whether this amount could be taken back. Ofcom does not believe that it is appropriate to take back money from BT that it has earned in the past, based on prices set by the regulator, as this would lead to huge uncertainty as to how prices today might be affected by decisions yet to be made.

1.9 In Part 2 of this review Ofcom did consider some more radical changes to the way the value of BT's copper access network is calculated. This included

[4] http://www.ofcom.org.uk/consult/condocs/copper/

basing the value of BT's network on what somebody might spend if they were to build a brand new network today as opposed to simply replacing what BT has. Responses from those companies which do not have their own network were in favour of such an approach as it would lead to the result that might be expected if an effective competitor to BT were to build their own network. In contrast, those companies which do have their own network – BT and the cable companies – did not agree with this approach. Ofcom agrees that such an approach is not appropriate as there is a great deal of subjectivity in the modelling and it is important that the model is right if it is to be used. Also, the use of such a model could require Ofcom to become intrusively involved in BT's internal network planning and investment decisions. It is Ofcom's view that with the information available today it is better to base costs on something real, i.e. BT's network, as a more objective way of determining what the replacement cost would be.

1.10 For the same reason, Ofcom does not believe it is right to reduce BT's valuation to account for spare and surplus network assets or for the fact that some of the network assets BT has deployed are no longer available new. Ofcom further believes that BT's estimate of the manpower cost of building the network, the labour rate, is the most objective estimate available today of what it might be if the network were to be replaced. Ofcom also does not wish to change the way in which the cost of equipment used in both BT's access and core networks, i.e. shared duct, is split between the two.

1.11 However, Ofcom does believe it is appropriate to adjust the accounting lives BT uses for it copper and duct access assets in its regulatory accounts. Ofcom proposes to align these more closely to international benchmarks and to typical service lives. Copper will therefore change from an accounting life of 15 years to 18 years and duct from a rolling 25 years (but effective average 38 years) to a straight line 40 years. Also, Ofcom believes it is appropriate to reduce prices that BT can charge if there is evidence that BT is operating its network inefficiently and this is something Ofcom will consider when the prices of services, e.g. WLR and LLU, are determined. Also, Ofcom expects that as BT establishes its Access Services Division[5] – as outlined in Ofcom's recent Notice under Section 155(1) of the Enterprise Act 2002[6] – it will need to look again at the sharing of costs between access and core and Ofcom will be involved in this process.

1.12 Finally, Ofcom explained in both Part 1 and Part 2 of this review about its concerns over the way in which BT currently counts the amount of equipment it has in its copper access network and the accuracy of the result. BT has explained to Ofcom that it is in the process of automating its paper records of equipment through its PIPeR project, in support of network operations, and that it expects that this can be used to provide a more accurate estimate in future of the total amount of equipment deployed in support of CCA valuations. Ofcom agrees that this is a promising route to solving the problems with the current method and will work with BT to agree a plan to migrate to the use of PIPeR and ensuring that the accuracy is improved.

1.13 Together with the change in the weighted average cost of capital for BT's access network assets, as determined in Ofcom's Cost of Capital review, the

[5] http://www.btplc.com/News/Articles/Showarticle.cfm?ArticleID=e89ed523-12a0-45a1-bc2b-321f127e83be

[6] http://www.ofcom.org.uk/consult/condocs/sec155/

changes that Ofcom has decided to make result in an overall reduction of £17.31 in the estimated average cost for the financial year 2005/6 for the parts of the copper loop considered within the scope of this exercise (i.e. the D and E-side duct and copper). The revised cost of the in-scope components is £59.10 for the financial year 2005/6. These figures are necessarily estimates, since they are calculated with reference to assumed changes in the CCA valuation of the assets for which actual data will not be available until after the end of the financial year ending 31 March 2006.

1.14 Further, this number needs to be adjusted slightly when applied to each service to account for differing fault rates by service and the presence of Digital Access Carrier System (DACS) equipment on some loops (which allows two voice lines to share the same loop). Further work will be undertaken, as part of the current analysis by Ofcom into the cost of WLR and LLU services, in order to establish the cost of the copper loop for each line bearing such products. However, Ofcom considers that a reasonable estimate of costs for the parts of the copper loop considered within the scope of this exercise to be the following, for the financial year 2005/6:

- WLR – £58.51 per line; and
- LLU – £60.11 per line.

1.15 The WLR and LLU reviews will also consider the need for any efficiency factor which should be appropriately taken into account in respect of the costs relevant to the copper loop and any further adjustments to the level of operating costs which may appropriately be attributed to those products or to the cost of a copper loop.

1.16 The RAV relates only to assets which were in place at the time of the switch from HCA to CCA, i.e. 1 August 1997. All assets added after this date have been treated consistently under CCA and will continue to be so. This means that over time the asset base will move toward a full CCA valuation as pre-1997 assets are retired and replaced with new ones. As a result the RAV will gradually “unwind” and costs will be calculated on a full CCA basis. Due to the shorter asset life this effect is more rapid for copper than for duct. If it is assumed that duct has a 40 year life (in line with the accounting treatment outlined in this review) then in theory the last remaining assets included in the RAV will become fully depreciated in 2037/8. From this point forward all assets would be treated under a full CCA basis and would have been so throughout their life. In terms of the near term impact of this convergence, Ofcom estimates that the unwinding of the RAV means that the cost of the in-scope assets is likely to be approximately 3% higher in 2009/10 than in 2005/6. This impact relates to the unwinding of the RAV only, and does not take account of any other cost changes such as changing asset prices and their impact on the CCA valuation. Ofcom will give consideration to these effects in its analysis of LLU and WLR charges.

1.17 It should be noted that Ofcom has compiled these estimates based on the most recent data available to it in respect of current cost accounting data for the financial year 2004/5. The external audit of these figures is ongoing and audited versions of BT’s regulatory financial statements are not due to be published until early September. Furthermore, Ofcom wishes to obtain further data from BT to inform its analysis of historical and future trends in relation to operating costs. Therefore, although Ofcom believes that the data provided to

it are likely to be sufficiently robust to support the numbers presented above, Ofcom may need to adjust these in the LLU and WLR consultations were substantial unexpected changes to the data to arise following completion of the audit process or of Ofcom's review of the operating cost data supplied to it by BT.

1.18 Ofcom intends to implement the results of this review via the forthcoming fully unbundled rental charge consultation (expected early September 2005) and the WLR charge consultation expected later this year. In parallel Ofcom will work with BT and industry to determine how these results might be represented in the regulatory financial statements and how to migrate to PIPeR as the basis of preparing the valuation.

Section 2

Introduction

Background

2.1 In Phase 2 of the Telecommunications Strategic Review[7] Ofcom set out its view that much of BT's copper access network is not effectively competitive and that there is little sign of this situation changing in the near term. In light of this, wholesale access services are an important mechanism for introducing sustainable competition in downstream markets.

2.2 For those wholesale products which use a copper loop, for example wholesale line rental (WLR) and local loop unbundling (LLU), the cost of that loop is an important component of the overall cost-oriented charge for the product. As such it is important to ensure that the copper loop cost is correctly determined within the regulatory framework prevailing at the time the wholesale product charges are determined. This review was initiated with the aim of establishing what the annual cost of a copper line is, in a manner consistent across all relevant regulated products.

Scope of this statement

2.3 This is the final statement of a two part consultation. The overall review has been concerned with two key questions:

1. Is BT correctly applying the existing methodology?

2. Is the agreed methodology the right one?

2.4 In Part 1 of this review[8] Ofcom concluded that BT is substantially applying the agreed methodology although a number of items were highlighted as being of concern. In Part 2 of this review[9] Ofcom provided a financial analysis of certain alternative valuation methodologies and also examined the items of concern highlighted in Part 1 within the context of this analysis. A supplement to Part 2[10] was published which provided further analysis of the approach proposed to limit the possibility of BT's future over-recovery of its costs.

2.5 In Part 2 of this review Ofcom proposed to establish a regulatory asset value (RAV) for those copper access network assets which were in place at 1 August 1997 (the date of the switch from historical cost accounting (HCA) to current cost accounting (CCA) within the regulatory accounts). Further, Ofcom proposed to align the regulatory book lives of copper and duct with international benchmarks.

Links to other areas of Ofcom's work

2.6 Within the framework of the Telecommunications Strategic Review, Ofcom has consulted on the approach to risk in the assessment of the cost of

[7] Phase 2 of the Telecommunications Strategic Review, published 18 November 2004, available at http://www.ofcom.org.uk/consult/condocs/telecoms_p2
[8] http://www.ofcom.org.uk/consult/condocs/copper/value/
[9] http://www.ofcom.org.uk/consult/condocs/copper/value2/
[10] http://www.ofcom.org.uk/consult/condocs/copper/valuep2/

capital[11]. The return on capital affects the cost base of the copper access network assets although it does not affect the methodology. The change in the cost of capital for access assets resulting from the cost of capital review has been factored into this analysis.

The legal framework

2.7 The current EU regulatory framework for electronic communications networks and services came into force in the UK on 25 July 2003. The basis for the framework is five EU Communications Directives[12]. Under the EU framework the provision of all electronic communications networks and services is generally authorised and the system of individual licences has been abolished. Therefore network and service providers can enter the market as they wish, although they must comply with any applicable general conditions which have been set, and any specific conditions which apply in their specific case, such as universal service conditions or SMP conditions. The Director General of Telecommunications (the 'Director') published the general conditions of entitlement on 22 July 2003[13].

2.8 The Framework, Authorisation, Access and Universal Service Directives were implemented via the Communications Act 2003 (the 'Act'). Prior to 29 December 2003 the Director exercised functions under the Act in relation to electronic communications networks and services. On 29 December 2003 Ofcom took over those functions.

2.9 As noted above, the purpose of this review is to establish how Ofcom will assess the cost of a copper loop for the purposes of setting the charges related to those wholesale products which use BT's copper access network.

2.10 Section 87(9) of the Act provides that Ofcom may impose the following types of conditions on a communications provider designated as having significant market power (SMP) in a particular market:

- such price controls as Ofcom may direct in relation to the matters connected with the provision of network access to the relevant network, or with the availability of the relevant facilities;
- such rules as they may make in relation to those matters about the recovery of costs and cost orientation;
- such rules as they may make for those purposes about the use of cost accounting systems; and
- obligations to adjust prices in accordance with such directions given by Ofcom as they may consider appropriate.

[11] http://www.ofcom.org.uk/consult/condocs/cost_capital2/statement/

[12] The Directives are: Directive 2002/21/EC (Framework Directive), Directive 2002/20/EC (Authorisation Directive), Directive 2002/19/EC (Access Directive), Directive 2002/22/EC (Universal Service Directive) and Directive 97/66/EC concerning the processing of personal data and the protection of privacy in the telecommunications sector. All can be obtained from http://europa.eu.int

[13] http://www.ofcom.org.uk/static/archive/oftel/publications/eu_directives/2003/cond_final0703.pdf

2.11 Section 87(10) of the Act states that the conditions that Ofcom may impose pursuant to section 87(9) of the Act include conditions requiring the application of presumptions in the fixing and determination of costs and charges for the purposes of the price controls, rules and obligations imposed.

2.12 Section 87(9) and (10) of the Act must be read in the light of Section 88 of the Act. This sets out certain conditions that Ofcom must satisfy and certain matters that Ofcom must take into account when imposing conditions under Section 87(9). Under section 88(1)(b), Ofcom must not impose a condition unless to do so is appropriate for the purposes of promoting efficiency, promoting sustainable competition and conferring the greatest possible benefit on the end-users.

Ofcom's duties

2.13 The Act sets out certain duties for Ofcom, including the principal duty under section 3(1) of the Act to further the interests of citizens in relation to communications matters and to further the interests of consumers in relevant markets, where appropriate by promoting competition. Under section 3(2)(b) Ofcom must secure the availability throughout the UK of a wide range of electronic communications services and under section 3(3)(a) must have regard to the principles under which regulatory activities should be transparent, accountable, proportionate, consistent and targeted only at cases in which action is needed. Section 3(4) of the Act also sets out a list of factors to which Ofcom must have regard as relevant, including the desirability of promoting competition in relevant markets. Under section 3(5) Ofcom must have regard, in performing its duty to further the interests of consumers, to the interests of those consumers in respect of choice, price, quality of service and value for money.

2.14 In addition, Ofcom must act in accordance with the six Community requirements set out in section 4 of the Act, including the requirement to promote competition in relation to the provision of electronic communications networks and services, the requirement not to favour, so far as practicable, one form of network or service over another, and the requirement to promote the interests of European citizens.

Terminology

2.15 A number of terms are in use with respect to the access network. For the purposes of this statement, Ofcom's understanding of two key terms is as follows:

- 'Access network' refers to that part of the network deployed between the exchange building and the end users. Within the context of this review, access links other than those provided by pairs of metallic wires, e.g. optical fibre, are excluded as are the 'drop wires' which comprise the final link between the end user and the distribution point (DP).

- 'Core network' refers to that part of the network deployed between exchange buildings. For the purposes of this review, the exchange buildings themselves are also assumed to be part of the core network as is the equipment within the building including the main distribution frame (MDF) and switching equipment.

2.16 Ofcom is not proposing that regulation should rely upon or specifically relate to the terms described above. These terms are being used simply to ensure consistent understanding and for convenience.

EU framework

2.17 Ofcom has met with both the German regulator[14], RegTP, and the French regulator[15], ARCEP, during the course of this review. Like Ofcom, both regulators are actively engaged in promoting wholesale access to the local access networks of their incumbent operators, Deutsche Telekom[16] and France Télécom[17] respectively.

Structure of the rest of this statement

2.18 The rest of this statement is divided into three main sections:

- Section 3 looks at the policy issues and the regulatory framework within which wholesale access services operate;
- Section 4 discusses responses to Part 2 of the review and the supplement to Part 2; and
- Section 5 presents Ofcom's conclusions.

[14] http://www.regtp.de/en/index.html
[15] http://www.arcep.fr/eng/index.htm
[16] http://www.telekom3.de/en-p/home/cc-startseite.html
[17] http://www.francetelecom.com/en/

Section 3

Policy aims and the regulatory framework

Introduction

3.1 As stated in the Telecommunications Strategic Review, it is Ofcom's view that wholesale access to BT's copper access network as a means of enabling sustainable competition in downstream markets has taken on a renewed importance. The mechanisms for this competition are the wholesale access products of WLR and LLU since it is through these products that alternative service providers can gain access to BT's local loop on a cost-oriented basis, and use these facilities for the delivery of their own services.

3.2 For wholesale charges to be cost-oriented it is necessary to establish the costs incurred by BT in offering these wholesale services. As these services are primarily based on copper assets it is important to establish what the annual cost of a copper loop is. The purpose of this review has been to consider how best to value BT's copper access network such that the annual cost of a copper loop can be determined and used to set the prices of WLR and LLU[18]. Part 1 of this review was concerned primarily with what should be valued and whether BT is correctly applying the existing methodology. Part 2 of this review looked in more depth at the appropriate methodology for establishing the cost.

3.3 The conclusions set out in this document are consistent with the approach to competition set out in the Telecommunications Strategic Review. In essence this is about striking an appropriate balance between protecting consumers through regulation and giving incentives for competition to develop through entry by new network operators. Although in the medium term, Ofcom believes that further entry by competing access providers is unlikely, in the longer term it remains possible. In the longer term, therefore, entry signals are still a relevant consideration, which Ofcom has sought to balance in its proposals with the need to protect consumers in the medium term. The aim of achieving this balance underlies Ofcom's decision to limit the possibility of over-recovery by BT of costs relating to those copper access network assets which were in place at the time of the switch to CCA in 1996/97 through the establishment of a RAV whilst, with this exception, retaining current cost accounting as the preferred approach to asset valuation. This is because, in the longer term, CCA will provide appropriate price signals to both suppliers and consumers as well as providing regulatory consistency and consistency with Ofcom's forward-looking approach generally.

[18] Some Partial Private Circuits (PPCs) also use metallic pairs in the final drop to the customer. Ofcom does not intend currently, however, to re-examine the existing PPC price controls as a result of this statement as to do so given that the price controls were imposed quite recently (in September 2004) would seem disproportionate. However, Ofcom will take account of this statement when the PPC price controls are next examined.

The change from HCA to CCA

3.4 In 1996/97 Oftel conducted a review of the methodology for valuing BT's local loop assets[19] and concluded that the existing method of HCA did not provide the most appropriate economic signals to BT, its competitors and consumers. As a result of this review a change from HCA to CCA was mandated. Ofcom believes that the argument that CCA provides better signals to BT, its competitors (including potential entrants) and consumers in relation to investment decisions still has some force, but that this needs to be balanced with other objectives.

3.5 The change to CCA was driven by Oftel's desire to encourage competition within the UK telecommunications market through encouraging new access infrastructure providers. The move from HCA to CCA was made to provide incentives for efficient investment in access infrastructure. Together with an appropriate cost of capital, this was a move in the direction of promoting competition in access, the stated intention.

3.6 During the period 1996 to 2000 the cable operators continued to expand their network coverage and some alternative access mechanisms, most notably wireless local loop, were tried. However, this has not resulted in significant infrastructure competition to BT in many regions as the narrowband wireless local loop providers were unable to sustain their business models and cable based services are only available to just over half of UK homes.

The case for retaining CCA

3.7 Throughout this review there has been much discussion about whether it is appropriate to retain CCA. Ofcom continues to believe that the CCA approach is in general the most appropriate method to follow provided it is followed consistently over the life of the assets:

- Although the Telecommunications Strategic Review has taken the view that the access network is an enduring bottleneck, and that new entry in the short to medium term appears unlikely, new entry in the long term has not been ruled out. Ofcom's proposals will protect consumers in the medium term whilst ensuring a return to full CCA in the long term once the pre-1997 assets have been written off.

- The most appropriate measure of costs is one which is sensitive to the way the cost of investment, or the resources which are needed to produce the goods or services, change over time. The objective of the work carried out by Ofcom is not to change prices in an arbitrary and inefficient way. The objective is rather to balance the desirability of prices which are linked to appropriate economic incentives with the interests of consumers. These incentives are important as they are designed to continue to encourage investment in the network.

- Ofcom believes that a return to HCA would tip the balance too far against the aim of encouraging competing infrastructure. Charges based on HCA give poor signals for investment since they reflect costs of when the asset was purchased rather than what it would cost now. There is a danger that

[19] Pricing of Telecommunications Services from 1997, published June 1996, available at http://www.ofcom.org.uk/static/archive/oftel/publications/1995_98/pricing/pri1997b/contents.htm

basing prices on HCA, without allowing for future changes in asset prices, could stifle efficient investment in access networks in the longer term.

Valuation

Initial options

3.8 It is Ofcom's view that in order to promote competition at the deepest levels of infrastructure where it will be effective and sustainable, in accordance with Ofcom's regulatory principles, it is necessary to set prices for wholesale access products which can support such competition whilst still allowing BT a fair return on its employed capital. These prices should not be set in an arbitrary and inefficient way, but in a way in which prices can be linked to appropriate economic incentives. Whilst Ofcom recognises the business context within which respondents framed their responses, it is important that a regulator should strike a fair balance in the interests of both the industry and the citizen-consumer.

3.9 In Part 1 of this review Ofcom identified four options for the valuation methodology to be applied to BT's copper access network and asked respondents to comment on them:

- **Option 1:** BT's current methodology, possibly amended to take into account some concerns with the methodology;
- **Option 2:** optimised deployment of current technology (taking advantage of any geo-demographic changes since the network was originally built);
- **Option 3:** optimised deployment of new technology (taking advantage of any geo-demographic changes and advances in technology since the network was originally built); and
- **Option 4:** varying asset and input prices (estimate unit prices based on the scope of the network build of an efficient entrant).

The first three options were mutually exclusive but the fourth could be used in combination with any of the other three.

Evaluation criteria

3.10 In order to provide an objective method for assessing these options, Ofcom established a list of criteria against which each candidate should be assessed. The criteria were based on Ofcom's regulatory principles and built upon the seven key regulatory principles as identified in the Telecommunications Strategic Review:

- promote competition at the deepest levels of infrastructure where it will be effective and sustainable;
- focus regulation to deliver equality of access beyond those levels;
- as soon as competitive conditions allow, withdraw from regulation at other levels;

- promote a favourable climate for efficient and timely investment and stimulate innovation, in particular by ensuring a consistent and transparent regulatory approach;

- accommodate varying regulatory solutions for different products and, where appropriate, different geographies;

- create scope for market entry that could, over time, remove economic bottlenecks; and

- in the wider communications value chain, unless there are enduring economic bottlenecks, adopt light-touch economic regulation based on competition law and the promotion of interoperability.

3.11 As noted in Section 2 above, Ofcom is required under Section 3 of the Act to further the interests of citizens in relation to communications matters, and further the interests of consumers in relevant markets, where appropriate by promoting competition. In addition, Ofcom is required to have regard to the principle that regulatory activities should be transparent, accountable, proportionate, consistent and targeted only at cases where action is needed. With this in mind Ofcom determined that the following evaluation criteria should be applied to the various options developed during this review:

- the method should be as simple as possible and consistent with the regulatory accounting principles of objectivity and transparency;

- the costs of implementation, and the burden on both industry and regulator, should not be disproportionate to the benefits to be gained by citizen-consumers from a more appropriate valuation and so the valuation should be practical;

- there should be minimum regulatory uncertainty moving forward so the chosen method should be robust and able to cope with anticipated future changes to the competitive market for local access;

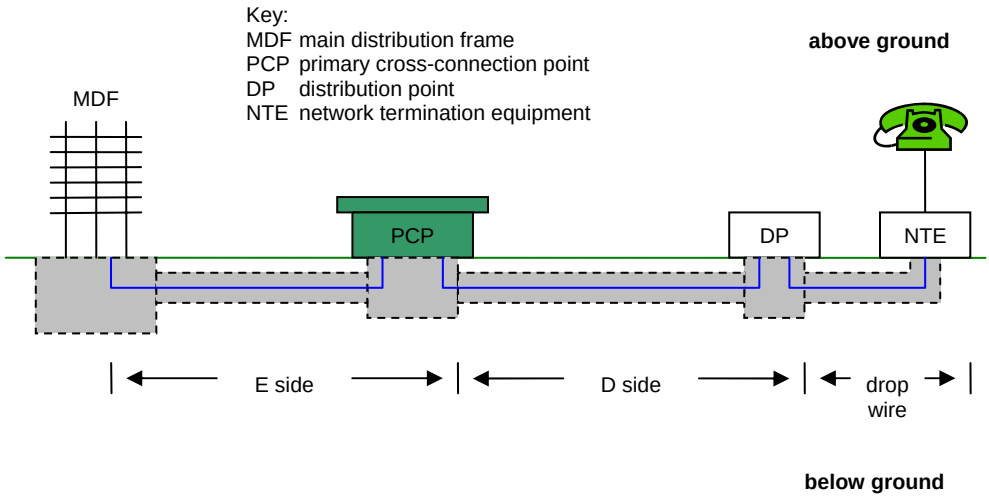
- it should be based on objective data sourced from within industry, primarily from within BT's regulatory accounting system, such that industry and citizen-consumers can be confident that charges reflect costs as accurately as possible; and

- the chosen method must be underpinned wherever possible by a sound economic rationale.

Scope of the valuation

3.12 In Part 1 of this review Ofcom took the view that the valuation should include the exchange side (E-side) and distribution side (D-side) infrastructure but exclude the drop wires. This is illustrated in Figure 1. The reason for this is that the majority of the value is in the E-side and D-side network and that this is where there is the greatest scope for examining alternative network architectures. With the notable exception of wireless technologies, the drop wire is essentially the same for each access technology and can, therefore, be assumed not to vary materially between options. This greatly simplified the analysis and allowed a direct comparison with the valuations provided by BT. Ofcom continued this approach in Part 2.

Figure 1: E side, D side and drop wire



Part 2 proposals

3.13 In Part 2 of this review Ofcom excluded Option 3 as the results of the work by Analysys[20] indicated that it was unsuitable as a basis for valuation. Similarly, Option 4 was excluded as the existing input prices were, in Ofcom's view, appropriate. Some respondents had indicated uncertainty in response to Part 1 of the review over the labour rates used by BT and these rates were therefore published in Part 2. Only Options 1 and 2 were therefore carried forward in Part 2 and these were refined into four proposals:

- **Proposal 0:** continue with the existing methodology and make no changes (the 'zero' case of Option 1 from Part 1);
- **Proposal 1:** adjust the existing methodology, including changes to the asset lives used by BT, and establish a RAV for the pre-1997 copper access network assets (Option 1 from Part 1 with the addition of the RAV concept);
- **Proposal 2:** adjust the existing methodology and add a network efficiency factor (Option 1 from Part 1 but with an abatement factor derived from Option 2); and
- **Proposal 3:** hypothetical modern equivalent asset (Option 2 from Part 1).

3.14 The supplement to Part 2 provided further detail to Proposal 1 by proposing four alternative methods of calculating the RAV:

- **Method 1:** establish the RAV at 1 August 1997 and index forward using asset specific price indices;
- **Method 2:** establish the RAV at 1 August 1997 and index forward using the Retail Price Index (RPI);
- **Method 3:** establish the RAV at 1 April 2004 and index forward using asset specific price indices; and

[20] http://www.ofcom.org.uk/consult/condocs/copper/loop.pdf

- **Method 4:** establish the RAV at 1 April 2004 and index forward using the Retail Price Index (RPI).

3.15 Part 2 and its supplement therefore presented for comment seven alternative proposals as identified by Ofcom. Ofcom stated that its preferred option was to adopt Proposal 1 from Part 2 and Method 4 from the supplement to Part 2.

Section 4

Responses to Part 2 consultation

Introduction

4.1 The second part of the consultation into valuing BT's copper access network, Valuing copper access: Part 2 – Proposals[21] (Part 2) was published on 16 March 2005. A supplementary document, Valuing copper access: Supplement to Part 2 – Proposals[22] (supplement to Part 2) was published on 26 April 2005 and, as a consequence, the consultation period was extended until 13 May 2005.

4.2 Non-confidential responses to Part 2 and the supplement to Part 2 were received from the following eight bodies:

- BT;
- Cable & Wireless;
- Centrica;
- easynet;
- ntl;
- Scottish & Southern Energy;
- Telewest; and
- UKCTA.

In addition one confidential response was received.

All non-confidential responses can be found on Ofcom's website at: http://www.ofcom.org.uk/consult/condocs/copper/.

4.3 In this section the detailed responses to each of the consultation questions are discussed. Any other substantive issues raised by respondents are also discussed.

Detailed responses

4.4 There were 20 questions within Part 2 and a further two questions within the supplement to Part 2. In the remainder of this section each question is presented followed by a discussion of the main points arising out of responses to it together with Ofcom's analysis of those responses.

[21] http://www.ofcom.org.uk/consult/condocs/copper/value2/
[22] http://www.ofcom.org.uk/consult/condocs/copper/valuep2/

Policy aims and the regulatory framework

Question 1: *What is your opinion of Ofcom's approach to the establishment of the appropriate regulatory value?*

4.5 Broadly speaking most respondents supported Ofcom's approach to establishing the appropriate regulatory value. However, some respondents queried Ofcom's decision not to attempt to quantify and potentially "clawback" the element of any over-recovery that may have crystallised since 1 August 1997.

4.6 Ofcom remains of the view that it would be inappropriate to propose to "clawback" any over-recovery that may have crystallised in the period up to the implementation of the results of this review. Ofcom believes that any attempt to do so would be retrospective, in contravention of Ofcom's regulatory principles, and could be perceived as opportunistic. Further, such retrospective action would set a precedent leading to investment uncertainty signalling the potential for ex-post expropriation of returns legitimately earned under the agreed regulatory framework. BT has received returns since 1 August 1997 in line with the regulatory regime, through the use of CCA accounting. Ofcom has therefore determined not to clawback any over-recovery.

4.7 ntl and Telewest argued that the regulatory value set by Ofcom should result in prices that encourage efficient levels of investment by both new entrants and existing firms, and that this implied a regulatory value that measured the cost (or market value) of a new entrant building a new network today.

4.8 As stated in Part 2, it is Ofcom's view that much of BT's copper access network is not effectively competitive and that there is little sign of this situation changing in the near term. Therefore, consumer protection as opposed to investment incentives are the priority of this review. Nevertheless, Ofcom feels that by continuing to apply the CCA approach to assets installed after 1 August 1997 there is still an incentive for existing operators to invest in access infrastructure, and furthermore this incentive will grow as the pre-1997 assets become fully depreciated and the valuation moves toward a complete CCA valuation.

4.9 BT disagreed with Ofcom's proposed approach stating:

"The regulatory understanding in 1997 was that future regulation would be on the basis of CCA. Setting a regulatory value for assets in a retrospective way, which is effectively what is being proposed, is inappropriate and increases regulatory uncertainty going forwards. Setting a regulatory value for the 1996/7 assets using anything other than CCA is not appropriate, and inconsistent with the regulatory "contract".

We still strongly believe that CCA is the correct basis for valuation of the local access network assets. The CCA valuation must be adjusted for regulatory purposes to take full account of important and material assets (fully written down assets and drop wire) that have economic value."

4.10 Ofcom, like Oftel before it, remains of the view that CCA is the most appropriate regulatory accounting method for BT's copper access network assets, provided it is consistently applied throughout the life of those assets. Oftel mandated a change from HCA to CCA with the clearly stated intention

that the resulting economic signals would encourage infrastructure competition, the intent being that such competition would provide a competitive control on prices removing the need for intrusive regulation. In the absence of the evolution of such competition it is the regulator's duty to consider whether any changes are needed to protect consumers. Ofcom's analysis indicates that this one-time intervention is needed to ensure that consumers are adequately protected in the future.

4.11 In terms of cost recovery, the total returns permitted will be equivalent (for any given asset), irrespective of whether an HCA or FCM CCA methodology is applied, provided that the methodology is applied consistently throughout the asset's life and that such returns are discounted at the operator's cost of capital. However, any change in methodology during the life of the asset could lead to an over- or under-recovery of cost. The analysis conducted by Ofcom has shown that the inconsistent application of CCA on some of BT's network assets has created the potential for a future over-recovery of costs against those assets.

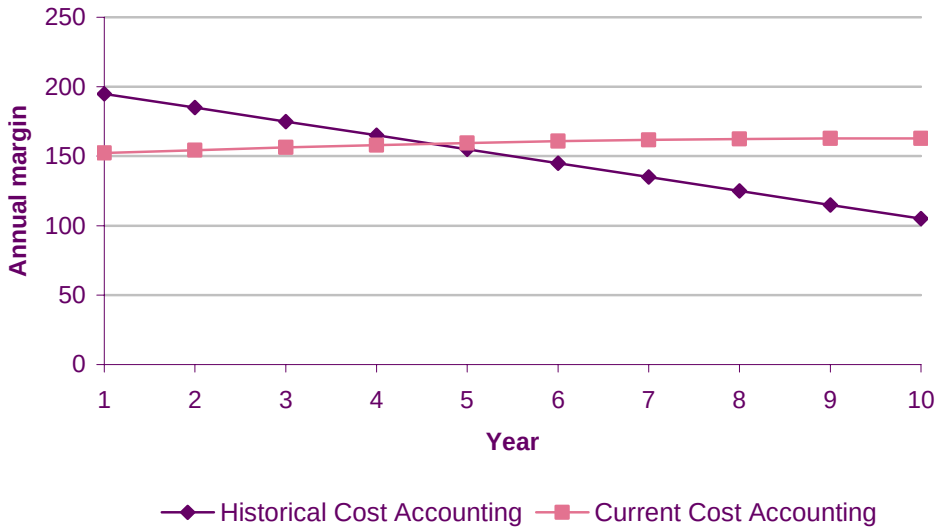
4.12 Although the use of CCA and HCA are equivalent in terms of cost recovery if applied consistently over time, a switch between the two conventions could potentially give rise to over- or under-recovery of costs depending upon the future replacement cost and the point during the asset lifecycle at which the switch took place. This is because, while the extent of cost recovery is equivalent between the two approaches, the path of cost recovery is not.

4.13 Depending upon the nature of the asset, setting prices using an HCA approach may lead to an earlier recovery of the costs than CCA or vice versa. Where the costs of the asset are not fully recovered through the price control, this gives rise to an under-recovery, whilst the converse gives rise to an over-recovery.

4.14 Figure 2 shows the gross margins required to equal a constant cost of capital for a simple hypothetical asset under both HCA and CCA. The asset is purchased at the outset, is subject to straight line depreciation over its useful economic life, subject to a constant increase in replacement cost and the firm is assumed to have a constant cost of capital. The chart shows the annual returns on an undiscounted basis for the full duration of the asset's life. Although the cost recovery paths are different, if they were discounted at the cost of capital, the total returns would be equivalent over the full period, regardless of whether the HCA or CCA approach were adopted, providing it was consistently applied over the entire period.

4.15 Figure 2 shows that for this particular type of asset (where the gross replacement cost, or GRC, is increasing over time) the earliest recovery of costs comes from the HCA approach, while the recovery of costs from a CCA approach is greater later in the asset's life. Accordingly, a change from setting the recovery of costs based on an HCA basis in the early period to a CCA basis in the later period at any point during the life of the asset would result in an over-recovery of costs if charges are set on the basis of this cost recovery. Such an over-recovery would be considered a gain arising from the change in accounting treatment in the setting of charges. However, the inverse is also true: if the GRC of the asset decreases over time, as a result of a decline in the asset's current value, then under-recovery or a loss would result from changing from HCA to CCA at any point in the recovery period.

Figure 2: gross margins required for a constant cost of capital over the life time of a single asset experiencing appreciation in value



4.16 At the time of the 1996 retail price control review (which set the control to apply for the period 1997-2001), Oftel considered the question of whether an over- or under-recovery was likely to arise as a result of the change from HCA to CCA. Oftel's consideration of this point was based on all basket services including all business and residential customers (the 'broad basket')[23] and included both retail and network costs without reflecting accounting separation between BT retail and BT network (an 'end-to-end' approach). Oftel noted that, under the assumptions made in its model, the CCA asset base for access assets increased compared to HCA but that this was partly offset by a lower asset base for calls. Oftel also concluded that the value of 'X' during the price control period was the same, regardless of whether HCA or CCA was adopted. This was because the additional return required under CCA was, given the assumptions made about inflation, provided in the form of a forecast holding gain rather than additional revenues from retail customers. Because prices would be the same under HCA or CCA, Oftel concluded that there was no over-recovery by BT in access during the period under review for the price control as a result of the change in accounting. Oftel's view at the time was that, beyond the current price control period, any excess or over-recovery which might arise in the longer term would be eroded through the process of competition and new entry to the market. Oftel expected that competition could be expected to act as a long term restraint on BT's charges.

4.17 In 2001, the existing retail price control was extended for one year so that account could be taken of then prospective developments in competition. The review of the retail price control carried out in 2001/02 concluded that in

[23] The basket contains a group of products that are subject to a combined price control, within which BT has flexibility to price each of those products separately as long as the overall basket control is achieved. The application of this particular basket in this context is explained in further detail in Pricing of Telecommunications Services from 1997, published June 1996, available at http://www.ofcom.org.uk/static/archive/oftel/publications/1995_98/pricing/pri1997b/contents.htm

future, the primary constraint on retail prices should be competition based on WLR rather than a retail price cap. The RPI-X cap which has applied since 2002 is therefore primarily intended as a safeguard cap rather than as a means to force prices down to some measure of costs. Although some financial modelling was undertaken to confirm that a cap at this level was sustainable, the modelling assumptions, including the asset base used, were not formally consulted on.

4.18 The charges set for WLR in 2002 included an amount to recover the costs of the copper loop and were based on the charges for a fully unbundled local loop which had been previously determined by Oftel. This was for consistency and because both products shared major components, most obviously the copper loop itself. Oftel set the charges for LLU (and, by implication, WLR) on the basis of LRIC+EPMU because this "reflects replacement cost, which is the economic value of a line in a market where loops are competitively supplied"[24]. The LRIC+EPMU cost of a loop was very slightly below the CCA fully allocated cost (FAC). Oftel considered that this struck the appropriate balance between the objectives of encouraging take-up of higher bandwidth services and of maintaining incentives to invest in competing delivery routes to provide greater choice in the medium term. It is clear that encouraging investment in competing access networks was at that time still a key Oftel objective in determining the level of the LLU and WLR charges.

4.19 As described in the recent TSR Phase 2 report, however, Ofcom now considers that there is no imminent likelihood of new entry into the local access market and that this part of the market remains an enduring bottleneck to competition. Given that the likelihood of entry in the short to medium term is now considered relatively low, Ofcom considers that future over-recoveries are less likely to be eroded through the process of competition than was envisaged at the time of setting the 1996/97 and 2001 price controls. Accordingly, Ofcom considers that it is appropriate to examine whether any over-recovery is likely to be realised by BT in the future and, in particular, over the period leading up to the next strategic review or at least the next five years.

4.20 This analysis has examined the path of cost recovery of all those assets which are within the scope of this review, namely the E and D-side copper access network. The results of this analysis provide a cost input to the cost analysis of those regulated products which use these assets, principally WLR and LLU, and other assets outside of the scope of this study, e.g. the drop wire, will be examined as part of those costing exercises.

Question 2: *What do you believe is the correct depreciation treatment for the remaining 1996/97 assets?*

4.21 BT, in line with its response to Question 1, argued that the remaining 1996/97 assets should continue to be valued and depreciated on a CCA basis, using the same depreciation basis as used to date. The cable operators, ntl and Telewest, suggested that Ofcom consider continuing to apply full CCA depreciation. Of the other respondents, Cable & Wireless agreed that depreciation should be in line with the revised valuation and UKCTA suggested that Ofcom might consider HCA depreciation. Easynet suggested

[24] http://www.ofcom.org.uk/static/archive/oftel/publications/1999/consumer/a2b1199.htm

that Ofcom could adjust depreciation charges to potentially compensate altnets for any over-recovery which may already have crystallised.

4.22 Ofcom considers that any depreciation policy should be consistent with the valuation methodology, such that post 1997 assets treated under CCA will be depreciated under the full CCA approach, while pre-1997 assets will be depreciated at a rate reflecting the reduced valuation, and the holding gain arising from the indexation of the asset base. The cable operators' suggestion of applying full CCA depreciation does have merit, but it is Ofcom's view that this could distort the life cycle of the assets – a depreciation charge reflecting an unwritten down asset base would result in a fully depreciated asset base before the end of the accounting life of the assets. Additionally, such an approach would not achieve Ofcom's aim of moving the entire asset base to CCA over time. However, the main issue is that depreciation treatment should be consistent between the balance sheet and the profit and loss account.

4.23 As stated previously Ofcom does not propose to clawback any element of any over-recovery that may have crystallised since 1 August 1997.

Question 3: *What is your opinion of the principle of correct incentives for entry as applied within this consultation?*

4.24 Operators with their own access network infrastructure (BT, ntl and Telewest) were concerned about the impact of the proposals on the incentive to invest in their networks. BT argued that:

"We remain of the view that prices should be set that incentivise new entrants to invest in infrastructure (since this is the most likely area where technological advances will deliver solutions that benefit consumers and the economy as a whole), and at the same time reward current infrastructure providers such as BT and cable companies for the investments already made, and incentivise them to maintain and enhance the capabilities and reach of their existing networks.

Ofcom is proposing changes that would seriously weaken current incentives and may slow down the development of important technologies in the UK, by materially under-valuing the economic value of BT's local access network, and because of the impact on access prices the economic value of other local access networks too."

4.25 ntl felt that the proposal would reduce the incentives for continued investment. Telewest felt that the proposals would materially affect their shareholders' ability to recover their existing investments. They argued that while Ofcom might be attempting to adjust for a potential over-recovery by BT, the proposals would lead to an under-recovery by those companies that owned their own access infrastructure as the prices they could charge for access were ultimately linked to BT's charges. Therefore, any reduction in the ability of investors to achieve their expected returns will damage confidence in the sector, and reduce the likelihood of future access network enhancements, whatever the proposed technology.

4.26 Cable & Wireless felt that Ofcom's proposed reduction in the charge did not go far enough given the conclusions from the TSR as to the likelihood of new entry into the access network. They commented that Ofcom is still apparently trying to keep some economic signals for entry, but note that Proposal 1 does

not reflect the costs of an efficient operator, but that Proposal 3 using an extended analysis from WIK Consult represents the actual costs of an efficient new entrant.

4.27 UKCTA felt that in light of the TSR setting incentives for entry should not be considered as part of this review; Easynet went further and argued that new entry was unlikely in the long term (i.e. beyond the scope of the current TSR), that they believe that access is a natural monopoly and that regulation of the incumbent should be based on an efficient new entrant model to stimulate efficiency gains by the incumbent.

4.28 It is Ofcom's view that for the purposes of this review consumer protection is the priority. Therefore whilst concerns over incentives to invest in access infrastructure have merit, they must be balanced by measures to protect consumers. The approach Ofcom is taking will, in the longer term, restore the asset base to its CCA value in line with Ofcom's previously stated view on the appropriateness of CCA as a basis for encouraging infrastructure investment.

4.29 Ofcom does not favour the implementation of Proposal 3 due to a number of practical difficulties:

- **drop wire.** This is particularly problematic as drop wires are outside of the scope of this study but would need to be factored into any estimate of a new entrant's cost base. If a complete new network is assumed then it cannot be assumed that the new entrant would use the same technology or the same architecture as BT. BT's drop wire costs may not therefore be representative of those of a new entrant and it could not be assumed that drop wire costs are equivalent between BT and Proposal 3 and therefore regarded as invariant and ignored in the analysis.

- **churn.** Over time the demographics of the customer base experience change which leads to a creeping topological inefficiency in the deployed network. A new entrant would be subject to these effects and the degree to which this would lead to increased cost would need to be understood and allowed for.

- **deployment.** Proposal 3 in its simplest form assumes an instantaneous build but clearly no new entrant could achieve this and instead a gradual build would have to be assumed. The period over which the build takes place will have a strong influence on the costs of raw materials and, hence, the assumed cost of the network.

Question 4: *Do you believe that these criteria are appropriate? What other criteria, if any, would you apply?*

4.30 In Section 3 of Part 2 five criteria by which candidate options might be assessed were listed:

- the method should be as simple as possible and consistent with the regulatory accounting principles of objectivity and transparency;

- the costs of implementation, and the burden on both industry and regulator, should not be disproportionate to the benefits to be gained by citizen-consumers from a more appropriate valuation and so the valuation should be practical;

- there should be minimum regulatory uncertainty moving forward so the chosen method should be robust and able to cope with anticipated future changes to the competitive market for local access;

- it should be based on objective data sourced from within industry, primarily from within BT's regulatory accounting system, such that industry and citizen-consumers can be confident that charges reflect costs as accurately as possible; and

- the chosen method must be underpinned wherever possible by a sound economic rationale.

4.31 In general all respondents agreed with the criteria, however, some respondents recommended slight changes to the criteria. Cable & Wireless felt that the use of "appropriate" and "practical" were too subjective and resulted in Ofcom rejecting certain options, in particular with regard to the allocation of duct, that it felt worthy of deeper consideration. This was echoed by UKCTA.

4.32 It is Ofcom's view that any proposal cannot ignore the practical issue of implementation and operation within the wider context of resource and time constraints. As such the criteria contained an element of practical assessment. In deciding on the most appropriate course of action Ofcom has adopted an approach which assesses the likely impact of any change and contrasts this with the resource requirements to implement it. The implementation of options which have significant resource implications with only marginal benefit would not, in Ofcom's view, be in the best interests of either industry or consumers.

4.33 BT, while agreeing that the criteria were appropriate, argued that Ofcom should have made different conclusions while applying the criteria. Similar arguments were raised in response to Questions 1-3 and are discussed above.

Valuation options

Question 5: *Do you agree that Ofcom should adopt 20 years as the appropriate book life for copper cable?*

4.34 BT did not agree that the asset life should be changed, arguing that as a network operator it is best placed to determine appropriate book lives for these assets. BT also noted that technological changes may in fact reduce the useful asset life for copper in the future, if the widespread deployment of wireless access becomes commercially viable, for example. BT also argued that it was not objective to base the choice of the asset life for copper cables on the responses of companies that have a vested interest in BT depreciating assets over a longer period. Other respondents broadly agreed with Ofcom's proposal for extending the asset life of copper with some respondents arguing for 25 years.

4.35 Ofcom recognises that adopting asset lives within the regulatory accounts which differ from those used in the statutory accounts may cause some confusion. However, it is Ofcom's view that the lives used in the regulatory accounts need to be based on an informed view of the actual service life of these assets, particularly given that further large scale access infrastructure

construction to compete with BT (including wireless) is unlikely in the short to medium term. In this way BT will recover costs on regulated products throughout the useful life of the asset. This view is informed by benchmarking and by understanding BT's real experience of typical service life.

4.36 In Part 2 Ofcom quoted an Ernst & Young study[25] in which 60% of European respondents indicated an asset life of between 16 and 20 years for copper. BT has also informed Ofcom that the design life of copper cables is around 20 years under ideal conditions; and that typical service life is likely to be between 15 and 20 years although precise empirical data is not available.

4.37 It is Ofcom's view that the period over which costs are recovered should more closely match the useful life of the asset. Whatever period is used the same level of revenues will be recovered over the lifetime of the asset, but recovery will be earlier or later accordingly. Given the evidence discussed above it is Ofcom's view that BT's current life of 15 years is likely to be significantly shorter than the useful life of the asset, which is likely to be nearer to the design life, and should be increased, particularly in light of the ever expanding use of the copper network for broadband services. In the absence of empirical data, Ofcom has decided to adopt an asset life of 18 years, i.e. the midpoint of the range quoted by Ernst & Young and by BT for the typical service life. Straight line depreciation will be used.

4.38 Ofcom has calculated that adoption of a book life of 18 years for copper, as opposed to the 20 years proposed in Part 2, will result in an increase of approximately 76p (or ~1.3%) on the average cost of a loop for the 2005/6 financial year.

Question 6: *Do you agree that Ofcom should adopt a straight line depreciation of 40 years as the appropriate book life for duct?*

4.39 BT did not agree that the asset life should be changed, arguing that as a network operator it is best placed to determine appropriate book lives for these assets. BT also noted that using a rolling life of 25 years for duct would allow BT to adjust the treatment of duct assets in the event that mass deployment of, for example, wireless access becomes commercially viable. BT also argued that it was not objective to base the choice of the asset life for duct on the responses of companies that have a vested interest in BT depreciating assets over a longer period. Other respondents broadly agreed with Ofcom's proposal for the treatment of the asset life of duct.

4.40 Ofcom recognises that adopting asset lives within the regulatory accounts which differ from those used in the statutory accounts may cause some confusion. However, it is Ofcom's view that the lives used in the regulatory accounts need to be based on an informed view of the actual service life of these assets, particularly given that further large scale access infrastructure construction to compete with BT (including wireless) is unlikely in the short to medium term. In this way BT will recover costs on regulated products throughout the useful life of the asset. This view is informed by benchmarking and by understanding BT's real experience of typical service life.

[25] http://www.ey.com/global/Content.nsf/Australia/TCE_-_Publications_-_Downturn_impacts_Telco_assets

4.41 In Part 2 Ofcom quoted BT's average book life of 38 years for access duct. The actual treatment of duct is quite complex: all duct installed prior to 1968 was given a 60 year life and this was revised in 1968 to 45 years. In 1993 it was revised again with all duct being given a nominal 25 year life[26]. Each year this is re-assessed and if, in BT's view, duct still has an economic life of a minimum of 25 years then the life is reset at a further 25 years. Thus each year 1/25th of the remaining value is written off. To ensure that all duct is eventually written off this process is capped if adding a further 25 years would take the asset life beyond its end date of 60 years for pre-1968 duct and 45 years for all duct thereafter. Therefore, all pre-1968 duct will be fully depreciated by 2028. Similarly, all remaining duct, installed from 1968 onwards, will be fully depreciated between 2013 and 2030. However, this end date will be extended each year for all duct whose real end date, based on 45 years, is beyond the current date plus 25 years. For example, duct installed in 2000 currently has an end date of 2030 and next year will have an end date of 2031 and so on until 2021 when it will be capped at 2045.

4.42 BT has also informed Ofcom that the design life of modern uPVC duct is 25 years under ideal conditions. This does not take into account a number of factors including the potential impact of chemical contamination (such as from petroleum products) and any disturbances or stresses on duct caused by construction activity by contractors which tend to reduce the life of the duct. In practice, however, under ideal conditions (i.e. assuming no earth contamination by chemicals and no physical disturbances) BT expects uPVC duct to have a life longer than 25 years. BT also has some earthenware duct in service which has been in service for more than 50 years. Unfortunately BT has not been able to provide any definitive data on typical service lives or physical volumes and no design data on old earthenware duct is available. However, BT claim that duct blockages due to silt, which renders duct unserviceable, is a regular occurrence.

4.43 It is Ofcom's view that the period over which costs are recovered should more closely match the useful life of the asset. Whatever period is used the same level of revenues will be recovered over the lifetime of the asset, but recovery will be earlier or later accordingly. Given the evidence discussed above it is Ofcom's view that the useful life of duct is likely to be at least as long as the average book life of 38 years stated by BT. Ofcom has, therefore, decided to adopt a straight line depreciation of 40 years in the regulatory accounts for BT's D and E-side duct, as proposed in Part 2.

Question 7: *Do you agree with Ofcom's approach to the issue of spare capacity?*

4.44 BT broadly agreed with Ofcom in its approach to spare capacity in Proposal 1, i.e. to use BT's current level as the most appropriate. In its response BT states:

"We agree that spare capacity is a complex issue and that determining the 'most efficient' level of spare capacity is both difficult and subjective, and we agree with Ofcom's approach. Assessment needs to take account of a number of factors including network resilience requirements, likely future demands, the cost efficiencies of investing in 'spare' capacity and the cost of having to add new capacity in future."

[26] BT took this approach to account for the possibility of technology advances in the wireless field rendering duct obsolete. This treatment has the effect of front-loading the depreciation.

4.45 Several other respondents, while noting that BT's spare capacity provided a benefit to them by reducing the average cost per pair, felt that the valuation should reflect an efficient level of spare capacity, and proposed the use of international benchmarks. UCKTA argued that Ofcom should consider the use of benchmarks and stated:

"Ofcom dismisses the idea of using international comparisons of spare capacity on the basis that demand and planning rules (as well as geography) can differ across countries. UKCTA do not agree that this is necessarily a reason to dismiss use of such statistics. Although market and geographical characteristics may differ, sub-sectors of areas may well be comparable and at the very least act to inform decisions and other data. For instance, UKCTA believe that levels of spare capacity will be similar across all European dense urban environments. "

4.46 Ofcom maintains that the shortcomings of a benchmarking study in this instance outweigh the potential benefits. However, Ofcom will use benchmarking studies where appropriate such as in asset lives, discussed earlier, and in operating efficiency studies used in the setting of prices.

Question 8: *Do you agree that Ofcom should continue to use the labour rates as used by BT in LLCS and that the existing method of indexing these each year should be retained?*

4.47 The majority of respondents agreed with the rates proposed by BT (reproduced in Figure 3 below), but questioned the transparency of how they were derived, feeling that they could not comment on the appropriateness of the actual rates in the absence of the original contract price and the price index used. One respondent suggested the use of international benchmarks.

Figure 3: Labour rates used in LLCS in 2003/04

No. of bores	£/m
1	23.04
2	25.16
3	28.24
4	30.48
5	34.19
6	36.88
7	40.97
8	43.74
9	46.66
10	68.19

4.48 Ofcom considers that the labour rates proposed by BT are appropriate for the hypothetical proposition of a national network roll-out. Several other respondents submitted their own current contract labour rates in confidence and all, including BT's, were higher than those used by BT for the valuation. It is Ofcom's view that this supports BT's assertion that today's contract rates

are higher due to the piecemeal nature of construction which is not representative of a national network roll-out. It is possible that a new entrant could negotiate lower rates but it is not objectively possible to determine what those rates might be. In the absence of any better data BT's rates do at least offer a link to real contract rates as paid in a period of significant network build in the past. It is also Ofcom's view that, with labour rates in particular, international benchmarking would be inappropriate due to considerable national differences in wages, productivity, construction methods, etc.

Question 9: *Do you agree that Ofcom should not apply an abatement for cable modularity given the analysis results?*

4.49 BT and ntl agreed that no adjustment should be made for cable modularity. BT argued that the valuation should reflect the cost of equipment that is commercially available now, and for which prices actually exist, and that a new entrant would face the same issues as it is impossible to predict technology changes.

4.50 Other respondents felt that Ofcom should make an adjustment for cable modularity arguing that although the impact was minimal (Ofcom's analysis suggests that the valuation was over-stated by about 0.2%) the cumulative dismissal of over statements of that size may become material. Cable & Wireless argued that a true MEA approach to valuation would look at the original requirement rather than the original equipment.

4.51 In this specific case, Ofcom believes that it is more appropriate to include the costs of equipment that is actually used rather than derive an assumed cost for a cable which in reality BT does not currently purchase. Ofcom understands the view that the cumulative impact of a number of adjustments could have a material effect, however, Ofcom does not believe that there are, within the scope of this analysis, a sufficient number of sufficiently large adjustments to have a cumulative effect which could be material. Furthermore, it is Ofcom's view that each adjustment must be considered on its own merit without regard to its size relative to other, not necessarily related, adjustments.

Question 10: *Do you agree that Ofcom should not change the existing method by which the costs of shared duct are allocated between access and core?*

4.52 BT currently attributes duct cost on the basis of cross-sectional area. In this approach a study is undertaken to sample the access network and determine, on average, how much of the available duct space is occupied by access network cables and how much by core network cables. Within the sample the number and type of cables is counted and the volume occupied is calculated in proportion to the cross-sectional area of the cable; the bigger the cable the more space it occupies and, hence, the more duct cost it attracts. Since access cables typically contain many copper pairs (possibly thousands) and core cables typically contain considerably fewer optical fibre pairs (tens or, at most, hundreds) then the access network tends to receive the majority of the cost. Ofcom was concerned about such a mechanism and proposed a number of alternatives:

- attribution based on the available bandwidth (or information carrying capacity) of the cable on the basis that revenue tends to be related strongly to bandwidth;

- attribution based on the incremental costs of access; and
- attribution based on equal proportional mark up (EPMU) which allocates cost in proportion to the incremental cost of both access and core.

4.53 As discussed in Part 1 and Part 2, the six principles of cost recovery (i.e. cost causation, distribution of benefits, effective competition, reciprocity and practicability) did not give clear guidance as to the proportions in which the costs of shared duct should be recovered from the access and core networks and, therefore, no method clearly stood apart from the others as the most appropriate approach.

4.54 Maintaining the existing approach was supported by both BT and ntl. Cable & Wireless, however, argued that a cross-sectional approach as proposed will tend to over-state the costs in access as access cables are typically larger than core cables, and encouraged Ofcom to consider an incremental cost approach, even if this entailed a further more detailed study.

4.55 It is Ofcom's view that the economic analysis it has conducted indicates that the practical issues over implementing an alternative method mean that it would be disproportionate at this time to change the approach. In response to Cable & Wireless' specific point about incremental cost, Ofcom does not believe that this method is appropriate as it does not take account of any common costs. In Ofcom's view, such an approach would imply that common costs would be recovered from core alone. Such an approach could encourage inefficient entry and might not be sustainable.

4.56 Ofcom notes, however, that BT's current proposals to establish an Access Services Division (ASD) will require it to re-examine the treatment of the costs of shared duct and should this indicate a more appropriate method can be implemented as part of this process Ofcom will consider at that time what alternatives are available.

Question 11: *What is your view of applying an efficiency adjustment to the access network operational costs?*

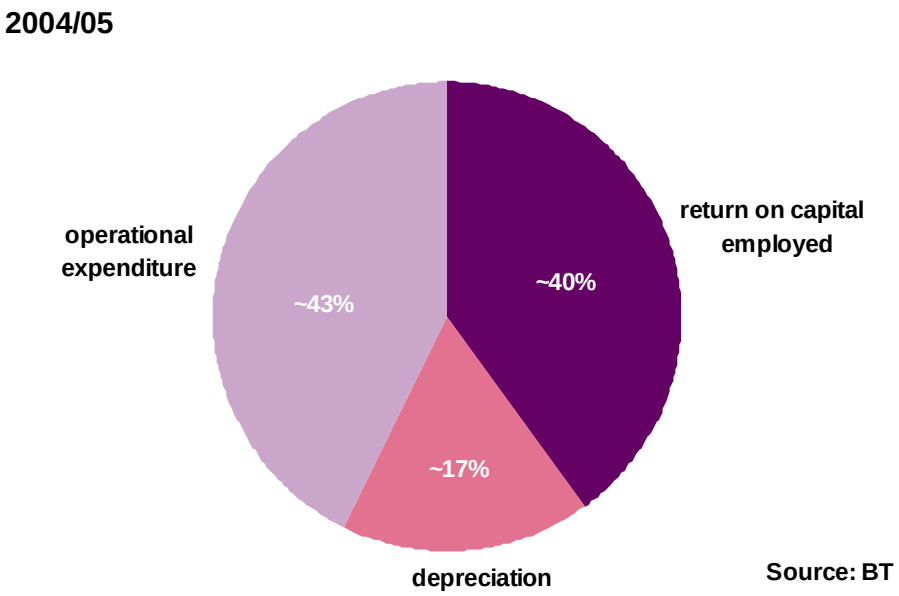
4.57 Cable & Wireless argued that as BT did not face competition in the access network it was likely that operational inefficiencies did exist, as there was little incentive for BT to improve its operational efficiency. Cable & Wireless argued that the efficiency adjustment should reflect the optimal deployment of assets under an efficient new entrant assumption.

4.58 Ofcom agrees that there is the possibility for inefficiencies to be present in BT's access operations, but remains of the view that this issue would be more appropriately examined in the context of a charge control, e.g. LLU and WLR, where any efficiency adjustment could be applied dynamically over a charge control period to maximise BT's incentive to reduce its costs. Ofcom is of the view that the efficient new entrant as a proxy is only valid within the overall context of the hypothetical new entrant (i.e. Proposals 2 and 3 in Part 2) which Ofcom is not proposing to adopt. Ofcom therefore does not propose to adjust for access network operational inefficiencies within the context of this study.

4.59 Other respondents were concerned that given the re-statement of costs in the supplement to Part 2 the scope for the impact of potential efficiency

adjustments had increased and so, therefore, had their importance. Ofcom accepts that there was some confusion as to the relative size of operational expenditure within E and D-side costs and has therefore taken the opportunity to clarify this as shown in Figure 4 below which is an update of Figure 3 in Part 1 and is based on the latest figures for 2004/05. The operational expenditure (or 'other costs' as in Figure 3 in Part 1) were understated, an understatement which was corrected in the analysis undertaken for Part 2. Ofcom also reiterates its view that operational efficiency adjustments are most appropriately applied as part of the charge setting exercise than as part of this review as the charge setting process has within scope all of the access network rather than just the E and D-side as here. As part of the WLR and LLU price setting process, Ofcom will also continue to review the appropriate level of operational expenditure which should be included for the purposes of setting those prices.

Figure 4: cost breakdown for E and D side assets



Question 12: *What is your view of Ofcom's analysis of this approach? Do you believe that it is valid to use an optimised copper network, although hypothetical, to inform the valuation process?*

4.60 This question relates to Proposal 3, that is the hypothetical construction of a new network by a new entrant using existing copper technology. Of the respondents, UCKTA and Cable & Wireless argued for the use of this approach as the basis of the valuation as they felt that the use of CCA in calculating the cost of assets should take into account a deployment that is optimised under those costs rather than the original deployment. They accepted that given the incremental nature of the construction of the access network the potential to realise efficiencies will be less than a complete network re-design but argue that BT, given its dominance, should be able to take a long term view of its investments. They also requested to see more details of the WIK Consult analysis, and were surprised that Ofcom only commissioned a study on five exchanges when it was clear that this would not be representative of the entire network. They argued that Ofcom's preferred

approach, Proposal 1, should only be used as an interim measure, with the results of an extended WIK analysis being implemented in the medium term.

4.61 BT had argued strongly against this approach as part of its response to Part 1 of the consultation and reproduced some of its arguments in its response to Part 2:

"As referred to in our Part 1 response, any new entrant would face the same issues as BT over how to dimension its network to most efficiently meet demand. Forecasting 'error' - which includes the inability to predict perfectly demographic or technological changes - means that no network can ever be fully efficient in the way that the WIK/Ofcom approach implies. In addition, it takes many years to build a network as extensive as BT's. A new entrant could not simply build a new network overnight - over the years it would take to build, apparent 'inefficiencies' would arise that could not be avoided, the result of fluctuating demand levels and associated forecasting error, demographic changes and technical advances and competitive impacts that cannot be predicted with certainty. A 'fully efficient' design is wholly theoretical and cannot exist in the real world."

4.62 Ofcom broadly agrees with this view and therefore continues to believe that Proposal 3 should not be used as the basis for the valuation. As mentioned by BT, this view is supported by that of the Federal Communications Commission in its 2003 review of Unbundled Network Elements[27]. BT quoted the following in its response:

"The UNE pricing methodology, while forward-looking, must be representative of the real world and should not be based on the totally hypothetical cost of a most-efficient provider building a network from scratch."

"An approach that reconstructs the network over time seems to be more appropriate than one that assumes the instantaneous redeployment of 100 percent new technology."

"In the real world, however, even in extremely competitive markets, firms do not instantaneously replace all of their facilities with every improvement in technology. Thus, even the most efficient carrier's network will reflect a mix of new and older technology at any given time."

4.63 Ofcom does not believe it would be appropriate to use the approach of Proposal 3 and does not intend to migrate towards it in the near future. Ofcom accepts that five exchanges was a small sample set, but Ofcom was constrained by the data available from BT's PIPeR project (PIPeR was the only practical source available for the type of data required by this analysis) and believed that the sample set was appropriate for a first stage methodological analysis. Had Ofcom chosen to adopt Proposal 3 a larger sample set would have been sought.

Question 13: *What is your view of Ofcom's analysis of this approach? Do you believe that an optimised network using modern technology is an inappropriate basis for informing the valuation of BT's copper access network?*

[27] http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-03-224A1.pdf

4.64 This approach considered the use of available modern technology to provide a more efficient network deployment than BT's existing access network. It was primarily concerned with the use of fibre to the kerb and active street cabinets with shorter metallic drops from there to the end user. Ofcom commissioned Analysys to conduct an analysis of this approach and its report is available on the Ofcom website[28].

4.65 Respondents largely agreed with Ofcom's decision not to proceed with this option. BT stated that while it continues to test new access technologies currently it would be uneconomic for any large scale roll out. Cable & Wireless felt that the use of modern technology is a valid alternative to the WIK analysis, but felt that it was impractical to adjust the costs of modern technology to reflect its additional capability. It also noted that the Analysys results suggested that this approach would not offer a material saving over the current valuation.

Calculating over-recovery adjustments

Question 14: *What is your opinion of Ofcom's approach to calculating the over-recovery (or under-recovery)?*

4.66 BT disputes the existence of any over recovery, and states that Ofcom has failed to provide any justification for its view apart from an illustrative model of a single asset. BT states that the dominant user of the copper access network has been its PSTN line rental product which has been consistently loss making. BT argues that Ofcom has presented no evidence to suggest that BT has over-recovered since 1997, and indeed BT made returns in line with its "regulatory contract"; that is, returns under the regulatory framework in place at the time.

4.67 It is Ofcom's view that the use of the theoretical model is a useful tool to illustrate the impact of a switch to CCA from HCA during an asset's life. If the result of a revaluation is to increase the value of the asset base, which was the case for the combined duct and copper assets in 1997, then it is clear that BT has received a holding gain, and this gain was not offset by any counterbalancing adjustment. It is therefore clear that while prices are cost-oriented BT will benefit from an increased return relative to that which would have been achieved if BT had remained on HCA, over the lifetime of the assets.

4.68 BT also argues that it is likely that returns prior to the change to CCA amounted to an "under-recovery", since allowed returns were based on HCA asset valuations but using a weighted average cost of capital (WACC) – which determines the allowed return on capital employed – based on a capital maintenance approach that requires a method of valuation that is close to or the same as market value. BT states that its market value prior to 1997 was consistently higher than the HCA valuation of net assets; thus, BT's argument appears to be that since its allowed return on capital employed was determined by a WACC that was based on the assumption that the valuation was close to market value, and that the actual valuation determined under HCA was consistently lower than this, then its returns were in effect too low, indicating a systematic understatement of allowed returns. BT goes on to argue that if it is difficult to conclude on the extent of any under- or over-

[28] http://www.ofcom.org.uk/consult/condocs/copper/loop.pdf

recovery of costs in the past, then it is still more problematic to base future pricing decisions on the possibility of over-recovery at some point in the future.

4.69 Whilst it would, in principle, be possible to verify whether the overall market valuation for BT was consistently higher than the HCA valuation for BT as a whole over the entire period prior to 1997, to determine whether this is material it would be necessary to disaggregate the market valuation of the in-scope assets from the remainder to perform the analysis. However, it is not possible to do this due to the absence of any separate market valuation for BT's access network. Even if this was possible it seems unlikely that the excess of market capitalisation over book values related to the access assets because the residential line rental, in particular, was priced at less than accounting cost during this period. Moreover, there is a circularity in that the (unobservable) market value of all the regulated assets is determined by the expected future returns on them which is in turn determined by the allowed cost of capital. It seems more likely therefore that the excess of market value over book value derived from the unregulated parts of BT and Ofcom does not, therefore, agree with BT that it is likely to have systematically under-recovered on the in-scope assets prior to 1997.

4.70 This is also relevant to the question of investors' expectations prior to 1997. BT argues that rough equality of market capitalisation and CCA valuations indicates that investors were expecting to be allowed the cost of capital on the CCA asset base and that this had been signalled before 1997. However, this must have been some time after the setting of the previous 1992 price control which was on an HCA basis. The suggestion of using CCA valuations in the 1997 price control was made in the December 1995 first consultative document[29]. However it was accompanied by a statement that action would be taken to prevent the earning by BT of windfall gains (paragraph 7.22). In the second (March 1996) document[30] it was again stated that steps would be taken to ensure that any rise in charges would be gradual to avoid windfall gains. It was explained that this would have been done by setting the starting value of the asset base equal to its HCA value, scaling down CCA depreciation in proportion to this and revaluing the asset base in subsequent years to allow for inflation (very similar to what is now proposed). Only in the June 1996 statement[31] was the decision announced to move straight to CCA with no measures to prevent windfall gains. It therefore seems most likely that market valuations reflected investors' expectations of earning the cost of capital on the HCA valuation of assets (for price controlled products) until at least June 1996.

4.71 UCKTA in its response expressed disappointment that Ofcom has not quantified the over-recovery, if any, achieved between 1997 and the present day. As has been stated previously, it is Ofcom's view that any change should

29 http://www.ofcom.org.uk/static/archive/oftel/publications/1995_98/pricing/pri1997/contents.htm

30 http://www.ofcom.org.uk/static/archive/oftel/publications/1995_98/pricing/pri1997a/contents.htm

31 http://www.ofcom.org.uk/static/archive/oftel/publications/1995_98/pricing/pri1997b/contents.htm

not include any retrospective element and it is not necessary, therefore, to attempt to analyse the real returns in this period.

4.72 ntl argued that the existence of an over- or under-recovery depends on whether or not BT's historic prices were strictly cost based. If this is not the case, there need not have been an over-recovery in real terms. ntl further argue that, in general, the theoretical argument for an over-recovery relies on several assumptions, and the consultation document does not investigate whether these assumptions hold.

4.73 It is Ofcom's view that regardless of whether BT has historically over-recovered relative to HCA, there is the potential for future over-recovery as a result of the increase in asset valuation on 1 August 1997 for those assets in place at that time, and that it is appropriate for Ofcom to limit this potential for over-recovery.

Question 15: *What is your opinion of Ofcom's proposal to disallow the over-recovery between 2004/05 and 2009/10?*

4.74 Both BT and ntl disagreed with Ofcom's proposal. The other respondents were largely supportive. Ofcom believes that limiting the potential for future over-recovery between the years 2004/05 and 2009/10 is in line with the timescales referred to in the TSR and provides a good compromise between medium term stability and ensuring that there is an opportunity in the medium to long term to reconsider the approach adopted.

Proposals

Question 16: *What is your view of adopting a proposal which leaves the existing approach unchanged?*

4.75 This referred to Proposal 0 in Part 2 and was BT's favoured approach. However, BT did state that:

"We continue to support a wholly CCA-based valuation methodology. Of the proposals made, Proposal 1 is the least inappropriate, notwithstanding the fact that there is no evidence that lowering the value of assets is necessary or in the best interests of consumers."

4.76 All other respondents, recognised that some adjustment to the existing valuation was appropriate. ntl, however, felt that Ofcom should conduct some cost benefit analysis to determine the impact on the wider communications market.

4.77 Ofcom believes that its analysis has shown that some modifications to the existing approach are warranted if the potential for consumers to be disadvantaged through prices which allow BT to over-recover its costs is to be avoided. Ofcom's review did not explicitly consider the impact of this change on prices and, therefore, on the wider communications market as this review is not concerned with the setting of any prices of any specific products available from BT. However, Ofcom recognises that a change in the regulator's view of the value of BT's access network could have an effect on the perceived value, particularly in the City, of other access network operator's network assets. As has been stated elsewhere in this document, it is Ofcom's view that the CCA valuation of BT's access network is as accurate

as can reasonably be expected. However, Ofcom is concerned with the path of cost recovery against those assets which BT is currently following.

Question 17: *What is your view of adopting a proposal which applies the adjustments described to the existing approach?*

4.78 UCKTA, Cable & Wireless and Easynet all suggested that Ofcom's favoured proposal should only be an interim step, with a move to an extended WIK analysis – i.e. Proposal 3 – within 12-18 months, and further analysis of duct allocation and operational costs. Ofcom has discussed above why it does not believe such an approach would be appropriate.

Question 18: *What is your view of adopting a proposal which applies the adjustments described in proposal 1, plus an efficiency adjustment derived from the WIK Consult work, to the existing approach?*

4.79 This "hybrid" approach sought to keep the existing valuation method but apply an abatement factor informed by the modelling conducted by WIK Consult. The inventory list from the optimum solution would be used as a comparator against that of BT's network to derive an efficiency factor related to how much duct and copper BT could save if they were to rebuild the network using the same technology. In theory, over time this efficiency adjustment would act much like any other in providing an incentive to migrate to a more efficient deployment.

4.80 BT strongly disagreed with this approach, arguing that any apparent inefficiency identified by the WIK analysis is likely to overstate the potential for reduction in costs. It stated that there are many factors that would lead to higher costs in practice that could not be avoided even using modern techniques and optimised route planning. BT also argued that it would be inappropriate to make an abatement for lines "stranded" due to competition.

4.81 Cable & Wireless questioned why Ofcom chose such a small sample size for the WIK Consult exercise, and also queried how the large efficiency improvements quoted in the document (64% in urban areas) resulted in a much smaller efficiency adjustment overall.

4.82 The adequacy of the sample size is discussed in response to Question 12 above. In calculating the overall network efficiency factor it is necessary to understand the average inefficiency in each class of exchange area, or "geotype". BT classes each exchange as one of six geotypes depending on the number of lines served and the line density. These two factors largely drive the quantity of duct and copper needed to serve the customer base and each geotype has a characteristic cost per loop. For example, in a dense urban area typically less duct is required and large cables can be used leading to a low cost per loop. By contrast in a rural area customer density is low leading to a comparatively high cost per loop. Thus, the average network efficiency factor is strongly influenced by the relative proportion of each geotype in the overall exchange population. In the case of BT there are far more rural and suburban exchanges than dense urban exchanges which means that the network efficiency factor is largely driven by these exchanges. Thus, even though there may be a large potential inefficiency in dense urban exchanges its influence on the network efficiency is swamped by the relatively small inefficiency in the rural and suburban exchanges. Ofcom also notes that

Proposal 2 did not adjust for over-recovery, hence the different results for Proposals 1 and 2.

Question 19: *What is your view of adopting a proposal which bases the valuation on that of a hypothetical modern equivalent network using an optimised deployment of duct and copper cables?*

4.83 Cable & Wireless believed that there was some merit in this approach, but that Ofcom had not seriously considered how it would be done or what the implications might be. Cable & Wireless also had concerns over the annualisation approach, and considered that this approach may result in over-recovery by BT. Cable & Wireless expressed surprise that the results derived from this approach gave rise to an increase in costs, suggesting that this may be as a result of under investment from BT.

4.84 ntl stated that a hypothetical new entrant cost model must measure the costs that can be realistically achieved by a real firm in the current market environment, and that this is likely to cost a great deal more than the current network.

4.85 UCKTA felt that logically an optimum new network approach should always give a lower result than the existing network.

4.86 Ofcom has conducted extensive analysis into this approach and agrees with ntl that depending upon the assumptions used for such things as the time taken to build, a hypothetical MEA using optimised deployment of duct and copper can result in a higher cost than the existing network. The WIK model in its simplest form assumes that the network is constructed instantaneously whilst BT's network has evolved over an extended period of time. It is Ofcom's view that assuming the network is built instantaneously ignores the realities of large-scale civil construction projects and would not, therefore, be appropriate as a basis for valuing BT's physical network assets. Similarly, once the initial network – and valuation – is fixed, assuming it is re-built each year would also be arbitrary and allowance would have to be made for the hypothetical entrant's sinking of investment and the relatively long useful economic life of assets. The determination of what is a realistic network build period, network operation period and demographic churn is a particularly challenging and subjective exercise and Ofcom does not believe that the resulting regulatory uncertainty would be in the best interests of either consumers or industry.

Question 20: *What is your view of Ofcom's proposal to use Proposal 1 as described above?*

4.87 BT did not believe that any change to the current approach was necessary. However, it stated that Proposal 1 was the least inappropriate approach compared with Proposals 2 and 3. BT's objections have been discussed above.

4.88 Both UKCTA and Cable & Wireless welcomed the adjustments proposed in Proposal 1 but saw them as a set of interim measures, and noted that they were essentially one-off adjustments that would disappear from the valuation over time. Cable & Wireless felt that the proposal should go further in rectifying the other issues in the existing methodology. UKCTA felt that further analysis was required and wished to see a further review within the next

twelve to eighteen months. The areas over which UKCTA expressed specific concerns were:

- shared duct;
- labour rate;
- hypothetical model of an optimised deployment of current technology (i.e. the WIK Consult model);
- spare capacity; and
- migration to PIPeR as a source of inventory data.

4.89 As stated previously, Ofcom firmly believes that some changes to the existing approach are necessary. Specifically, adjustments to limit any potential for over-recovery of costs and alignment of asset lives with international benchmarks and typical service lives. Ofcom does not believe that adoption of an approach based on hypothetical modelling of the deployment of a new entrant's network is appropriate. Ofcom believes that the labour rates used for valuation and the level of spare capacity used within BT's network are appropriate. Ofcom expects that the establishment of ASD will necessitate a closer examination of the allocation of costs associated with shared duct and Ofcom intends to engage with BT on planning a migration to the use of PIPeR as an input into the regulatory accounting process.

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Question 21: *Do you agree that the RAV should be based on the closing net book value in the 2003/4 financial year of assets in situ as of 1 August 1997 and that the approach should be implemented in the 2005/6 financial year? If not, on what do you believe Ofcom should base the RAV, when should this be implemented and why?*

4.90 BT pointed out the "RAV" as defined by Ofcom is the value of the copper and duct assets in situ as of 1 August 1997, which is different to the definition in other regulated industries where the "RAV" relates to all assets. BT maintains that CCA is the correct treatment for all its access network assets, but stated that if Ofcom persists with this approach then the value of the RAV should be the net book value of those assets as at 31 March 2005, so that the RAV methodology would apply in the financial year 2005/06.

4.91 BT also maintains that in line with the treatment in other industries the RAV should be based on market capitalisation, and states that it is unaware of any case where the RAV has been valued based on the HCA of the assets, BT also noted that in no year since 1997 has its market capitalisation fallen below the CCA of its assets.

4.92 Cable & Wireless believed that the closing net book value in 2004/05 should form the opening value of the RAV for the financial year 2005/06.

4.93 Telewest argued that for consistency the RAV approach should be on a backwards looking basis and applied from 1 August 1997. It pointed out that Oftel made two policy changes in 1997:

- a switch from HCA to CCA; and

- an adjustment to the calculation of the actual cash return received by BT in each year, to reflect the fact that part of the return to investors was now being received through appreciation of the asset base.

4.94 Telewest asserted that Ofcom's proposed RAV approach involves reversing the first decision, i.e. switching back to an HCA value, while keeping in place the second decision, as the RAV proposal is that the HCA asset value will be indexed each year. In other words, of the two policy changes made in 1997, Telewest argued that Ofcom is only intending to reverse the first one, which it intends to correct on a forward-looking basis. Telewest then proposed the counterfactual that if Ofcom had not switched from an HCA to a CCA asset valuation in 1997, but, in every other respect had made the same policy decisions, what would the value of the asset base in 2004/5 be?

4.95 According to Telewest the answer can only be reached by inflating the HCA asset base by RPI from 1997, rather than only on a forward-looking basis, as actual cash returns between 1997 and 2004 were being abated to reflect the fact that the asset base was appreciating. In other words Method 2 (page 10 of the supplement to Part 2) is the only outcome consistent with Ofcom's other price control policies.

4.96 Ofcom believes that any attempt to say what Oftel's policy would have been if it had not adopted CCA in 1997 is inevitably speculative. It is also unnecessary for the purposes of considering the possibility of over-recovery in future. Ofcom's decision not to adopt Method 1 or 2, i.e. not to index forward from 1996/97, is consistent with its decision to apply the change on a forward-looking basis only. The returns BT received since 1996/97 were in-line with the regulatory regime existing at the time. Ofcom proposes to intervene only to limit the possibility of any future over-recovery.

Question 22: *Do you agree that the appropriate index for the RAV in the 2004/5 financial year is an RPI of 3.2% and do you agree that RPI should continue to be used for future indexation of the RAV? If not, what index should be adopted and why?*

4.97 BT made a number of detailed comments on Ofcom's approach to the RAV:

- The starting point for the RAV should be the actual asset valuation at the end of 2004/5, ideally in accordance with the finalised, audited financial statements for the year ended 31 March 2005. In the absence of finalised data, Ofcom could estimate the data and work forwards on that basis, but a correction mechanism should be built in to adjust the cost stack, and any prices based on it, once actual data becomes available.

- Indexation forward from 31 March 2004 is not only unnecessary but to do so would result in inappropriate and confusing "holding gains", which are not relevant to setting a RAV. BT did not, therefore, believe it appropriate to index forward the RAV to determine the starting point; only actual year end figures should be used.

- BT recognised that in other UK regulated industries a general inflation index (in practice RPI) has been used to index the RAV, and that using a relatively stable and predictable index has some advantages in the context of setting periodic price controls. However, BT did not believe that RPI would be appropriate for BT's local access network assets, and that instead the RAV

should be indexed forward using CCA indices. This is because of the need to maintain signals about the economics of copper investment, as the price of copper is highly volatile, while for duct the main element of the index are labour rates which are typically above RPI and therefore justify a higher index. Furthermore it is inconsistent, in BT's view, to use RPI for the RAV assets and a CCA index for those assets installed after 1997.

4.98 The other respondents were in favour of RPI, with both UCKTA and Cable & Wireless proposing that the starting point for the RAV should be 1 April 2005 (the 2005/6 financial year) rather than the 2004/5 financial year.

4.99 Given the consensus view that the starting point for the RAV should be 1 April 2005, Ofcom has adopted this approach. The value of the RAV is therefore set to equal the closing HCA value for the pre 1 August 1997 assets for the 2004/5 financial year. In calculating the RAV for the 2005/6 financial year Ofcom has adopted a RPI of 2.5%. This value will be revised each year in line with the observed RPI.

4.100 Ofcom believes the use of RPI to index the RAV is most appropriate as, once created, the RAV is a financial concept rather than the value of physical assets. Use of RPI would also be consistent with other regulators' approaches to indexing the RAV.

Other issues

4.101 Some respondents raised some other issues not directly related to the questions asked and two of these issues in particular are discussed below.

PIPeR

4.102 BT is gradually digitising its local plant records using its operational tool PIPeR to store the plant record data. The purpose is to increase the efficiency and accuracy of network operations. In both Part 1 and Part 2 of this review PIPeR was discussed as a source of network inventory data as an input to the calculation of the copper access network gross replacement cost and some respondents requested more information on the proposed migration to PIPeR. In particular, concern was raised over ensuring the accuracy of the data and independent auditing to ensure that accuracy is maintained.

4.103 It is Ofcom's belief that once complete PIPeR will allow the production of network inventory data which is more consistent and more accurate, over a wider sample and at reduced cost than BT's existing manual method. Ofcom encourages BT to adopt PIPeR as the source of inventory data for the calculation of the copper access network gross replacement cost but recognises the need to ensure that this migration is managed to ensure the accuracy of the results and that it is fit for purpose. Ofcom anticipates that this will require parallel running of PIPeR and the manual method for a number of years followed by regular independent audits to ensure that the accuracy is maintained. Ofcom will seek to work with BT on agreeing a suitable migration plan.

BT vs. Central Valuation Officer

4.104 In Vtesse's response to Part 1 mention was made of the valuation of BT's network assets with respect to the non-domestic rates BT pays on those assets. It was pointed out to Ofcom that the valuation methodology could be

relevant with respect to this review and Ofcom stated in Part 2 that it would look into this further.

4.105 Ofcom has requested from BT an explanation of the approach to calculating the rateable value and the background to its dispute with the Valuation Office and the comments made in relation to that case. BT's evidence was in support of its contention that a Contractors Basis Valuation is superior to a Profits Basis Valuation for the purpose of valuing its assets for rating purposes. However, the dispute was eventually settled on the basis of a mutually agreed value, although no agreement was reached at this time between BT and the Valuation Office on the methodology that should be used. Also, BT has told Ofcom that the process adopted for determining the value of rateable assets is significantly different to CCA in a number of respects: assumption of no supply restrictions, application of obsolescence allowances, inclusion of an element for land and application of a statutory decapitalisation rate. As such the resulting "net replacement cost" is not directly comparable with the net replacement cost derived under CCA and cannot be used as a proxy. Ofcom has ascertained that the network valuation that was finally settled for the 1994/5 valuation exercise which was the subject of this dispute, was significantly higher than the net replacement costs of the 1994/5 CCA value.

Section 5

Conclusions

Introduction

5.1 Ofcom began this review in May 2004 with the objective of reviewing the value BT places on its copper access network in order to inform the cost-based pricing of those regulated services which use it. During this process it has become clear to Ofcom that the valuation methodology, and the valuation it produces, appear to be appropriate within the bounds of the analysis it has been possible to undertake. The only exception to this being the doubt over the accuracy of the sampling method used to determine the asset inventory. However, what the analysis has indicated to Ofcom is that there are real problems with the path of cost recovery that the current method prescribes.

5.2 In this section Ofcom presents its conclusions on the changes necessary to the current methodology for valuing BT's copper access network assets. Ofcom's analysis indicates that the following changes are appropriate for the purposes of ensuring the promotion of efficiency and sustainable competition and the maximum benefit for consumers, in accordance with Ofcom's duties and regulatory principles outlined in Sections 2 and 3 above:

- establishment of a regulatory asset value (or "RAV") for those copper access network assets in place prior to the change from HCA to CCA in the regulatory financial accounts on 1 August 1997;
- alignment of the regulatory accounting lives for duct and copper cables with international benchmarks and typical service lives; and
- migration from a manual method of establishing the copper access network inventory to an automated method based on BT's operational PIPeR geographical information system[32].

5.3 In addition, Ofcom's analysis has indicated a number of areas in which changes are not necessary:

- use of current cost accounting as at present for assets deployed from 1 August 1997 onwards;
- labour rates used in the calculation of the gross replacement cost;
- treatment of spare and surplus capacity, or cable modularity; and
- treatment of duct shared between core and access cables[33].

[32] PIPeR has not been implemented specifically to support regulatory accounting but rather to replace manual network planning methods and support BT's network operations. Use in regulatory accounting is a 'spin-off' from BT's PIPeR implementation.
[33] Note that with the forthcoming establishment of the Access Services Division as part of the Undertakings in lieu of a reference under the Enterprise Act (should they be accepted by Ofcom) it is likely that the allocation of costs between access and core in relation to shared assets will need to be further examined.

5.4 Finally, it is Ofcom's intention to make any adjustments for inefficiency by BT in the operation and maintenance of the copper access network as part of the determination of the charges for the regulated products which use it.

Establishing a regulatory asset value

5.5 As explained in Section 4 above, Ofcom's analysis has shown that if the path of cost recovery remains unchanged then BT will over-recover against copper access network assets which were already in place when the regulatory accounting switch was made from HCA to CCA on 1 August 1997. It is Ofcom's intention, therefore, to limit this possibility by establishing a RAV for those assets. This corresponds to Proposal 1 from Part 2.

5.6 As noted above, the value of the RAV is set to equal the closing HCA value for the pre 1 August 1997 assets for the 2004/5 financial year. Going forward, BT will be required to maintain appropriate records to identify the relevant assets which constitute the RAV and enable the calculation of the RAV in future such that the RAV is capable of being distinguished from other access assets which are subject to a full CCA approach. Ofcom and BT will work together to establish the most appropriate means of presenting the RAV within the 2005/6 financial statements.

5.7 The RAV relates only to assets which were in place at the time of the switch from HCA to CCA, i.e. 1 August 1997. All assets added after this date have been treated consistently under CCA and will continue to be so. This means that over time the asset base will move toward a full CCA valuation as pre-1997 assets are retired and replaced with new ones. As a result the RAV will gradually "unwind" and costs will be calculated on a full CCA basis. Due to the shorter asset life this effect is more rapid for copper than for duct. If it is assumed that duct has a 40 year life (in line with the accounting treatment outlined in this review) then in theory the last remaining assets included in the RAV will become fully depreciated in 2037/8. From this point forward all assets would be treated under a full CCA basis and would have been so throughout their life. In terms of the near term impact of this convergence, Ofcom estimates that the unwinding of the RAV means that the cost of the in-scope assets is likely to be approximately 3% higher in 2009/10 than in 2005/6. This impact relates to the unwinding of the RAV only, and does not take account of any other cost changes such as changing asset prices and their impact on the CCA valuation. Ofcom will give consideration to these effects in its analysis of LLU and WLR charges.

Accounting lives for duct and copper

5.8 It is Ofcom's view that the depreciation schedules for copper access network assets (i.e. both duct and copper assets) employed by BT in its statutory accounts are not appropriate within a regulatory context in which substantial, large-scale entry or expansion of alternative access infrastructure is unlikely in the short to medium term.

5.9 For duct assets Ofcom does not believe that BT's aggressive depreciation policy is borne out by experience in that duct continues to receive a new 25 year life each year. It is difficult to envisage any large scale technological deployment which will render BT's duct network obsolete, even in the longer term, given the reliance placed on it by both copper and fibre access. BT has stated to Ofcom that, on average, its duct has a book life of 38 years whilst the maximum book life is 45 years. It is Ofcom's intention, therefore, to adopt

a simpler straight line depreciation treatment for E and D-side duct within the regulatory financial accounts and to use an accounting life of 40 years.

5.10 Similarly, for copper assets Ofcom does not believe that BT's aggressive depreciation policy is appropriate. Internationally, in the Ernst & Young study referred to in Part 2[34] the majority of European access network operators indicated a book life in the range 16 to 20 years, higher than BT's 15 years, for copper cable. BT has indicated that the design life is 20 years and the actual service life is expected to be somewhere between 15 and 20 years. Also, given the widespread and rapid adoption of DSL technology the useful economic life of copper cable has been increased. Evidence for this can be seen in the actions of a number of access network operators, including BT, seeking to overlay fibre-based passive optical networks with copper to facilitate the provision of DSL services. Local loop unbundling has further increased the utility, and the competitive importance, of the copper access network. Taking all this into consideration it is Ofcom's intention to adopt a straight line depreciation treatment for E and D-side copper cable within the regulatory financial accounts and to use a book life in the middle of the range indicated by both BT's response and the Ernst & Young study, i.e. 18 years.

5.11 Ofcom will work with BT in order to establish the most appropriate presentation of these changes in the 2005/6 financial statements.

Migration to PIPeR

5.12 In both Part 1 and Part 2 of this review Ofcom highlighted its concerns over the accuracy of the manual method BT currently uses to estimate the total inventory of copper access network assets. These data are necessary to inform the calculation of the GRC under the CCA methodology in which the quantity of each asset type is multiplied by the current unit price to arrive at its gross replacement cost. Ofcom's concerns with the current process are principally the opportunity for error and the limited sampling exercise necessary due to resource constraints.

5.13 During the course of this review BT has made Ofcom aware of the process of digitisation of its paper local access network plant records through the adoption of the Physical Inventory, Planning and eRecords (PIPeR) geographical information system. This system is being deployed by BT to increase operational efficiency and support its local access network operations. However, the adoption of this system offers the opportunity to greatly reduce the possibility of introducing human error and increasing the number of plant records which are included in the survey used for the CCA valuation; potentially even including all records and thereby eliminating the need for scaling of the results of the sampling exercise. Respondents in general agreed that such an approach would improve on the current approach and had the potential to increase confidence in the valuation.

5.14 BT has also indicated to Ofcom its desire to migrate to PIPeR as it should result in significant cost savings to BT through elimination of the resource intensive annual survey. Ofcom agrees that in the interests of efficiency and lower operational costs, which is ultimately in the interest of citizen-consumers, PIPeR offers an advantage over the existing approach.

[34] http://www.ey.com/global/Content.nsf/Australia/TCE_-_Publications_-_Downturn_impacts_Telco_assets

5.15 However, Ofcom is concerned that PIPeR should only be adopted if it can be shown to improve on the accuracy of the current system and if a process of independent audit, to verify its accuracy, can be introduced. Ofcom is further concerned that the introduction of PIPeR may result in a significant change to the underlying costs due to inherent inaccuracies in the current approach. Such changes would need to be accommodated through a process of gradual change to the underlying costs to avoid any price shocks as a result of the move to PIPeR.

5.16 It is Ofcom's intention to work with BT and industry to agree a plan for migration from the current approach to one using PIPeR as a data source. BT has informed Ofcom that it intends to adopt a programme of reconciliations as the size of the PIPeR database grows before adopting it completely for the CCA valuation. This programme will start as soon as there are sufficient exchanges in the database to provide a representative sample of the population. BT's current plan indicates a start of the pilot phase for PIPeR systems and data using an initial set of exchanges in August 2005. As a reminder, the current method samples 176 exchanges. BT also intends to perform a CCA valuation using PIPeR in the 2005/6 financial year, irrespective of whether the sample at that time is representative, as part of its reconciliation programme. Ofcom intends to monitor this reconciliation programme and anticipates that even once it is complete a period of parallel running of PIPeR and the manual method will be required for a number of years, followed by regular independent audits to ensure that the accuracy is maintained. Ofcom will seek to work with BT and industry on agreeing a suitable migration plan.

Impact of changes

5.17 All the figures presented below are based on BT's preliminary 2004/5 regulated financial accounts which are due for publication in early September 2005. Although Ofcom believes that the accounting data is unlikely to change substantially before publication, any change may result in changes in the figures presented here. Such changes may need to be taken into account when calculating the cost of the in-scope assets for the LLU and WLR services.

5.18 The changes Ofcom has decided to make apply only to the E and D-side assets as only these assets were considered in the review. The reasons for this were discussed in Section 3. In the 2004/5 accounts as reported by BT the access network assets have a WACC of 13.5% applied. Applying the changes discussed earlier, and with the same cost of capital, the average per loop cost of the E and D-side assets for the 2005/6 financial year reduces from £76.41 per annum to £65.62 per annum representing a reduction of £10.79 per loop.

5.19 However, Ofcom's cost of capital review[35] has determined that a WACC of 10.0% is more appropriate for the access network assets and incorporating this change further reduces the average cost per loop to £59.10 for the 2005/6 financial year.

5.20 This figure is being used in the analysis underway within Ofcom in respect of WLR and LLU pricing. The actual cost of a copper loop applied to those

[35] http://www.ofcom.org.uk/consult/condocs/cost_capital2/statement/

products will be dependent upon a number of adjustments, such as factoring in the impact of Digital Access Carrier System (DACS) in relation to the average number of loops utilised per WLR line and the impact of differing fault rates being encountered on the loops of each product. As also highlighted above, in the discussion of the responses to Question 11 of Part 2, these calculations will also consider whether it would be appropriate to include further adjustments to the cost of a copper loop to reflect efficiency gains.

5.21 However, Ofcom has calculated, based on the reduced cost of capital and the changes resulting from this review, indicative costs for the in-scope assets for a WLR and LLU line:

- WLR – £58.51 per line for the 2005/6 financial year; and
- LLU – £60.11 per line for the 2005/6 financial year.

These figures assume that the allocation of costs to plant groups within the regulated financial accounts remains unchanged.

Future review of these conclusions

5.22 In Part 2 Ofcom stated that it proposed to implement its proposals for modifying the path of cost recovery against the in-scope assets until such time as the competitiveness of the appropriate markets is re-assessed. This was indicated as likely being 2009/10. In order to provide some regulatory certainty regarding these changes Ofcom undertakes to implement the conclusions of this review in the 2005/6 financial year and to implement the price adjustments through the normal cycle of price reviews of the relevant products, beginning with full MPF LLU. Ofcom will re-examine the conclusions of this review in light of the results of the next Telecommunications Strategic Review or in 2009/10 whichever is the earlier.

Section 6

Questions and further information

Further information

If you want to discuss the issues and questions raised in this statement please contact Graeme Hodgson on 020 7783 4417 or by email at graeme.hodgson@ofcom.org.uk.

Ofcom's consultation processes

If you have any comments or suggestions on how Ofcom conducts its consultations, please call our consultation helpdesk on 020 7981 3003 or e-mail us at consult@ofcom.org.uk. We would particularly welcome thoughts on how Ofcom could more effectively seek the views of those groups or individuals, such as small businesses or particular types of residential consumers, whose views are less likely to be obtained in a formal consultation.

If you would like to discuss these issues, or Ofcom's consultation processes more generally, please contact Tony Stoller, Director of External Relations, who is Ofcom's consultation champion:

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Annex 1

Ofcom's consultation principles

Ofcom has published the following seven principles that it will follow for each public written consultation:

Before the consultation

1 Where possible, we will hold informal talks with people and organisations before announcing a big consultation to find out whether we are thinking in the right direction. If we do not have enough time to do this, we will hold an open meeting to explain our proposals shortly after announcing the consultation.

During the consultation

2 We will be clear about who we are consulting, why, on what questions and for how long.

3 We will make the consultation document as short and simple as possible with a summary of no more than two pages. We will try to make it as easy as possible to give us a written response. If the consultation is complicated, we may provide a shortened version for smaller organisations or individuals who would otherwise not be able to spare the time to share their views.

4 We will normally allow ten weeks for responses to consultations on issues of general interest.

5 There will be a person within Ofcom who will be in charge of making sure we follow our own guidelines and reach out to the largest number of people and organisations interested in the outcome of our decisions. This individual (who we call the consultation champion) will also be the main person to contact with views on the way we run our consultations.

6 If we are not able to follow one of these principles, we will explain why. This may be because a particular issue is urgent. If we need to reduce the amount of time we have set aside for a consultation, we will let those concerned know beforehand that this is a 'red flag consultation' which needs their urgent attention.

After the consultation

7 We will look at each response carefully and with an open mind. We will give reasons for our decisions and will give an account of how the views of those concerned helped shape those decisions.

Annex 2

Glossary

Item	Description
21CN	BT's 21st Century Network programme, see www.btplc.com for more information.
access	Access refers to the part of the network which provides connectivity between the customer and the core, often referred to as 'the last mile'.
ARCEP	The French telecommunications regulator, see www.arcep.fr for more information.
ASD	Access Services Division
asset life	The economic or 'book' life of an asset over which its value is depreciated.
bore	An individual duct tube laid into a trench. A duct may contain multiple bores.
BT	BT Group plc
CCA	Current Cost Accounting
copper access network	The part of the access network formed from pairs of copper wires bundled together into cables which are then laid in ducts, carried overhead on poles or directly buried into the ground.
copper cable	A cable containing one, or more, pairs of copper wires together with a sheath and a core to provide protection and strength respectively.
copper line	An individual pair of copper wires.
copper loop	As per a copper line but usually used to refer to the entire metallic path between the exchange and the customer.
cost of capital	The opportunity cost of an investment, i.e. the rate of return that a company would otherwise be able to earn at the same risk level as the investment that has been selected.
core	Core refers to the part of the network which generally contains all the switching and processing equipment used to provide services to customers via the access network.
CPE	Customer Premises Equipment: terminal equipment used by the customer, e.g. telephone.
DACS	Digital Access Carrier System
DP	Distribution Point: the point in the access network from which the drop wire is provided to the customer.

drop wire	The pair of copper wires which connect the customer to the distribution point (e.g. pole).
D-side	Distribution side of the access network between the primary cross-connection point (“green street cabinet”) and the customer.
duct	A facility of one or more buried tubes through which cables can be routed.
ECPR	Efficient Component Pricing Rule
EPMU	Equal Proportionate Mark-Up
E-side	Exchange side of the access network between the exchange and the primary cross-connection point (“green street cabinet”).
EU	European Union
exchange	Used to refer to the building and equipment located within the exchange area and to which all customers are connected via the access network.
FAC	Fully Attributed Costs
FCM	Financial Capital Maintenance
GBV	Gross Book Value
GIS	Geographical Information System
GRC	Gross Replacement Cost
HCA	Historical Cost Accounting
infrastructure	General term used to refer to all the equipment and plant used to provide connectivity and services to customers.
labour rate	The rate charged for the civil works related to construction of infrastructure.
LLCS	Local Line Costing Study: a study operated by BT to estimate the GRC of their access network based on a sample of exchanges.
LLU	Local Loop Unbundling
LRIC	Long Run Incremental Cost; may also be prefixed with FL- for Forward Looking.
MDF	Main Distribution Frame: the mechanical frame within the exchange through which all copper loops are cross-connected to a copper line connected to the core infrastructure.
MEA	Modern Equivalent Asset
MPF	Metallic Path Facility: the pair of metallic wires which provide a physical connection between the MDF and the end user.
NBV	Net Book Value

NPV	Net Present Value
NRC	Net Replacement Cost
PCP	Primary Cross-connection Point: the familiar street cabinet which provides a flexibility point between the E-side and D-side parts of the access network.
PIPeR	Physical Inventory, Planning and eRecords: BT's GIS used to store data related to their access network infrastructure.
RAV	Regulatory Asset Value
RegTP	The German telecommunications regulator, see www.regtp.de for more information.
RV	Regulatory Value
RPI	Retail Price Index
SMP	Significant Market Power
spare capacity	Additional capacity provided within network infrastructure against future demand and maintenance requirements.
surplus capacity	Additional capacity provided within network infrastructure beyond what is required to provide sufficient spare capacity.
TSR	Ofcom's Telecommunications Strategic Review, see www.ofcom.org.uk for more information.
UK	United Kingdom
UKCTA	United Kingdom Competitive Telecommunications Association, see www.ukcta.com for more information.
WACC	Weighted Average Cost of Capital: see cost of capital
wholesale access services	Services provided over the access network which allow competitive communications providers access to basic services on a wholesale basis.
WLR	Wholesale Line Rental