



Valuing copper access

Part 2 – Proposals

Consultation document

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Section 1

Summary

Introduction

- 1.1 In Phase 2 of the Telecommunications Strategic Review¹ (TSR) 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 such as local loop unbundling (LLU) and wholesale line rental (WLR) are an important mechanism for introducing sustainable competition in downstream markets. The cost of the copper loop, which is the single largest component of the costs of these services, is unlikely to be constrained by competitive pressure.
- 1.2 In Part 1 of this consultation² Ofcom considered how it should treat the costs of the copper loop, in the absence of significant infrastructure-based competition. Ofcom focused on the principles for determining an appropriate cost for the copper loop. These essentially considered a continuation of the existing regime or a move to a modern equivalent asset (MEA) basis. Ofcom considered in particular whether it is appropriate for BT to continue to benefit from the over-recovery of costs resulting from the move from historical cost accounting to current cost accounting in 1996/97.
- 1.3 Ofcom received a significant range of responses to Part 1. BT stated that it does not believe the existing approach needs to be changed, although it accepted the need to address the issue of the accuracy of the existing approach and supported a migration to its new geographical information system (PIPeR) to assist this. Telewest was concerned that the approach taken should be more tightly integrated with other work undertaken by Ofcom and that a more service-oriented view be taken. This was echoed to some extent by Earthlease who preferred a valuation based on forward-looking cash flow projections. The alternative network operators, represented in the main by UKCTA, wished to see a return to charges based on the historical cost accounting method.
- 1.4 In Part 2 of this consultation, Ofcom sets out a financial analysis of the various proposals resulting from continuing analysis into the options considered in Part 1 and has taken the opportunity, based on the responses and the further work undertaken since December 2004, to refine the approaches it is considering.
- 1.5 Ofcom's preferred approach is to continue with BT's existing method for determining the cost of the copper loop but to disallow that element of the over-recovery which has not yet crystallised but would otherwise do so in the future. In Part 1 Ofcom suggested that it might be appropriate to disallow the entire over-recovery but Ofcom now believes that it would be inappropriate to do so and that only that part of the over-recovery which has not yet crystallised should be disallowed. In addition, Ofcom is proposing to calculate the allowable depreciation of the asset base on a prospective basis using revised economic lives, reflecting the consensus position of the respondents.

¹ Phase 2 of the Telecommunications Strategic Review, published 18 November 2004, available at http://www.ofcom.org.uk/consult/condocs/telecoms_p2

² <http://www.ofcom.org.uk/consult/condocs/copper/value/?a=87101>

- 1.6 Ofcom has compared the resulting cost estimates with the results of the modern equivalent asset approach to determine whether they approximate to the costs that a new entrant might be expected to incur if entering the market.
- 1.7 Ofcom considers there to be a number of advantages to this approach:
- it is forward looking;
 - there is no “claw back” of over-recovery of costs that BT has benefited from since 1996/97;
 - it has minimum disruption to the current regulatory burden on BT;
 - it gives regulatory certainty;
 - it does not rely upon an annual recalibration of a modern equivalent asset; and
 - it allows BT full recovery of its current efficiently incurred expenditure.
- 1.8 Ofcom proposes initially to disallow the un-crystallised portion of the over-recovery for a period of five years. It proposes to reconsider the state of access infrastructure competition and the cost estimates for the access network at the end of this period, at which point a decision will be taken as to whether to continue to disallow the over-recovery thereafter. For the avoidance of doubt, Ofcom would expect that element of the over-recovery either to be competed away or to be disallowed at that time.
- 1.9 The result of Ofcom’s analysis indicates that, if its preferred approach were to be followed, the reduction in the cost of a copper loop would be between 4.8% and 14.2%, if the cost of capital were fixed at 13.5%³. It is expected that these reductions, together with any change in the cost of capital, will feed into the determination of LLU and WLR charges by summer 2005.
- 1.10 The cost of capital has a significant impact on the final costs of a copper loop. Ofcom is separately consulting on the appropriate cost of capital, including its disaggregation between the access and core networks⁴. Section 7 includes a brief analysis of the combined effects of the two consultations; this shows that a reduction in the cost of capital to, for example, 10.3%⁵ would move the range quoted above giving a range of 14.6% to 24.1% for the combined effect. The final statement on cost of capital, due in April 2005, will include an updated version of this analysis.
- 1.11 As stated above, a number of respondents argued that a return to historical cost accounting was necessary. Ofcom, however, remains of the view that this would not be appropriate. 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

³ 13.5% was used in BT’s 2003/04 accounts which were used as input to much of this analysis.

⁴ http://www.ofcom.org.uk/consult/condocs/cost_capital/

⁵ Based on the parameter values discussed in the cost of capital consultation.

with the need to protect consumers in the medium term. Therefore, with the exception of the removal of part of the over-recovery arising from the switch to CCA in 1996/97, current cost accounting remains the preferred approach. This is because this provides appropriate price signals to both suppliers and consumers as well as providing regulatory consistency and consistency with Ofcom's forward-looking approach generally. A fuller analysis of this issue is provided in Section 3.

- 1.12 Ofcom also consulted in Part 1 on whether the current arrangements for the allocation of the costs of duct shared between the access and core networks were appropriate. In light of further analysis of the alternatives and a review of the consultation responses on this matter, Ofcom does not consider there to be sufficient merit in any of the alternatives to warrant changing methodologies at this time.

Section 2

Introduction

Background

- 2.1 In Phase 2 of the Telecommunications Strategic Review 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, namely wholesale line rental (WLR), local loop unbundling (LLU) and the terminating segments of Partial Private Circuits (PPCs), 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 consultation 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 consultation

- 2.3 This is the second part of a two part consultation. The overall consultation is 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 consultation Ofcom concluded that BT is substantially applying the agreed methodology although a number of items were highlighted as being of concern. These were:
- the statistical accuracy of the Local Line Costing Study (LLCS);
 - the asset lives assigned to copper cables and duct;
 - the quantity of spare and surplus capacity;
 - the labour rate used by BT for the gross replacement cost (GRC) calculation;
 - the unavailability of prices for cables installed but no longer stocked; and
 - the method for allocation of the cost of duct shared by both access and core cables.
- 2.5 Part 1 described the existing methodology, but also began to address the second question by providing two options for alternative methods of arriving at a valuation. The first of these looked at an optimised use of existing copper cable and duct technology, whilst the second offered a more radical option of using new technology to provide the same capacity, reach and functionality of BT's existing copper access network.

- 2.6 In this second part of the consultation Ofcom provides a financial analysis of the alternative valuation methodologies and also examines the items of concern highlighted above within the context of this analysis.
- 2.7 Upon the conclusion of this consultation Ofcom will make a statement as to how it 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. Ofcom expects to make this statement in late June 2005.

Links to other areas of Ofcom's work

- 2.8 Within the framework of the Telecommunications Strategic Review, Ofcom is currently consulting on the approach to risk in the assessment of the cost of capital and is very shortly to consult on network charge controls. Both of these consultations have an interrelationship with this consultation. The cost of capital affects the return on the capital employed in BT's copper access network. Within the context of network charge controls Ofcom is considering the efficiency of BT's operations and the use of long run incremental costs plus equal proportionate mark-up (LRIC+EPMU) or fully attributed costs (FAC) all of which may have implications for this consultation.
- 2.9 Throughout the consultation process Ofcom has worked internally to ensure that these consultations are closely aligned and any cross-consultation effects are identified and the implications, if any, accounted for.

The legal framework

- 2.10 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 Directives⁶. 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 2003⁷.
- 2.11 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.

⁶ 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>

⁷ http://www.ofcom.org.uk/static/archive/oftel/publications/eu_directives/2003/cond_final0703.pdf

- 2.12 As noted above, the purpose of this consultation 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.
- 2.13 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.
- 2.14 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.
- 2.15 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

- 2.16 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.
- 2.17 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

2.18 A number of terms are in use with respect to the access network. For the purposes of this consultation document, 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 served customers. Within the context of this consultation, access links other than those provided by pairs of wires, e.g. optical fibre, are excluded as are the 'drop wires' which comprise the final link between the customer and the distribution point (DP).
- 'Core network' refers to that part of the network deployed between exchange buildings. For the purposes of this consultation, 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.

In common with the definition used in Part 1 of this consultation, drop wires are excluded from the analysis. With the notable exception of wireless technologies, the drop wire is essentially the same for each access technology and can, therefore, be assumed to be invariant between the options. This greatly simplifies the analysis and allows a direct comparison with the valuations provided by BT. Ofcom recognises that some respondents to Part 1 expressed concern with this approach and Ofcom has addressed these concerns in its analysis. Further discussion on this issue is provided in Section 4.

2.19 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

2.20 Ofcom has met with both the German regulator⁸, RegTP, and the French regulator⁹, ART, during the course of this consultation. Like Ofcom, both regulators are actively engaged in promoting wholesale access to the local access networks of their incumbent operators, Deutsche Telekom¹⁰ and France Télécom¹¹ respectively.

2.21 At present both regulators adopt an approach designed to set costs with reference to an estimate of the current cost of the network assets. RegTP uses an approach which includes a detailed modelling of the network to estimate the cost an efficient entrant might incur. This modelling involves planning an optimal access network for a large sample of exchange areas and using the results to derive a network gross replacement cost. Ofcom has also investigated this approach and presents the results of this analysis in

⁸ <http://www.regtp.de/en/index.html>

⁹ <http://www.art-telecom.fr/eng/index.htm>

¹⁰ <http://www.telekom3.de/en-p/home/cc-startseite.html>

¹¹ <http://www.francetelecom.com/en/>

Section 4. ART uses a LRIC approach which estimates how assets will be replaced over time.

Structure of the rest of this consultation

2.22 The rest of this consultation is divided into six main sections:

- Section 3 looks at the policy issues and the regulatory framework within which wholesale access services operate;
- Section 4 presents the results of Ofcom's analysis into the options identified in Part 1;
- Section 5 examines the calculation of the over-recovery;
- Section 6 presents proposals for the approach to take for future calculations of the cost of a copper loop from BT;
- Section 7 examines the impact a change in the valuation might have and how the change might be implemented; and
- Section 8 provides guidance on how to respond to this consultation.

Section 3

Policy aims and the regulatory framework

Introduction

3.1 In Part 1 of this consultation Ofcom described the regulatory context within which this consultation is taking place. In this section that context is revisited.

3.2 The Telecommunications Strategic Review stated that:

7.15 The considerations concerning the regulated returns that BT should be permitted to earn from its current access network are very different from those concerning the core network.

7.16 The relative importance of incentives to invest is low. It is important that BT is not disincentivised from investing in next generation access networks, and we consider this below. But the current generation copper access network is already in the ground, and little new investment beyond incremental investment for new-build properties is in prospect.

7.17 Much of the copper access network is not contestable by competing network providers, and as a result there is a strong need for direct consumer protection. The market reviews completed by Oftel and Ofcom found that competition in access networks from mobile and cable does not constitute effective competition to BT in many markets. Therefore in these markets, direct regulation on the return that BT is permitted to make on its assets is the principal means of consumer protection.

3.3 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, LLU and PPCs 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.

3.4 For wholesale charges to be cost-orientated 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 consultation, then, is 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, LLU and PPCs. Part 1 was concerned primarily with what should be valued and whether BT is correctly applying the existing methodology. In Part 2 Ofcom is looking in more depth at the appropriate methodology for establishing the cost.

3.5 The proposals 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 proposal to remove part of the over-recovery arising from the switch to CCA in 1996/97 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.

The change from HCA to CCA

- 3.6 In 1996/97 Oftel conducted a review of the methodology for valuing BT's local loop assets¹² and concluded that the existing method of Historical Cost Accounting (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 Current Cost Accounting (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. This issue is considered further below.
- 3.7 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.
- 3.8 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 available to just over half of UK homes.

The case for retaining CCA

- 3.9 In Section 3 of Part 1 Ofcom discussed whether HCA or CCA was the most appropriate method to use in valuing the copper access network. The conclusion reached was that Ofcom continues to believe that the CCA approach is the most appropriate method to follow.
- 3.10 Since the publication of the document Ofcom has been asked, by a number of communication providers, to further explain its reasoning behind believing CCA to be the most appropriate approach. As discussed below, Ofcom is proposing to depart from the full CCA approach adopted since 1997, although it does not propose to return to HCA and will retain the key aspects of the CCA methodology. The main reasons for not returning to the HCA methodology are as follows:

¹² 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

- 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 by removing the one-off gain associated with the adoption of CCA but over time the significance of this adjustment will decrease.
- The most appropriate measure of costs, therefore, is one which is sensitive to the way the cost of investment, or the resources which are needed to produce the good 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 the 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 then that basing prices on HCA, without allowing for future changes in asset prices, could stifle efficient investment in access networks in the longer term.

Responses to question 1: Should this consultation be extended to cover the copper access network operated in the Hull area by Kingston Communications? If you think it should then please explain why.

- 3.11 The majority of respondents do not believe that this consultation should be extended to cover the copper access network operated in the Hull area by Kingston Communications. However, both BT and Earthlease believe that it should in the interest of consistency of approach across the UK.

Ofcom's response

- 3.12 Ofcom has not yet considered it necessary to set charges for wholesale access to Kingston's copper access network, principally due to the lack of demand for such access. Ofcom does not therefore consider it necessary at this stage to extend the scope of this consultation to cover the copper access network operated by Kingston in the Hull area. Ofcom recognises, however, that this situation may change in the foreseeable future as some operators may wish to offer services to customers in the Hull area using wholesale access products. Ofcom does not intend to extend this framework to consider the costs of Kingston's copper access network until such time as there is evidence of sufficient demand for wholesale access to justify regulatory intervention.

Responses to question 2: What is your opinion of a return to HCA?

- 3.13 There were three respondents UKCTA, Earthlease and BT who discussed whether it would be more appropriate to move away from the current CCA valuation approach. Their favoured method was a market value approach similar to that used by other UK regulators. The methods put forward by the three respondents in order to arrive at this valuation appear to differ, but the principle discussed is the same.

- 3.14 BT has stated that although the current CCA approach is sound, Ofcom has not considered any alternative approaches such as the use of market value as used by a number of other regulators. BT has included a paper by Dr Eileen Marshall CBE (Annex 3 of BT's submission)¹³ on reasons why Ofcom should adopt a different approach to valuing BT's copper access network assets by establishing a regulatory value.
- 3.15 UKCTA states that a 'modified version of HCA' would be more appropriate, where the asset value is based on the price paid by shareholders at privatisation for those assets plus the historical cost of asset investments since privatisation minus the appropriate depreciation. UKCTA also asks Ofcom to assess the potential cost to be 'paid' by consumers by using a CCA valuation versus the prospects for and benefits flowing from competition.

Ofcom's response

- 3.16 Dr Marshall in her paper has identified two main problems with the use of CCA, firstly that the value of the company at flotation may be significantly less than replacement cost and secondly that there are practical difficulties with determining the appropriate CCA valuation using an MEA approach.
- 3.17 Dr Marshall goes on to identify four further 'unintended consequences' of CCA:
- revaluation could lead to expropriation of assets;
 - prices could vary in an arbitrary way from year to year;
 - it could deter entry; and
 - it could detract from the proper regulatory scrutiny of BT's investment plans.
- 3.18 Ofcom agrees that full CCA is not now appropriate for those access assets revalued in 1996/97, although not primarily for the reasons set out by Dr Marshall and listed above. Firstly, as Dr Marshall acknowledges, BT was not floated at a significant discount to its accounting value.
- 3.19 Regarding the second problem Dr Marshall argues that CCA valuations are inevitably subjective because it is unclear at any point in time what the MEA actually is. In order to inform its analysis, Ofcom has sought to minimise any subjectivity by the use in this consultation of external consultants to advise it on the appropriate costs of the MEA. Moreover, Ofcom no longer intends to revalue BT's network on the basis of estimates of efficient network costs. Rather, such a valuation would only be used to inform as to what the costs of an MEA might be in order to assess the reasonableness of the proposals.
- 3.20 The possibility of expropriating assets is a matter that Ofcom takes very seriously. Ofcom agrees that clawing back profits which are due to unanticipated efficiency gains would damage incentives to increase efficiency. However, the opportunity for over-recovery resulting from the 1997 revaluation to CCA did not result from any efficiency on the part of BT, but

¹³ <http://www.ofcom.org.uk/consult/condocs/copper/rescoppers/btannexes>

from a change in accounting treatment by the regulator. Ofcom believes that removing the opportunity for over-recovery in future should have minimal effect on economic incentives.

- 3.21 Ofcom agrees that, if the network is periodically revalued downwards without compensation (as it would be in a competitive market if replacement costs were falling), investors could be unable to recover the investments which they have sunk. This could then make it difficult to attract investment into the industry or, in effect, raise the cost of capital. Under the CCA Financial Capital Maintenance (FCM) convention, this issue is addressed by treating a downward revaluation as giving rise to a holding loss which could, in principle be recovered through charges for use of the assets in question. As part of its response to the first consultation document, BT commissioned a report from KPMG which, in part, considered the issue of asset revaluation. As KPMG notes, full recognition of holding losses in this way would in principle leave the firm indifferent to the scale of any revaluation.
- 3.22 It would seem unlikely that the MEA value would be as volatile from year to year as suggested by Dr Marshall, but in any case any charge volatility on a year by year basis would be avoided under a four year price cap as currently used with PPCs, for example. Finally, Ofcom now believes that immediate further entry into local loop provision is unlikely. The possibility of longer term entry has however been taken into account in Ofcom's proposals.
- 3.23 In the light of all these factors and, in particular the risk of expropriation of shareholders' funds if assets purchased following the 1996/97 conversion from HCA to CCA (assets which have, therefore, always been accounted for under the CCA convention) were revalued downwards, Ofcom believes that the CCA method may still be appropriate for those assets. However, for those access assets already in situ and therefore revalued in the 1996/97 switch from HCA to CCA, Ofcom believes the approach of setting a regulatory value different from the accounting valuation, as advocated by Dr Marshall, has merit.
- 3.24 Dr Marshall argues that rather than CCA, Ofcom should set a "regulatory value" (RV) for BT's access network. This should reflect "shareholders' reasonable expectations and interests". Charges for use of the network would then be set to yield a cash flow sufficient to cover forward-looking costs and fund future investment. This approach is based on that adopted for the regulation of other network utilities in the UK, notably by Ofgas (now Ofgem).
- 3.25 Ofcom notes that there is a large measure of agreement between Dr Marshall and other respondents, such as UKCTA, who have proposed broadly similar approaches. Ofcom also agrees that, in general terms, this approach has merit. The question then is how to address its two key components: setting the RV and determining future allowed revenues. Basing the RV on current market valuations would be circular, as Dr Marshall notes, since the market valuation will reflect the expected impact of regulation, which in turn depends on the regulator's valuation of the network. There would also be practical difficulties in identifying a market value for the local loop in isolation and it would be difficult to distinguish the relevant revenues from those of other services for which customers need to be connected to the BT network via the local loop, a difficulty which is recognised in Dr Marshall's submission on behalf of BT as leading to possible subjectivity.

- 3.26 The usual alternative is to use the valuation at or close to flotation. But as Dr Marshall also notes, this is now so long ago as to be irrelevant. No clear means of identifying an appropriate time at which to determine the RV is proposed by Dr Marshall, only that it should “strike an acceptable balance between the interests of shareholders and consumers”. Ofcom would agree that these are the appropriate factors to consider and indeed these also underlie its own approach. Ofcom believes that, in effect, an appropriate balance is struck by determining an RV equal to the current value of the assets revalued in 1996/97 less the amount of the over-recovery arising which has not yet “crystallised”. (The precise meaning of this term as used in this document is explained in Section 5. Note that it does not necessarily imply that BT has enjoyed higher revenues in the past as a result of the use of CCA.)
- 3.27 Ofcom believes that the approach of rolling forward the regulatory asset base by adding new investment and subtracting depreciation, as suggested by Dr Marshall, is in principle correct. However, detailed analysis of BT’s future investment needs would represent a move towards more intrusive regulation of BT than at present and so should not be undertaken without clear evidence that it would be superior to the current approach and is proportionate to the problems identified. It is potentially quite resource-intensive for both the regulator and regulated company. It is also arguably less appropriate to a company such as BT, which also provides a large number of other services and operates in markets with a significant degree of competition, than to a vertically separated network company like Transco, the example on which Dr Marshall largely draws. For example, BT may avoid problems of co-ordinating investment which can arise where the network operator and service providers are separate companies. This may reduce the need for repeated and continual “review” of BT’s investment decisions by Ofcom.
- 3.28 This approach raises the question of how the asset base should be indexed. Ofcom believes that, for consistency throughout the asset base, it should continue to be revalued on CCA principles as set out in Section 4, subject to the modifications proposed in Section 6. A second issue is whether to depreciate the assets in situ at the time of the 1996/97 switch from HCA to CCA at the full CCA rate or at the reduced rate consistent with the new lower valuation. Ofcom believes that the second approach is the more appropriate and has adopted this approach in its analysis. As those assets that were in situ at the time of the switch to CCA become fully written down or replaced, this approach will lead to the significance of the adjustment to the CCA valuation diminishing over time. Thus it is consistent with Ofcom’s aim of preserving incentives for competing network investments in the longer term.

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

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

The principle of correct entry incentives

- 3.29 In this document, Ofcom has set out its belief that further entry by local access providers is unlikely in the short to medium term and that therefore, when setting charges for the use of BT’s local loop, attention should focus less on encouraging entry by competing operators and more on protecting

consumers. It has, however, considered as a benchmark the valuation which would result if prices were at the level of the costs of an efficient new entrant. It would be consistent with this approach to estimate the value of BT's local loop as if BT operated in a fully competitive or contestable market.

- 3.30 In a contestable market, the threat of competition from potential new entrants is sufficient to force an existing firm with market power to price at a level no higher than the efficient level of cost. This requires (amongst other things) that entry is possible without the need to incur sunk costs (costs which could not be recovered or redeployed to some alternative economic use if the firm left the market). Contestability is sometimes described as assuming 'hit-and-run' entry under which entry and exit can occur without cost before an incumbent can respond by changing prices. Then, if an existing firm tried to raise price above (average) cost, entry would occur and prices would be competed back down to the level of (average) cost. In addition, costs are minimised because an inefficient incumbent that raised prices to cover excess costs would also be vulnerable to entry in the same way as one which raised prices in an attempt to make excess profits. However, in a contestable market, the incumbent firm is able to recover its efficiently incurred costs.
- 3.31 In principle the contestable markets valuation could be based on the topology that a new entrant would adopt, without any of the constraints of BT's existing network (the 'scorched earth' approach). The network cost modelling carried out for Ofcom however reflects some of the constraints imposed by BT's existing network topology (the 'scorched node' approach) and may therefore not necessarily represent the lowest cost attainable by a new entrant. Constraints are discussed further in Section 4.
- 3.32 KPMG, in the submission that BT has provided, appear to be in agreement with Ofcom when they state:

In an effectively competitive market, prices are driven down to the cost that an efficient new entrant charges for the service. The economic value of a business' assets is therefore determined by the costs that a new entrant incurs in producing the service. In the absence of effective competition, one of the objectives of the regulator is to ensure that economic efficiency is achieved and consumers are protected. This is typically done by setting regulated prices on the basis of the cost that a new entrant would incur in delivering the service.

The question then is how to assess the costs of an efficient new entrant.

- 3.33 BT has argued that Ofcom should reflect in its valuation all the costs which would be incurred if a replacement network were actually to be built and the time which it would take to do so. Although BT agrees that the CCA approach is sound, it suggests that Ofcom should consider alternatives based on the deprival value or market value of its network (deprival value is in fact the lower of replacement cost and market or scrap value). The deprival value would, it argues, include loss of revenues and funding costs over the rebuilding period:

The CCA approach is sound, but it is noteworthy that Ofcom's consultation document does not consider a number of alternative approaches:

- **Deprival value** - This would give a far better recognition to the fact that a network could not be rebuilt overnight if you were immediately deprived of the

assets, and the value would represent the real economic value to the organisation, including potential loss of revenues and funding costs over a realistic re-build period.

- **Use of market value** of the regulated firm, as other UK regulators do, on the basis that market value, suitable disaggregated to value the regulated assets in relation to the overall market value, gives an independent measure of the true economic value of the assets.

- 3.34 Ofcom agrees that there is scope, under this approach, for the extent to which the calculated valuation reflects real world constraints to vary. BT argues that it should do so more or less completely. However, if actual investment in competing networks is not thought likely, it would not be necessary to reflect in the valuation the practical constraints which an entrant might encounter if it were actually to replace or duplicate BT's network. Indeed these are among the reasons why the market is not competitive and why regulation is required. It could be argued that if the market were contestable, such constraints would not exist and therefore, under a strict contestability assumption, that the appropriate valuation is that of the hypothetical most-efficient new network. In addition, even if it were accepted that the valuation should allow for all incurred costs to be recovered, when the primary objective is consumer protection rather than promoting entry, it is necessary to consider whether BT has in fact already recovered these costs from consumers. As with BT's fully depreciated assets, it may be reasonable to assume that recovery of costs of network build which occurred long ago has already been allowed for. However, as the proposal in this document is not to revalue BT's network using an MEA, this issue is now of reduced importance.
- 3.35 Ofcom has considered the alternative approaches proposed by BT and others. As noted above, an apparent difficulty with the use of current market values is the risk of circularity, since the market valuation will reflect the expected impact of regulation, which in turn depends on the regulator's valuation of the network. However, as discussed earlier it believes that the approach set out by Dr Marshall, in which a regulatory asset value is defined by the regulator, has merit.

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

Valuation

- 3.36 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 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.
- 3.37 In Part 1 Ofcom identified four options for the valuation methodology to be applied to BT's copper access network:

- 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 are mutually exclusive but the fourth could be used in combination with any of the other three.

Evaluation criteria

3.38 In order to provide an objective method for assessing the candidate options which were identified in Part 1, and further refined in Part 2, Ofcom has established a list of criteria against which each candidate should be assessed. The criteria, listed in paragraph 3.39 below, are based on Ofcom's regulatory principles and build upon the seven key regulatory principles as identified in the Telecommunications Strategic Review which are to:

1. promote competition at the deepest levels of infrastructure where it will be effective and sustainable;
2. focus regulation to deliver equality of access beyond those levels;
3. as soon as competitive conditions allow, withdraw from regulation at other levels;
4. promote a favourable climate for efficient and timely investment and stimulate innovation, in particular by ensuring a consistent and transparent regulatory approach;
5. accommodate varying regulatory solutions for different products and, where appropriate, different geographies;
6. create scope for market entry that could, over time, remove economic bottlenecks; and
7. 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.

3.39 Ofcom has applied the criteria set out below to objectively determine those candidate options which offer the best approach in the interests of both industry and citizen-consumers. 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. Ofcom considers that the criteria it has selected reflect these duties. The criteria are:

- 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.

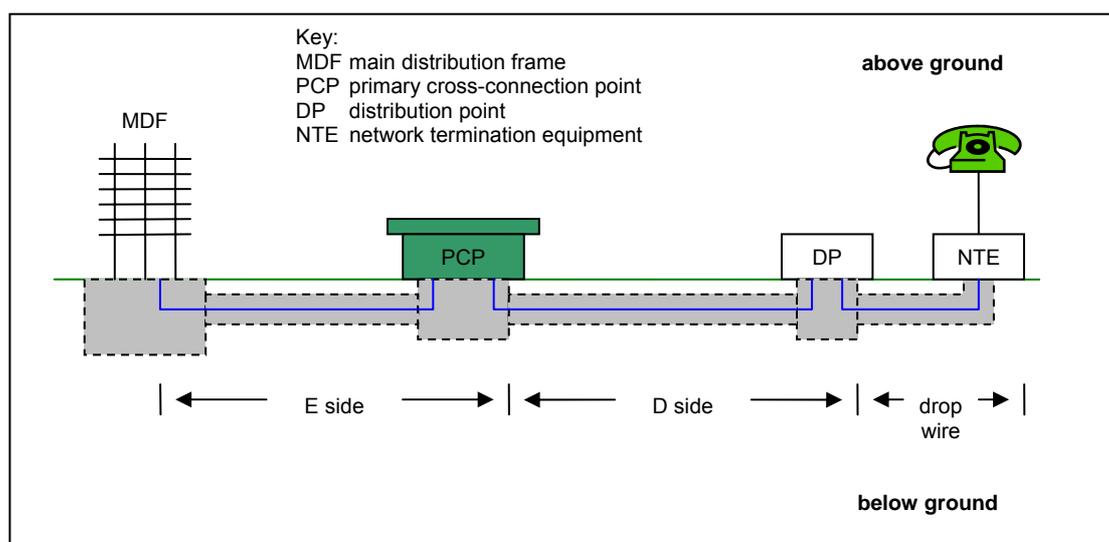
3.40 Ofcom believes that the application of these criteria ensures that the chosen method is both appropriate for today and remains appropriate during the price control period of those charges which are based upon it. Further, it is Ofcom's belief that a selection process guided by these criteria will ensure that appropriate economic signals for future investment and innovation in access networks will continue.

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

Scope of the valuation

3.41 In Part 1 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 between options. This greatly simplifies the analysis and allows a direct comparison with the valuations provided by BT. Ofcom has continued this approach in Part 2.

Figure 1: E side, D side and drop wire



3.42 Also in Part 1 the area of common costs, and the allocation of costs related to assets shared by both the access and core networks, was identified as a concern. This has been examined further in Part 2.

Responses to question 3: Do you believe that the overall regulatory approach described in this section is complete and appropriate? If not then please explain how the proposed approach should be changed.

3.43 In Part 1 respondents were asked whether they agreed with Ofcom's approach to this consultation. Many felt that the approach was appropriate but some did not. BT believed that the approach was in isolation from the wider regulatory regime and that a more holistic view should be taken. Telewest expressed concern that the approach was divergent from the LRIC approach taken with interconnect charges and that there was therefore a possibility of inconsistency.

3.44 Earthlease felt that the access network should be treated from a regulatory perspective as a utility asset:

Fundamentally Earthlease believes that the Access Network is a utility asset (such as the electricity, gas or water distribution networks) and that the regulation of the Access Network should more closely follow the approach used for distribution networks in the water, gas and electricity sectors, adapted where necessary and beneficial, to the particular circumstances of the telecommunications sector.

3.45 The Welsh Assembly Government expressed concern that the principal driver for this work is a reduced LLU charge which, in Wales, would have little benefit outside of the major urban areas of Cardiff, Newport and Swansea. Additionally, concern was expressed that the assumption of Part 1 was that competitive access could only be achieved by replicating BT's wireline network and that other solutions such as wireless were not being considered.

3.46 KPMG, in its response on behalf of BT, advance a number of arguments relating to competition in local access markets. These are:

- Ofcom believe that the local access market is a natural monopoly throughout the UK and that this is incorrect;

- broadband customers in areas of high population density can choose between a number of local access operators;
 - Ofcom should only revalue the network in areas of natural monopoly;
 - future technological developments will reduce the extent of any natural monopoly;
 - Ofcom should consider de-averaging market definition and regulation; and
 - investment in local access networks could be disincentivised if charges for local access are set below true cost.
- 3.47 Vtesse responded referring Ofcom to a Valuation Tribunal case¹⁴ in which BT had defended its network valuation to the Central Valuation Officer, citing the valuation put forward by BT in this case as being at odds with the valuation determined under the current approach.

Ofcom's response

- 3.48 As stated in Section 2, Ofcom has conducted this consultation with reference to the preliminary conclusions of the Telecommunications Strategic Review and in close cooperation with the teams responsible for both the cost of capital and network charge controls reviews. Hence consistency between this consultation and these other reviews and consultations has been maintained, and that together they provide an integrated approach.
- 3.49 In the analysis, conducted by Analysys on behalf of Ofcom¹⁵, of the modern technology approach wireless technology was considered as an option. However, within the context of the constraints under which the analysis was conducted wireless technology was unlikely to provide a cost competitive solution. With consideration of alternative service mixes and alternative Customer Premises Equipment (CPE) constraints it is possible a different result would have been achieved.
- 3.50 Ofcom believes that appropriately set wholesale access charges will benefit both citizen-consumers in urban (i.e. more competitive) and non-urban (i.e. less competitive) areas. Both will have access to WLR based services. Consumers in non-urban areas will benefit indirectly from LLU through the competitive pressure this will provide on broadband services as a whole. Nevertheless, Ofcom's view is that efficient entry through alternative access infrastructure provision should be encouraged and this would include wireless providers. As noted above, Ofcom's proposal is intended to balance protection of consumers through regulation in the medium term with encouraging potential entry in the longer term. Ofcom does not, therefore, believe that the approach taken within this consultation necessarily precludes the efficient entry of service providers who choose to provide services via wireless access networks.
- 3.51 Ofcom recognises that significant numbers of consumers can choose between cable and BT. However, as stated in the TSR, this has not brought

¹⁴ Receipts and expenditure method preferred in valuing BT hereditaments, British Telecommunications plc v Central Valuation Officer, March 1998, Rating and Valuation Reporter

¹⁵ <http://www.ofcom.org.uk/consult/condocs/copper/loop.pdf>

about effective competition to BT and the primary means of consumer protection is therefore regulation of BT's network. The relative importance of investment incentives is low in the short to medium term although the development of competing networks in the longer term is possible.

3.52 KPMG's remaining points concern de-averaging and applying a valuation based on local competitive conditions. The issue of the extent to which effective competition in the local access network is likely to emerge is being considered in the Telecommunications Strategic Review. The framework within which the consultation on the appropriate means of valuing BT's copper access network is being conducted is consistent with Ofcom's views as set out in the TSR Phase 2 consultation document published in November 2004.

3.53 In the Telecommunications Strategic Review, Ofcom argued that:

- there is "little appetite for new investment to compete with BT Group plc at the local access level";
- enduring economic bottlenecks remain "where effective infrastructure based competition is unlikely to emerge in the medium term";
- the majority of respondents to the first Telecommunications Strategic Review consultation felt that local fixed access would continue to be a bottleneck;
- new technologies may increase local access competition in future but are not yet viable for mass roll-out;
- for these reasons, Ofcom cannot base its regulatory policy on "the expectation that there will be new mass-market access networks...between now and the end of the decade"; and
- it may be appropriate to promote competition at different levels of the value chain in different geographies, for example by means of LLU in areas of higher population density and by regulated wholesale broadband access in lower density areas.

3.54 Ofcom is also considering the issues of potential differences in competition and regulation in different geographical areas. In a recent speech made to an industry seminar on 24 February 2005¹⁶ the Ofcom Chief Executive, Stephen Carter, stated:

Between then and now we will be conducting the second Wholesale Broadband Access market review. We have already started the preparatory work for this critical review and the first formal consultation will be in May. The review will look at the implications of different regulatory approaches in different geographic regions, and ultimately a set of remedies designed to promote effective and sustainable competition in LLU by scale players, possibly including price/margin structures or other undertakings.

3.55 The approach set out in this consultation is consistent with these principles in that it:

¹⁶ http://www.ofcom.org.uk/media_office/speeches_presentations/tsrsc

- recognises that entry into local access markets using existing or new technologies is unlikely to provide effective competition to BT in the medium term;
- to the extent that charges for use of the copper loop are reduced, it will encourage competition through LLU;
- will not prevent future entry by operators who can serve the market at lower cost than BT; and
- recognises the potential for differences in competitive conditions in different geographical areas.

3.56 Ofcom finds the case of BT vs. Central Valuation Officer of interest. In particular, during the case the BT witness Dr Tom Finegan made comments with respect to the inefficiencies inherent within BT's network. These were summarised in the Rating and Valuation Reporter as follows:

He described in full the network, as at the 1st April 1995, its physical extent operation and inefficiencies. This included his analysis of the current inefficiencies which were a result of legacy build, faults and changing demand patterns. He explained how it would be possible to optimise network efficiency using current technology.

3.57 Such comments support Ofcom's decision to undertake as part of this consultation analysis into the costs that a hypothetical efficient entrant might incur.

3.58 Ofcom does not believe, however, that it is possible to easily draw conclusions from the rateable valuation as to what the cost of a copper loop ought to be under the CCA regulatory approach. The reason for this is that the two approaches are different and have different aims: the purpose of the rateable valuation is to determine the rates that should be paid by BT whereas the purpose of the CCA valuation is to provide a cost-oriented price for wholesale access products such that BT can recover its efficiently incurred costs and make a fair return on its capital employed. Nevertheless, the calculations undertaken by BT in support of its rateable valuation may provide further insight into BT's access network costs and Ofcom has requested further information from BT in this area.

Section 4

Valuation options

Introduction

- 4.1 In Part 1 of this consultation Ofcom described how BT currently calculates the value of its copper access network as an input into the annual costs of providing a copper loop between the exchange and the customer. The cost comprises three elements: a cost of depreciation, a cost related to BT's return on its capital employed and other costs. The other costs include items such as operational expenditure on maintenance activities.
- 4.2 Ofcom stated that analysis had indicated that the other costs, which are derived from BT's accounts using attribution methods described in the published Detailed Attribution Methods¹⁷, are substantially as set out in the published Detailed Attribution Methods. Thus, at present, the attribution of these costs has not been changed. However, should the attribution methodology be altered then Ofcom may wish to revisit the current attributions.
- 4.3 The focus of Ofcom's analysis in Part 2 has been on the manner in which BT arrives at a valuation for the copper access network and, thus, arrives at the annual figures for depreciation and return on the capital employed. This work has concentrated on the calculation of the GRC under the CCA approach currently used within the regulatory framework, and the abatements applied to that number for depreciation. Ofcom is in parallel to this consultation also consulting separately on the appropriate cost of capital.
- 4.4 A further part of the analysis has looked at the treatment of costs related to duct assets shared by both access and core cables, and also at the manner in which the change from HCA to CCA in 1996/97 has affected the recovery of cost by BT and the size of the over-recovery for BT as a result.
- 4.5 In Part 1 Ofcom presented four options for the method by which BT's copper access network could be valued. These were:
- 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).

¹⁷ The Detailed Attribution Methods are available from <http://www.btplc.com>

- 4.6 Options 1 to 3 are concerned with the calculation of the GRC which is the sum of the GRCs for each type of asset within the network; each individual GRC is calculated by multiplying the amount of that asset by the unit price of that asset. Thus, if there are i different types of asset deployed within the network, the overall GRC can be represented mathematically by the simple equation:

$$\text{GRC} = \sum_{\text{all } i} \text{quantity}_i \times \text{price}_i$$

Option 4 is concerned with the last part of this equation, namely the prices which are used for the assets within the list of quantities. As such it has become clear since the publication of Part 1 that Option 4 is best considered in conjunction with each of the other options rather than as a separate option in its own right. This approach is further supported by the assumption that different options could use different unit prices if that is deemed appropriate. This is the approach that has been followed in Part 2 and applied in this consultation document. To this mix Ofcom feels it is also appropriate to add a final option, 'Option 0', which is to leave everything unchanged and make no adjustments to BT's existing calculation methodology.

- 4.7 Since the publication of Part 1 Ofcom has received the results of two studies conducted by external consultancies – one examining Option 2 and one examining Option 3 – and has also completed a substantial amount of analysis internally into these options. The results of this work, together with responses from stakeholders to the original consultation, have been used to inform Ofcom's view as to how the valuation and costs related to the copper access network should be determined going forward. In this section the results of this analysis are presented and examined.

An analysis of Option 0 – BT's current methodology, unchanged

- 4.8 This option would retain the current approach based on LLCS and make no adjustments. This approach, however, would retain all the problems which Ofcom has identified through its analysis and which were identified in Section 2, i.e.:
- the statistical accuracy of the Local Line Costing Study (LLCS);
 - the asset lives assigned to copper cables and duct;
 - the quantity of spare and surplus capacity;
 - the labour rate used by BT for the gross replacement cost (GRC) calculation;
 - the unavailability of prices for cables installed but no longer stocked; and
 - the method for allocation of the cost of duct shared by both access and core cables.
- 4.9 For this reason Ofcom does not believe it is appropriate to adopt this option and leave the existing method unchanged.

An analysis of Option 1 – BT’s current methodology, with adjustments

Overview

- 4.10 BT’s current methodology is to estimate an inventory of all existing copper access network assets based on a sample, multiply that by the relevant current unit prices and make adjustments to reflect the historical depreciation profile.
- 4.11 This is achieved through BT’s Local Line Costing Study (LLCS) which is used to estimate the network asset inventory based on a sample of 176 out of ~5,600 exchange areas. These assets are then multiplied by current unit prices to provide a GRC for each sample exchange. After an adjustment to account for any differences between the number of operational PCPs and those recorded in the sample, the sample set is scaled up to provide a GRC for the access network as a whole. An abatement is then made to reflect those assets which are fully depreciated and accumulated depreciation is applied for those assets partly depreciated, in line with the profiles determined for the HCA accounts. Each year 40 exchanges from the original 176 are re-examined. This is extremely labour intensive employing a team of 13 for some three months to complete the update for 40 exchange areas.
- 4.12 As mentioned in Section 2, Ofcom has identified a number of issues with this approach which are summarised below:
- statistical accuracy;
 - asset life for copper cable;
 - asset life for duct;
 - spare and surplus capacity;
 - labour rate;
 - cable modularity; and
 - shared duct.

In this section these issues are considered further.

Statistical accuracy

- 4.13 The input data into any GRC calculation is a list of the assets deployed and the unit prices. To determine the list of assets, BT uses the LLCS to estimate the assets used by a sample of exchanges and then scales the result to arrive at a list of assets for the network as a whole. It is important, therefore, to ensure that both the measurement of the sample set is accurate and that the sample set forms a representative sample of the whole exchange population. BT quotes a statistical accuracy of $\pm 8\%$ (within 95% confidence limits) for the LLCS. Given that this translates into a $\pm 8\%$ error range on the GRC this represents a potentially large error range for the annual cost of a copper loop, a point made by Cable & Wireless in its response. Ofcom therefore believes that it is necessary to improve the statistical accuracy.

- 4.14 As explained in Part 1, BT is adopting the PIPeR Geographical Information System (GIS) in support of its planning operations and this database will eventually contain a complete inventory of all local network assets. BT are considering using PIPeR in place of LLCS as the source of the asset list for the network. By using a direct inquiry of the PIPeR database in place of LLCS it should, in principle, be possible to greatly increase the size of the sample set and it should be possible to increase the sample size to the entire exchange population. This should reduce, or eliminate, the statistical error due to using only a sample of exchanges. Ofcom recognises that there are still data validity problems with PIPeR in that it is dependent on the accuracy of the manual records used to populate it, many of which may still contain some errors or omissions. Nevertheless, as these same records are used for LLCS this source of error is present in the existing method also and will, over time, reduce as the data within PIPeR is validated. With inclusion of all exchanges and validation of the PIPeR database it should be possible to virtually eliminate error in the asset list. It is Ofcom's belief that such an approach will also provide cost benefits to BT over the use of LLCS thereby reducing the cost impact of regulation, in accordance with Ofcom's principles.

Asset life for copper cable

- 4.15 In Part 1 Ofcom stated that BT assume copper cables have a service life equal to their book life of 15 years.

Responses to question 4: What do you believe the useful economic life, i.e. book life, and the service life, i.e. actual usable life before replacement is required, of a copper access cable should be?

- 4.16 From responses received from a variety of communication providers many felt that the service life of copper was not equal to its current book life, such that the service life of a copper cable was likely to be far longer than its book life. In line with this many respondents were of the opinion that the book life of copper should be somewhere between 15 and 25 years. BT states that currently its policy on assessing which book lives to use is in line with telecommunication companies in Europe and North America, where the book life for copper ranges between 11 and 20 years.
- 4.17 Cable & Wireless suggests that Ofcom should seek expert independent information on the age profile of BT's copper assets and on best practice on the age at which copper cables should be replaced.

Ofcom's response

- 4.18 At present BT has an annual asset lifing process and where appropriate, information available from benchmarking studies is taken into account. BT has told Ofcom that as its 21st Century Network (21CN) is more likely to use copper than fibre it is now an appropriate time to look at whether there should be an extension to the life of copper, where a slightly higher life is more in line with other European operators. A figure of 20 years has been suggested by BT.
- 4.19 With reference to the point made by Cable & Wireless, Ernst & Young has commissioned a survey of 14 global telecommunication companies across

three continents¹⁸. The highlights of this survey show that telecommunication companies in Europe tend to have an asset life of between 16 and 20 years, higher than American service providers where the asset life is between 11 and 15 years. However, Ofcom understands that in practice the majority of the benchmark population use an asset life of 20 years.

- 4.20 Taking this and comments received from other Communication Providers into account, Ofcom for the purposes of determining an appropriate depreciation charge against the value of the access network believe that 20 years, as per BT's suggestion and in line with the majority benchmark, would be an appropriate period to use on a prospective basis.

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

Asset life for duct

- 4.21 In Part 1 Ofcom stated that duct is currently re-assessed on a rolling basis such that each year the remaining economic life is extended to 25 years if that is judged by BT to be appropriate.

Responses to question 5: Do you believe that a rolling treatment of the economic life for duct is appropriate? If not, how do you believe duct should be treated?

- 4.22 Many respondents did not agree with BT's current policy of a 25 year rolling period. The majority of respondents felt that a fixed line depreciation period, similar to that used for copper would be more appropriate. The respondents had mixed views on what that period should be with comments ranging from 30 to 40 years.
- 4.23 BT stated that its policy is in line with other telecommunication providers and that the range of economic lives used is from 10 to 50 years.

Ofcom's response

- 4.24 Under BT's current methodology the average book life period works out to approximately 38 years for duct based on a 25 year reducing balance calculation. While new assets are depreciated over 25 years, the oldest assets have lives of 60 years.
- 4.25 In line with the current methodology and taking all views into account, Ofcom believes that the appropriate period that duct should be depreciated over is 40 years, similar to the current book life, and that this should be on a fixed line basis, rather than a rolling period of 25 years. According to the Ernst & Young survey mentioned above, straight-line depreciation was the most commonly used method, thus by changing to this BT would be more in-line with other telecommunication service providers world-wide. As Cable & Wireless points out, mathematically the change from a rolling period to a fixed period should not, in the long run, result in any difference to the overall level of recovery¹⁹.

¹⁸ http://www.ey.com/global/Content.nsf/Australia/TCE_-_Publications_-_Downturn_impacts_Telco_assets

¹⁹ It should be noted that these proposals would not affect the book lives as reflected in BT's statutory financial statements. It will however introduce a disconnect, in addition to CCA, between the asset values used in the two.

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

Spare and surplus capacity

- 4.26 Currently BT treats all assets as in-service and makes no adjustments for assets which are spare, faulty or stranded as a result of losses to competition.

Responses to question 6: What level of spare capacity do you believe is appropriate for a copper access network?

- 4.27 Many respondents, including BT, have commented that working out the correct spare capacity needed is an extremely difficult process. BT points out that there are a number of factors which need to be assessed. These include being able to meet future demand and network resilience requirements, planning rules are in effect here and in general are based on experience. Economic efficiency is another factor; it may be more cost effective to build-in excess capacity at the time of initial construction. Such decisions rely on forecasting future demand and are therefore subject to forecasting error and the vagaries of the market. BT also points out that spare capacity is valuable to competing network providers as well as BT, where those competitors are able to defer a decision on building their own network as they have the option of using BT's spare capacity through wholesale access to BT's copper access network.
- 4.28 Cable & Wireless stated that Ofcom may find it useful to benchmark BT's network against best practice planning rules in comparable overseas incumbent networks.

Ofcom's response

- 4.29 Ofcom agrees that the issue of spare capacity is complex. It is also Ofcom's opinion that the correct level of spare capacity will be different for different network architectures. Thus, potentially each option presented by Ofcom will have a different optimum level of spare capacity.
- 4.30 For Option 1 it is Ofcom's view that the current level of spare capacity in BT's network should be used, i.e. that no abatement takes place for spare capacity. This view is based on the fact that there is little evidence of BT systematically over-providing capacity within its copper access network and the belief that BT's planning rules are based on BT's active forecasting of future demand. Any over-capacity would therefore be as a result of forecasting error which could not reasonably have been negated without perfect foresight. For Options 2 and 3 the level of spare capacity should be set to reflect the requirements of the network architecture. As explained further in Section 7, Ofcom has chosen to use a range of percentages of in-service pairs as the level of spare capacity. This takes into account responses received from communication providers which indicate that this percentage should be between 10-20%.
- 4.31 Ofcom recognises that international comparisons can provide a useful benchmark against which to judge such activities as planning rules. However, it is important to recognise that activities can differ across countries for a number of reasons. These differences include demand patterns across countries which may alter the planning rules required. Therefore the UK can

only draw simple conclusions based on such studies, as these may not accurately reflect the situation in the UK.

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

Labour rate

4.32 Ofcom has continued its analysis of the labour rate used by BT to calculate the network GRC. The labour rate used is based on the absolute value that BT obtained from its contractors in 1995. This time period is used as BT believes that this represented a level of network build similar to that which would be required under a network replacement scenario. BT does not believe that its current contract rates are representative of such a scenario of high volume build. The rates used in LLCS in 2003/04 are shown in Figure 2.

Figure 2: 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

4.33 To provide a rate that can be used in the GRC calculation it is necessary to index the 1995 rate forward to the present day. The method BT uses is to apply the percentage change from year to year that it see in its actual contract rates²⁰. However, BT ignores a number of years in the late 90s as it believes that the rate increases seen in these years are unrepresentative.

4.34 The result of this process is that the labour rate used by BT in the GRC calculation is significantly lower than BT's existing contract rates. Evidence from other operators indicates that the rate used in the GRC calculation is also significantly lower than the benchmark for the industry. As current levels of construction within the industry are considerably lower than under the scenario of a new network build, and are based on more piecemeal construction requirements, this would seem reasonable.

4.35 Ofcom has looked into whether any other indices available would be more appropriate, for example the Retail Prices Index (RPI) or the Unit Wage Costs (UWC) index, however there are a number of problems associated with these. The RPI is an average measure of the change in the prices of goods

²⁰ This is a clarification of the statement made in Part 1 of this consultation which was not entirely correct.

and services bought for the purpose of consumption by the vast majority of households in the UK. As such the RPI is a generic index including all types of goods and services and is not considered appropriate for construction based labour activities such as duct installation.

- 4.36 Ofcom has also looked at whether the use of a UWC index would be more appropriate, this is a generic index reflecting costs and productivity saving for the whole economy. BT has discussed with the Office of National Statistics (ONS) the applicability of whole economy indices to specific industry sectors and activities. The ONS does not believe that the UWC index is appropriate for the valuation of the labour element in duct and that the average earnings index for Production is a better measure than for the whole economy.
- 4.37 Overall, therefore, Ofcom agrees with BT that current contract rates are unrepresentative of the scenario of a new network build and that the most appropriate method of indexation is to use current annual rate rises but adjusting for market anomalies. The labour rate BT currently uses in its GRC calculation provides a reasonable estimate of what a new entrant would need to pay in the scenario of a national network build and is, therefore, likely to reflect costs that an efficient entrant would face.

Responses to question 12: How do you believe the labour rate should be set?

- 4.38 BT has highlighted that in modelling the costs that a new entrant building a 'fully efficient' network would incur that the scarcity of labour resources should be reflected in the labour rates, and that using BT's rates would not be appropriate. BT state that using rates far closer to the current contract rates would be more applicable, as these represent a true current market rate.
- 4.39 Many respondents have indicated that they are unable to comment on the labour rate with the information that has been provided in the consultation document, and UKCTA has suggested that the following information is published so that an assessment can be made:
- the actual BT labour rate in 94/95;
 - the number of years to replace the entire BT network;
 - the composition of the index; and
 - the actual annual variation in the labour rate to date.

Ofcom's response

- 4.40 BT states that the 94/95 labour rate indexed forward to the valuation date is representative of those rates which would apply in the case of a large scale build which a new entrant would need to conduct. It is not clear why an entrant building a 'fully efficient' network, where the amount of build would be large, should not be able to negotiate a labour rate as favourable as BT's new entrant.
- 4.41 To the points made by UKCTA, BT has now agreed to allow Ofcom to publish the rates used in LLCS as seen in Figure 2 above.

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?*

Cable modularity

- 4.42 The calculation of the copper access network GRC relies on an accurate assessment of the cable deployed within BT's access network. Under LLCS this is undertaken by the survey of exchange area cable records; in the future, under PIPeR, this would be undertaken by a direct enquiry into the PIPeR inventory database. When the GRC is calculated the copper cable component is derived by multiplying the total volume of cable of a particular type and size by the current contract price for the purchase and installation of that same cable.
- 4.43 The cable records identify the cable type and the number of copper pairs within the cable. The exact type and size of cable is chosen by the network planner at the time the installation is planned. The planner chooses from the available cable types, i.e. from the BT stores list prevailing at that time. Over time BT rationalises its stores list to reflect requirements as they change, particularly in the case of cable sizes. As many cables in the network are 15 or more years old, the installed cable population typically represents quite a diverse mix of cable types and sizes, many of which may no longer be used by BT. For example, the data provided to Ofcom by BT indicate that BT currently stocks 73 different types and sizes of cable whereas the installed population contains over 2,500 different combinations of type and size. This presents a problem when determining what the correct unit price should be for a cable which is no longer stocked by BT.
- 4.44 To address the issue of cable non-availability, BT uses the nearest equivalent from its existing stores list. This typically means a cable of the same construction but with the same, or more, number of pairs and / or with the same, or larger, gauge of wire as the installed cable. For example, in some areas BT has deployed cable which contains 40 pairs of 0.4mm gauge copper wire. This cable is no longer stocked by BT and so would be replaced in the GRC calculation by the nearest equivalent which contains 50 pairs of 0.5mm gauge copper wire.
- 4.45 Ofcom is concerned that such a strategy leads to an effective increase to the GRC by assuming that there is more copper deployed in the network than there actually is. The GRC is calculated based on this increased copper stock rather than the actual copper stock and leads to the inclusion of a 'cable modularity' factor in the GRC.
- 4.46 To estimate the effect of this Ofcom has analysed cable data from a number of exchanges and calculated the effective increase in the copper cable GRC for the network as a whole from this data. The full analysis is presented in Annex 3. The result of this analysis indicated a potential increase to the network-wide copper cable GRC of <0.2%. Given the small size of the difference, changing the existing costing method to incorporate such a correction would not seem proportionate. Also, as BT points out in their response, making such an adjustment would not seem in keeping with the principle of CCA which assumes the use of modern equivalent assets. Ofcom does not, therefore, propose to request BT to make such a change.

Responses to question 13: How do you believe the issue of unavailability of asset types used in the network should be accounted for in the valuation?

- 4.47 BT stated that no abatement should be applied to reflect the unavailability of asset types deployed in the network. BT argued that any new entrant would face the same purchasing scenario as BT and would therefore have available to it either the same or a similar list of assets. Almost all other respondents stated that an abatement should be used.

Ofcom's response

- 4.48 It is Ofcom's view that an abatement is not appropriate. It could be assumed that in the scenario of a complete rebuild of the network there would be much more scope for ordering a wider range of asset types. However, it is difficult to determine whether the volumes involved would lead to a lower cost for cables BT does not currently use, or a higher cost due to their custom nature. In view of this difficulty, and the disproportionate nature of an abatement given its potential size, Ofcom does not propose to apply such an abatement.

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

Shared duct

- 4.49 In Section 6 of Part 1 how the costs of shared duct should be recovered was discussed and a number of options that could be used were listed. Annex 4 sets out in more detail Ofcom's analysis of the four options. There was also a discussion on what the most appropriate way to attribute common costs was: the Ramsey principle, equal proportionate mark-ups over incremental cost (LRIC+EPMU) and the efficient component pricing rule (ECPR) were all discussed.
- 4.50 The means of recovering the cost of shared duct, and in what proportions, was also considered with reference to Ofcom's six principles of cost recovery²¹. However, it was considered that the principles did not offer clear guidance regarding the most appropriate method. A variety of options were put forward including BT's current method for allocating shared duct. The results of the analysis into each of these options are presented in summary below:

Option A: current methodology

- 4.51 Part 1 set out BT's current basis for allocating shared duct. BT attributes duct cost on the basis of cross-sectional area.
- 4.52 As discussed in Part 1, the six principles of cost recovery do not give clear guidance as to the proportions in which the costs of shared duct should be recovered from the access and core networks. However, these principles are unlikely to support any extreme allocations.

²¹ The six principles of cost recovery are: cost causation, distribution of benefits, effective competition, reciprocity and practicability.

Option B: bandwidth

- 4.53 Under this option the cost of shared duct could be attributed according to the bandwidth of the cable. However, as noted in Part 1 there are a number of practical problems in implementing this solution, for example the determination of the bandwidth potential of each asset category which is likely to be a subjective process, especially since the equipment on the end of a line is able to influence the bandwidth used.
- 4.54 It should also be noted that any move to this methodology would result in a change to those charges that have a cost element included in them relating to access fibre as well as access copper, the effects of this were highlighted in Part 1.
- 4.55 Ofcom, therefore believes that Option B would be highly subjective and subject to practical difficulties. Therefore this option has not been considered as a viable alternative to Option A.

Option C: incremental costs of access only

- 4.56 The implication of using this methodology is that all duct shared between access and core is allocated to core.
- 4.57 One suggestion is that the allocation could differ by area, that is, all shared duct in some areas could be allocated to access and in other areas to core, so as to be consistent with the six general principles of cost recovery, in particular the principle of cost causality. However, the application of this may be arbitrary as the 'areas' would need to be specifically defined.
- 4.58 The other principles of cost recovery may provide some guidance here. This methodology is unlikely to align with that of the distribution of benefits principle, as both access and core users (in this case network service operators / providers) should bear the cost of shared duct as both sets of users are making use of it. It is also not clear that Option C gives good incentives for cost minimisation as it is possible that it distorts the incentive on BT to share duct where this is the cost minimising solution.

Option D: equal proportionate mark-ups

- 4.59 This method looks at how to treat cost recovery, where the costs of shared duct would be allocated in proportion to the incremental costs of core and access respectively. Part 1 highlighted the fact that this method would be consistent with charges which have already been set on this basis.
- 4.60 Ofcom has undertaken further analysis regarding this option. There are a couple of ways the EPMU methodology could be applied in this case:
- The costs of shared duct could be allocated in proportion to the incremental costs of the access and core networks as a whole, but there are a number of practical difficulties with this approach.
 - The costs of shared duct could be allocated in proportion to the incremental costs of unshared access and core duct respectively. It should be noted that there are a number of difficulties in performing such a calculation.

- 4.61 Annex 4 sets out in more detail the effects of both options on the attribution of shared duct, taking into account the difficulties in the data (discussed in the annex) it can be seen that a change to this methodology, at present, would not result in any material change.
- 4.62 At present Ofcom believes that the current methodology offers the most practical means of attributing shared duct costs between the access and core networks. Although the case for Option A is not compelling in terms of the six principles of recovery, it is at least easy and practical to implement and would not unfairly allocate incremental costs as common costs. No other option appears to offer clear advantages whilst they also have significant disadvantages.

Responses to questions

- 14: What is your opinion of using cross-sectional area to attribute the cost of shared duct?**
- 15: What is your opinion of using bandwidth to attribute the cost of shared duct?**
- 16: What is your opinion of using incremental cost as the basis to attribute the cost of shared duct?**
- 17: What other methods of attribution for the cost of shared duct might be appropriate?**
- 4.63 There were a number of respondents who indicated that their preference regarding the treatment of shared duct were either Option C or D.

Ofcom's response

- 4.64 The full discussion illustrating the reasons why Ofcom has chosen to stay with Option A are provided in summary above and in detail in Annex 4.
- 4.65 Regarding which cost standard should be used, i.e. that of FAC or LRIC+EPMU, this needs to be consistent with the outcome of the network charge control review the consultation for which will be published very shortly.

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?*

Operational expenditure

- 4.66 It is possible that there is inefficiency in the operating expenditure which BT incurs in running its access network. Ofcom believes that it would be appropriate to adjust BT's operating expenditure to approximate that which an efficient access network operator would incur. It proposes to assess the extent of any inefficiency using evidence from benchmarking against comparable companies overseas.
- 4.67 Ofcom will very shortly be consulting on proposals to replace the controls on BT's network charges which end in 2005. As part of this review, Ofcom has commissioned from economic consultants NERA²² a study of BT's efficiency relative to that of appropriate comparator companies, principally the US local exchange carriers. The study covers capital and operating efficiencies in

²² <http://www.nera.com>

combined access and core networks. Ofcom therefore proposes to use the results of this study in setting any network charge controls to apply from 2005.

- 4.68 Any inefficiency adjustment would be set on the assumption that the inefficiency existing at the start would be eliminated eventually, just as competitive pressure would force companies to become efficient in a competitive market. The NERA study gives a relative inefficiency factor of 0.5% for BT for operating costs including depreciation. However, Ofcom has decided that it would be inappropriate to make this adjustment as part of this consultation as efficiency adjustments are usually made when determining price controls. Ofcom would therefore seek to apply any efficiency adjustment during the determination of the prices for wholesale products which use a copper loop, e.g. WLR, LLU and PPCs.
- 4.69 It is arguable that the NERA study may itself tend to underestimate BT's inefficiency relative to best practice because the comparator companies, the US local exchange carriers, may not in fact be as efficient as best practice. Indeed, it is quite likely that they are not since, as regulated operators with market power, the incentives on them to reduce costs may be lower than in an effectively competitive market. For this reason, Ofcom believes that the appropriate comparison is between BT and the best performing decile of local exchange carriers.

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

Responses to question 7: What is your opinion on the option of keeping the current methodology and then moving to a valuation based on PIPeR when it becomes possible (expected in 2006/7)?

- 4.70 BT stated that it favours continuing with the existing approach arguing that it is a proven and robust methodology. However, it also supported the migration away from LLCS to PIPeR, noting that changes in the valuation due to this migration could be phased in over a period to avoid any "price shocks".
- 4.71 The majority of respondents were in favour of a migration to PIPeR if the current methodology were retained. Bulldog stated that this should be accompanied by alignment in pricing levels with EU best practice. Cable & Wireless also supported the migration to PIPeR, but only after it has been accepted by Ofcom and industry as fit for purpose. UKCTA stated that should PIPeR be delayed then the LLCS sample size should be increased.

Ofcom's response

- 4.72 Ofcom agrees that if the current methodology is retained then the issue of the sample size must be addressed. Ofcom believes that the best solution to this is through a migration to PIPeR as opposed to an increase of the LLCS sample size. However, Ofcom recognises that such an approach needs a number of safeguards including regular audits to ensure that the approach is both accurate and fit for purpose. Also, any changes to the valuation as a result of the migration would need to be dealt with in an agreed framework. A fall-back of increasing the LLCS sample size should also be in place should PIPeR be delayed for any reason.

An analysis of Option 2 – optimised deployment of current technology

- 4.73 In Part 1 Ofcom identified an option for valuing BT's copper access network based on the optimised deployment of current technology. This approach should in theory provide the equivalent service set as it uses the same technology, i.e. copper cables and buried plastic duct, that is used in BT's existing copper access network. This approach does, however, have one key difference with that described in Option 1; this approach allows the planner to use modern planning tools to design an optimised network for providing connectivity between the existing MDF location and the existing DP location. This should, in theory, remove any planning inefficiencies that may be inherent in BT's existing network.
- 4.74 To undertake this analysis Ofcom has engaged the services of the consultancy WIK Consult²³ which has pioneered a similar approach in its support of the German regulator, RegTP. In Germany RegTP apply this technique to a sample of approximately 10% of Deutsche Telekom's exchanges.
- 4.75 WIK Consult was provided with detailed exchange data for five of BT's exchanges. Of these exchanges three are also included in both BT's LLCS and in the work undertaken by Analysys in support of Option 3. The exchange data provided by BT to WIK Consult comprised:
- the geographical coordinates of the MDF;
 - the geographical coordinates of each DP served from that MDF;
 - the number of copper pairs in-service at each DP;
 - the total number of copper pairs installed within the MDF area; and
 - current unit prices for the various assets used within BT's copper access network.

In addition, WIK Consult independently procured up-to-date detailed street layer digital maps for each of the exchange areas.

- 4.76 Using these data and its network planning software WIK Consult was able to simulate the planning of copper access networks for each of the five exchange areas. The copper access networks were designed to provide duct connectivity to each of the DPs within the exchange area and to support connectivity from each served line on each DP back to the MDF. The model planned the distribution of PCPs and duct routes to provide a cost-optimised solution by minimising the amount of duct required. The model simulates each exchange area in isolation and does not, therefore, consider the scope for sharing duct between exchange areas or between access and core.
- 4.77 For each of the three exchanges that were common with the LLCS sample set it was possible to perform a comparison of the amount of duct required between the WIK Consult solution and BT's existing network as inventoried by LLCS. The results are shown in Figure 3.

²³ http://www.wik.org/index_e.htm

Figure 3: Comparison between WIK Consult model and BT's network

Exchange type	Reduction in total duct length for WIK Consult model over LLCS
dense urban exchange	64%
sub-urban exchange	6%
rural exchange	14%

- 4.78 Any saving in total duct length also translates into a saving in the total amount of copper required to service the customer base. Having produced an asset inventory for each of the model solutions, it is also possible to calculate a GRC based on the pricing information provided by BT. Intuitively the model would be expected to produce a result which uses less, or the same, duct than the existing network and the results support this assumption. However, should this technique be applied then the small sample set used for this analysis would need to be increased in size in order to reduce the error margin in line with the comments made about LLCS previously. Ofcom would seek to ensure that wherever possible exchanges are chosen which also feature in the LLCS sample set.
- 4.79 In BT's response to question 8 of the Part 1 consultation, it identifies issues with the Option 2 approach which it believes exist. In particular BT points out that this approach assumes that the model network could be built instantaneously and, potentially, rebuilt each year to take advantage of any topological or market changes which have taken place. It is BT's contention that this is not representative of the real world. BT further points out that if such an approach is taken then the comparison with BT's network should be based on the GRC of BT's network, i.e. prior to any depreciation. For a comparison against the Net Replacement Cost (NRC) of BT's network it would be necessary to model each exchange area on a forward looking basis over a period of time to model the effects of network growth, churn and depreciation.
- 4.80 Ofcom understands the position of BT and agrees that it is important that before any comparison of NRC can be made it would be necessary to consider modelling the network in a forward-looking manner over a time period. However, the analysis to date has concentrated on a comparison of the GRCs.
- 4.81 It is also worth noting at this point the exclusion of drop wires. Both the model and the GRC derived through LLCS exclude the cost of drop wires and they can therefore be regarded as a cost which is common to both approaches. Ofcom does not, therefore, believe that they need to be accounted for within the WIK Consult model.
- 4.82 On the basis of this initial analysis the approach of Option 2 appears to indicate that an optimised modelling approach would yield a reduction in the total route length required to serve the same customer base as BT's existing network serves. However, an enhanced sample set would be needed to reduce the error margin on the analysis results. As explained further in Section 6, Ofcom does not believe that this approach should be relied upon to fix the valuation of BT's copper access network. Nevertheless, Ofcom believes it is appropriate to use such an approach to provide guidance as to

what the CCA valuation of a hypothetical new entrant network might be. This could then be used to ensure that the valuation provided by BT is proximate to what an efficient new entrant could be expected to achieve. However, Ofcom accepts that as well as the sample size, “real world” effects of network churn, planning issues (such as wayleaves) and potential market penetration would need to be considered.

Responses to question 8: What is your opinion of using an optimised approach to estimate the value of BT’s copper access network?

- 4.83 BT argued strongly against the applicability of this as an approach for setting prices. Reference has already been made above to the main points of BT’s argument. Several other respondents favoured this as a CCA approach arguing that it provided a better measure of efficient entry signals. Telewest argued that a new entrant would not adopt an all copper architecture and that therefore this should not be used as the basis for valuation:

The concept of an optimised deployment of the same technology as used in BT’s network raises a number of issues. In essence, we have a concern as to whether it makes sense for any new entrant to try to adopt the current same BT network design throughout the whole of the UK. In a number of respects this seems a highly theoretical approach which will not be a credible method for re-valuation. Consequently, we believe that any pursuit of an optimised network model must take full account of cable network values and design.

Ofcom’s response

- 4.84 It is Ofcom’s view that there are arguments both in favour of and against this approach. Ofcom believes that this approach is a valid method for informing the cost determination process and for benchmarking BT’s network against what might be achieved if it was to be rebuilt. As the purpose of this exercise is to provide a valuation for the assets which BT currently has deployed, it is appropriate to consider how those same assets could be more efficiently employed and that is the purpose of this approach.

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?*

An analysis of Option 3 – optimised deployment of new technology

- 4.85 Ofcom identified in Part 1 that a new entrant may choose to use alternative technology to that deployed by BT in its existing network in order to provide services competitive to those of BT. To examine this approach in detail Ofcom engaged the services of the consultancy Analysys²⁴.
- 4.86 Analysys was given the task of examining the cost of a modern equivalent asset to BT’s UK copper wire local loop network and was given a number of constraints which bounded the analysis. The constraints were chosen as the MEA must perform the same function as BT’s existing network with the same capacity and reach. Additionally, it was decided to exclude those solutions which would require a change of CPE as the cost of this would have to be borne by the MEA and this would have the negative effect of rendering a large amount of existing CPE unusable with the MEA. In Ofcom’s opinion a

²⁴ <http://www.analysys.com>

MEA which could not perform the same function as BT's copper access network, in terms of services, should not be used as a basis for valuing BT's network without including the cost impacts of the differences.

- 4.87 Analysys considered a wide variety of possible architectures but established that other than the current architecture, only one met all the study constraints: 'fibre to the PCP'. Wireless solutions were considered, but discarded early on in the process as they did not meet the CPE constraint described above without significant cost disadvantages.
- 4.88 Analysys found that the costs of a fibre to the PCP architecture are very similar to those of the current copper architecture, but are slightly higher than the current architecture, for the current layout of PCPs (street cabinets). They are very slightly lower than the current architecture, if the number of PCPs can be significantly reduced for the fibre architecture (including in rural exchanges), but this advantage is removed and the costs are higher than the current architecture if rural exchanges cannot in practice be optimised in such a manner.
- 4.89 The work indicated that a small saving of 1.5% of the total GRC could potentially be achieved by moving to a smaller number of larger fibre-fed PCPs. However, changing the PCPs in the same manner within the current architecture would also yield a small saving of 0.9%. It would seem reasonable, therefore, to deduce that the total saving due to the introduction of new technology in such a scenario is the difference, i.e. 0.6%. This result is based on a very small sample set of only eight exchanges out of a total population of over 5,500 but each of BT's six geotypes were represented in the sample set and Ofcom has no reason to believe that increasing the size of the sample set would yield a significantly different result.
- 4.90 Given the marginal difference in cost between the MEA and the existing network, and the increased complexity of this option, Ofcom does not believe that this option represents a viable approach when considered against the criteria identified in Section 3 and does not, therefore, propose at this time to pursue this option further.
- 4.91 The full Analysys report can be found on the Ofcom website²⁵.

Responses to question 9: Do you believe it would be possible to discount the new technology solution for additional functionality and, if so, how?

- 4.92 Most respondents, including BT, agreed that it is appropriate to consider the new technology approach and that it would be inappropriate to discount the MEA for the additional service functionality that new technology might make possible. UKCTA made the additional point that the lack of such a discount will mean that the valuation will tend to be overstated and that this should be taken into account within the wider policy context. UKCTA also stressed that:

...this would not apply to capacity i.e. if new technology enabled greater capacity to be transmitted or the same capacity to be transmitted for less investment in equipment then this obviously will have to be accounted for in the size of network required.

²⁵ <http://www.ofcom.org.uk/consult/condocs/copper/loop.pdf>

Ofcom's response

- 4.93 Ofcom retains its view that a discount would be inappropriate. However, Ofcom accepts UKCTA's point that this will tend to lead to an overstatement of the valuation. Unlike functionality, capacity is divisible and therefore only the minimum required capacity to serve the same demand as in BT's network was included in the modelling. Ofcom therefore believes that UKCTA's second point was addressed in the work.

Responses to question 10: What alternative architectures to the active PCP architecture studied by Ofcom do you believe would be viable options for a modern equivalent asset to BT's copper access network?

- 4.94 The majority of respondents, including BT, agreed that it is appropriate to examine an MEA alternative based on wireline technologies but some, e.g. Cable & Wireless, pointed out that future wireless technologies such as WiMax may offer a viable alternative to BT's copper access network. UKCTA reiterated this point with a request that such a cost-benefit analysis of wireless technologies be considered by Ofcom.
- 4.95 BT responded that it is appropriate for Ofcom to examine alternative architectures but noted that the adoption of a fibre to the PCP architecture would have implications for LLU operators and the core network.

Ofcom's response

- 4.96 Ofcom agrees that future wireless technologies may well offer a viable alternative to the existing copper access network and Ofcom seeks to encourage the development of such technology. However, Ofcom believes that such technologies are unlikely to provide service to customers using the same interfaces as are currently used by BT. It is possible that consumers will accept the cost of changing CPE for the benefit that the new services bring, but this is a very difficult proposition to model objectively. It is hoped that the market may provide the answer in the not too distant future.
- 4.97 Ofcom acknowledges the concerns raised by BT as to the effect a fibre to the PCP architecture would have on LLU operators. It is recognised that a fibre to the PCP architecture would necessarily imply either sub-loop unbundling at the PCP or wholesale access to the fibre, or the data carried by it, in the exchange. However, the precise mechanisms of such access were not within the scope of this study.

Responses to question 11: What is your opinion of using an optimised approach which takes advantage of modern technology to estimate the value of BT's copper access network?

- 4.98 Many respondents stated interest in the results of this work but felt that it was unlikely to result in an alternative architecture at significantly lower cost than BT's existing copper access network. UKCTA does not believe that such an approach should be adopted unless it revealed a lower cost than the CCA valuation of BT's existing assets. Video Networks believed that the time taken to adopt such an approach would lead to unnecessary delay in the determination of charges and that the optimised approach without modern technology should be adopted in the interim.

Ofcom's response

- 4.99 Ofcom does not believe that this approach should be adopted at this time as the complexity of the approach brings with it alternative solutions which leads to the opportunity for subjectivity. In addition, new service introductions by BT, via the existing copper network, would require the MEA to be re-examined and this could fundamentally change the nature of the MEA leading to unpredictable variations in valuation. This complexity and subjectivity could lead to a degree of regulatory uncertainty.

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?*

Section 5

Calculating over-recovery adjustments

Introduction

- 5.1 The current basis for the valuation of the access network is based upon the CCA convention. From the 1997 pricing control period onwards, Ofcom's predecessor, Oftel, determined that the appropriate costing methodology for its regulatory decisions would be forward looking long run incremental costs (FL-LRIC). Because LRIC is a forward looking concept, it was determined that this would be more appropriately reflected by the use of CCA than the previously employed HCA, because:
- forward looking costs reflect resource costs and therefore the setting of prices on this basis encourages economic efficiency; and
 - since replacement costs would be the costs faced by a new entrant, the setting of charges based on forward looking costs provides signals to potential entrants that encourage efficient entry into and exit from interconnection services.
- 5.2 In terms of cost recovery, the total returns permitted under this process will be equivalent (for any given asset), irrespective of whether an HCA or CCA methodology is applied, providing 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.
- 5.3 In the remainder of this section Ofcom considers the nature of any over- or under-recovery and how it might be calculated. Hypothetical examples are used to illustrate the points made. These examples are based upon the model advanced by KPMG as part of BT's response to Part 1.

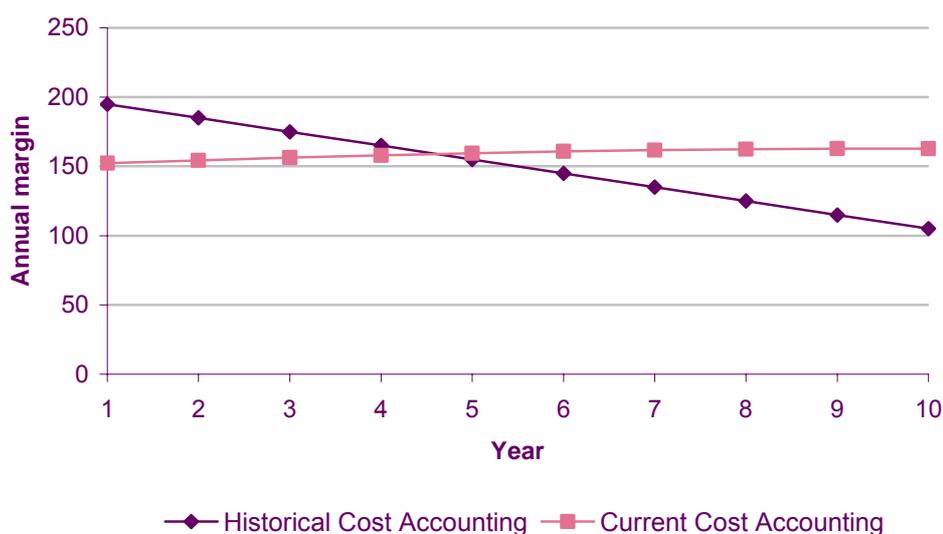
The concept of an over-/under-recovery

- 5.4 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.
- 5.5 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.
- 5.6 Figure 4 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 HCA 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.

- 5.7 Figure 4 shows that for this particular type of asset (where the 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 4: gross margins required for a constant cost of capital over the life time of a single asset experiencing appreciation in value



- 5.8 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')²⁶ and included both retail and network costs without reflecting accounting separation between BT retail and BT network (an 'end-to-end'

²⁶ 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

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.

- 5.9 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 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.
- 5.10 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"²⁷. The LRIC+EPMU cost of a loop was very slightly below the CCA FAC cost. 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.
- 5.11 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 is now considered relatively low, Ofcom considers that future over-recoveries are less likely to be eroded through the process of competition than was the case 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 next five year period.

²⁷ Access to Bandwidth: Delivering Competition for the Information Age, Oftel, November 1999 (<http://www.ofcom.org.uk/static/archive/oftel/publications/1999/consumer/a2b1199.htm>)

Responses to questions

18: Over what timeframe do you think it is appropriate to recognise the impact of any change in valuation of the copper access network in relation to setting prices?

19: Over what range of products and services do you believe it would be appropriate to recover any potential holding loss?

20: What do you believe would be the most appropriate way to implement changes relating to pricing of specific products? What timeframe do you believe would be appropriate for such implementation?

5.12 The majority of respondents did not feel it would be appropriate to allow BT to recover any holding loss from any change to the copper access network valuation and that any over-recovery should therefore be used to offset it.

5.13 BT, as part of its response to the first consultation paper, commissioned KPMG to produce a paper critiquing Ofcom's approach, in this document KPMG states:

Ofcom are right in their assertion that a windfall gain would result from a switch, after the first period, from a HCA basis to a CCA basis if the assets continually appreciated over time. This results from the basic premise that revenue is calculated based on the value of assets, plus allowable costs (depreciation charges plus any holding gains or losses), and therefore under HCA those assets earn a higher revenue in earlier years. . . . If we assume that the accounting change was made after year five, the regulated firm would earn the higher revenue before and after the change was made. The difference between the CCA and HCA graphs after year five is the windfall gain.²⁸

5.14 KPMG produced a simple model to demonstrate the existence of an over-recovery through the switch from HCA to CCA. In this model KPMG made the following assumptions:

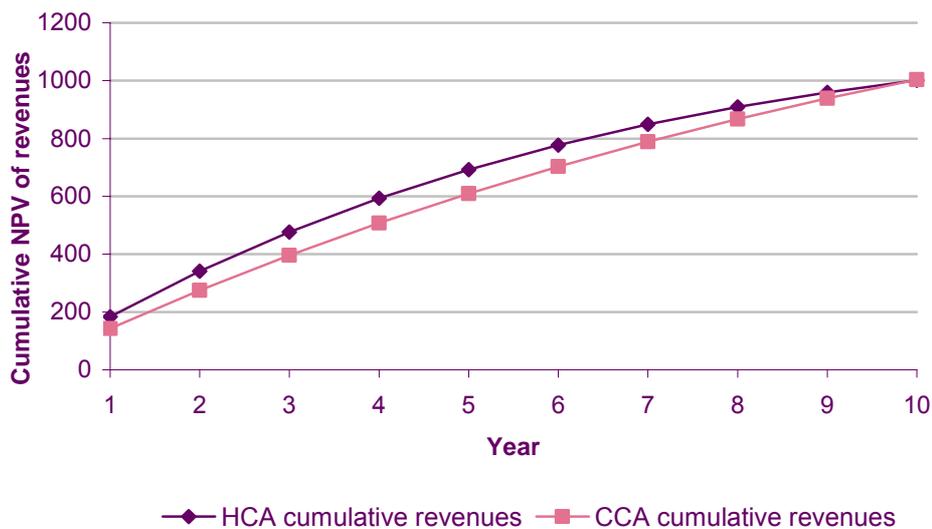
- there is a single asset, and it is bought in year 1 for a value of 1000;
- the asset has a life of ten years, and under HCA is depreciated on a straight line basis;
- the CCA depreciation charge is estimated by deriving the ratio of depreciation as estimated under HCA to the original cost of acquiring the asset under HCA and applying this to the GRC in order to drive the write down CCA value, known as the NRC;
- costs have been simplified to only include only those which are treated differently under the two methodologies. KPMG has, therefore, not included an estimation of operating or other costs in its treatment of allowable costs;
- the asset appreciates at 5% a year;

²⁸ BT's response to Ofcom's consultation document published December 2004 – 11th February 2004. Annex 1 paragraph 5.2.1 (<http://www.ofcom.org.uk/consult/condocs/copper/rescoppers/btannexes>)

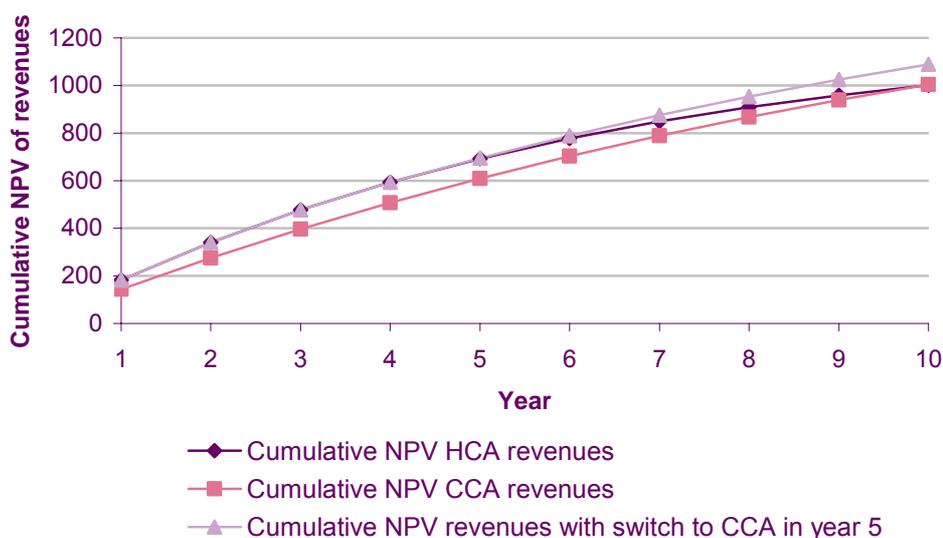
- yearly returns are calculated at 10%, and based on the mid year value of the net book value (NBV) or NRC; and
- revenues are discounted at 10% a year.

5.15 Using KPMG’s model it is possible to demonstrate that the NPV of revenues to the business are equal under either accounting principle, if applied consistently over time. This is shown in Figure 5.

Figure 5: cumulative NPV of revenues under HCA and CCA



5.16 However, if there is a switch at any point during the period, then (assuming $NRC > NBV$) there would be an over-recovery. Figure 6 shows the impact on the NPV of revenues (discounted to year 0) of a switch to CCA in year 5. As can be seen, this additional path follows the superior cost recovery associated with HCA treatment in the earlier years followed by the superior gradient associated with CCA treatment in the later years.

Figure 6: cumulative NPV revenues after switch to CCA in year 5

5.17 KPMG made the further point that the impact of any appreciation or depreciation in assets after the change in methodology occurs does not impact total discounted revenues, as the changes are accounted for in the year that they occur through the holding charge applied to the accounts. This is demonstrated in Annex C, of its response document²⁹ and holds true to the fact that under either methodology the total discounted cash flows will be equivalent assuming that the methodology was applied consistently from the day the assets were registered in the accounts.

5.18 KPMG termed an attempt by Ofcom to recover any crystallisation of any over-recovery (or under-recovery) in the past as a “clawback” and felt that it was inappropriate for a number of reasons including:

- KPMG believed the approach was inconsistent with a forward looking approach to price regulation in that any change in a price control for future periods should not retrospectively reclaim the results of previous changes.
- KPMG believed the approach attempts to recover efficiency gains which is effectively an ex-post removal of incentives. It asserts that this will increase regulatory uncertainty.
- KPMG believed that for reasons of consistency Ofcom would need to review all decisions made since 1997 and apply the same approach.
- KPMG believed that attempting to recoup historical gains arising through forecasting error, and already passed on to shareholders, would effectively amount to ex-post appropriation of shareholder’s assets.

²⁹ Annex I to BT’s main response: KPMG: Valuing Copper Access – an assessment of the Ofcom Consultation paper – Annex C (<http://www.ofcom.org.uk/consult/condocs/copper/rescoppers/btannexes>)

Ofcom's response

- 5.19 The analysis of KPMG appears to support Ofcom's view that an over-recovery (or under-recovery) does arise on the switch from HCA to CCA. KPMG also notes that this amount of over-recovery (or under-recovery) is invariant to changes to asset prices following the date of the switch.
- 5.20 KPMG notes that were the value of the asset to depreciate, and hence NBV > NRC at the switch, then the revenues generated over the life of the assets will be lower under CCA than HCA. Ofcom, as mentioned above, agrees with this conclusion.
- 5.21 Ofcom considers that it would not be appropriate to "clawback" any element of the over-recovery that may have crystallised between 1996/97 and the latest accounting period as a result of the switch from HCA to CCA. Such an approach could be considered to have a retrospective effect on shareholders' assets. Furthermore, the decisions made in the 1996 price control and the 2001 price control were based on a particular set of assumptions and forecasts made at the time. This sought to take into account all information available to Oftel at that time in order to produce as accurate a predictor as was reasonably possible. In the past, it has not been considered appropriate to revisit historical returns based on any forecast error, and Ofcom does not consider it appropriate to do so in this case. However, Ofcom does consider that in view of the current competitive landscape, it is not appropriate that BT should continue to recover the element of the over-recovery that crystallises in the period under consideration. In the past, it was considered that competition would act naturally to check the ability of BT to extract such gains. As highlighted in TSR Phase 2, Ofcom no longer considers that this is an appropriate assumption in the current environment. Ofcom therefore considers that it is appropriate to examine whether BT would over-recover costs in the switch from HCA to CCA and, if it is the case, take steps to prevent this from continuing to occur in future.
- 5.22 Ofcom, taking into account these comments, therefore feels that it would be inappropriate to attempt to adjust the valuation of the copper network by the element of over-recovery occurring since 1 August 1997.
- 5.23 However, Ofcom notes that it would be appropriate to disallow any future element of over-recovery from the switch from HCA to CCA. This involves an adjustment to disallow the over-recovery arising as a result of this switch, on a forward looking basis, from 2004/05 to 2009/10. The start date is chosen based on the latest available set of regulatory accounts from BT. The end date is chosen as it is in-line with the TSR Phase 2 assumption that infrastructure competition would not occur in the medium to long term and five years is judged by Ofcom to be an appropriate medium to long term period.
- 5.24 Thus Ofcom proposes that the value of the copper access network (and therefore the returns available upon it) should be adjusted to reflect the un-crystallised³⁰ over-recovery as at 2004/05 on the relevant assets in situ at 1 August 1997 (the date of the first relevant price control). If, at the end of the period of adjustment, Ofcom were to conclude that the access market had

³⁰ Ofcom uses the term "un-crystallised" in this context to refer to the element of the one-off gain arising from the switch to CCA from HCA in 1996/97 that has not already been recovered by BT.

become competitive, then the relevant valuation would be the lower of the competitive market value and the new entrant's costs otherwise the adjustment would continue to apply.

- 5.25 Ofcom has considered whether BT holds other assets, outside of these assets (e.g. assets in the core network), which may have an un-crystallised under recovery as at 2004/05 on the relevant assets in situ as at 1 August 1997. Using financial data extracted by BT, Ofcom has reviewed the rest of BT's asset base and has determined that there is no under-recovery likely on core or other access assets in situ at the time of the switch from HCA to CCA which should be offset against any over-recovery in the copper access network.

Calculating the over-recovery

- 5.26 There are two possible methods to calculate the value of the un-crystallised over-recovery. Ofcom has termed these the 'income' approach and the 'asset' approach which are, in theory, effectively equivalent. The concepts are explained below.

Income approach

- 5.27 The income approach takes the forecast differences between the discounted revenues that would have been set using HCA and CCA based on the 1996/97 asset base, both in that price cap and in the 2001 price cap. If price caps are predicted to continue until the end of the book lives of the relevant asset base then the differences above, when discounted at the cost of capital should equal the opening difference between NRC and NBV.

Asset approach

- 5.28 The asset approach takes the asset base in 1996/97 (pro rated to reflect the asset base as of 1 August 1997, the start of the original charge control) as a starting point. It relies on the assumption that at any point in time after the switch to CCA the difference between revenues on a CCA and HCA basis, discounted at the cost of capital, equals the difference between NRC and NBV. Thus the amount of the un-crystallised gain can be determined by comparing the NRC and NBV of the relevant asset base – in this case the assets in existence in 1996/97. This can be calculated by the following methods:

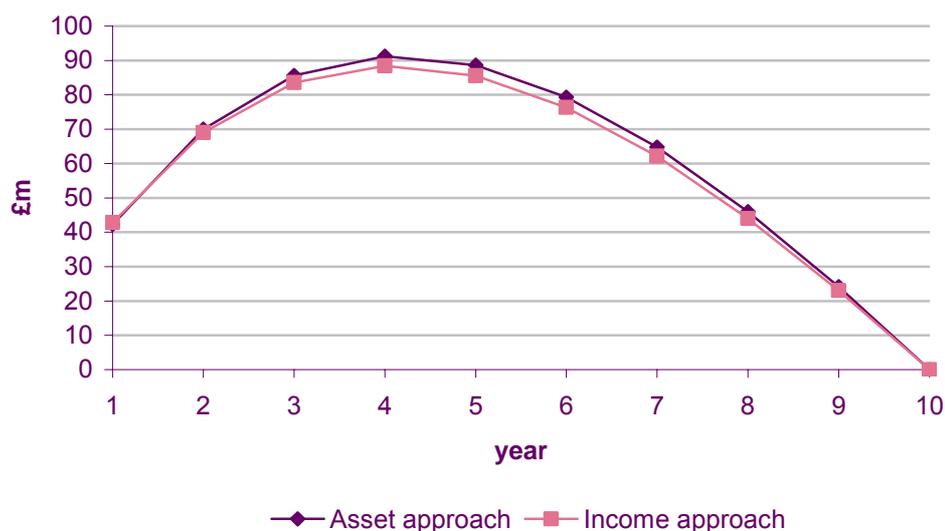
- prices can be held constant at 1996/97 levels effectively giving a straight line amortisation of the over-recovery;
- actual observed price increases and changes in the depreciation profile from the accounting records for 1996/97 to 2003/04 could be used (this has the advantage that Ofcom would be using actual achieved numbers);
or
- price movements, as predicted in the original model from 1996/97, would give a comparison between the asset approach and the income approach, consistent with the assumptions made in the 1996/97 and 2001 price caps.

Comparing the income and asset approaches

- 5.29 Using KPMG's analysis it is possible to model the impact of a switch to HCA or CCA in any time period, under both the 'income' and 'asset' approaches.

Figure 7 below shows the total difference in the NPV of revenues over the whole period by the year when the switch took place, i.e. the ‘income’ approach. It also shows the NPV (with year 1 as the base year) of the difference between the NRC and NBC of the asset in each year (i.e. the over-recovery), i.e. the ‘asset’ approach. Although the two are not strictly equivalent, Ofcom does not consider the difference material.

Figure 7: the over-recovery over time



- 5.30 Furthermore, this holds true regardless from which year the switch takes place. Figure 8 shows the revenue stream for HCA and CCA over the entire ten year period. If it is assumed that at the end of year 4 there is a switch from HCA to CCA then there is a revenue gain. Figure 8 also shows the NRC and NBV. The difference between the closing NRV and NRC in year 4 (hence the opening values in year 5) is equal to the NPV of the gain in revenue from year 5 onwards, where the base year for discounting purposes is year 5. This supports the assumption that the difference in NRC and NBV in any year is equal to the NPV of the difference in revenues, and hence the two approaches are equivalent.
- 5.31 The ‘income’ approach requires a bottom-up valuation model of both the copper and duct assets, looking at historical information on additions, prices and asset lives up to 1996/97. Information on additions and asset lives was available for copper and duct, however an accurate price index for copper was unavailable, as BT’s CCA valuation of this asset is on an absolute rather than an indexed basis. In the absence of this information, Ofcom proposes to adopt the ‘asset’ approach.

Figure 8: revenue stream for HCA and CCA over a 10 year period based on the KPMG model

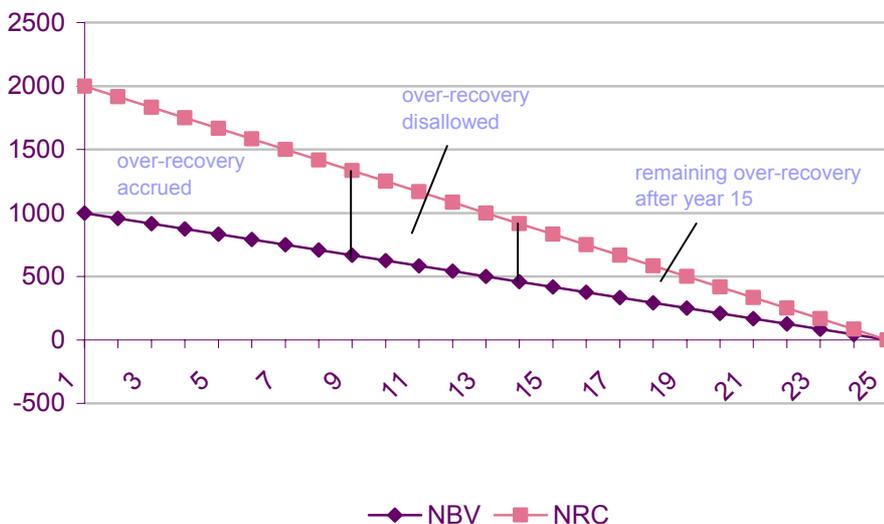
Year	1	2	3	4	5	6	7	8	9	10
HCA revenues	195	185	175	165	155	145	135	125	115	105
CCA revenues	152	154	156	158	160	161	162	163	163	163
Revenue given switch in year 4	195	185	175	165	160	161	162	163	163	163
Gain after switch (CCA-HCA)	0	0	0	0	5	16	27	38	48	58
NPV gain					4	13	21	26	31	34
Total NPV				129.5						
Closing NRC	945.0	882.0	810.3	729.3	638.1	536.0	422.1	295.5	155.1	0.0
Closing NBV	900.0	800.0	700.0	600.0	500.0	400.0	300.0	200.0	100.0	0.0
Difference	45.0	82.0	110.3	129.3	138.1	136.0	122.1	95.5	55.1	0.0

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

Applying the adjustment of an over-recovery

- 5.32 As mentioned above, Ofcom proposes to disallow the over-recovery crystallised from 2004/05 until 2009/10. The over-recovery is calculated by the difference between NRC and NBV of the relevant asset base in 2004/05, where the relevant asset base only refers to those assets present in 1996/97. The proposed adjustment is detailed below.
- 5.33 Figure 9 shows the path of NRC and NBV for a group of assets belonging to an incumbent operator. Straight line recovery is assumed, and that the switch to CCA from HCA happened at a period before year 1 on this chart. The over-recovery in any year is equal to the difference between NRC and NBV. The regulator has decided to intervene in year 10 and seeks to remove any crystallisation of the over-recovery for the next five years. The regulator intends to re-assess the competitive situation in year 15. The element of the over-recovery crystallised before year 10 is kept by the operator. To do this the regulator must set the asset base to NBV for the duration of the control. At the end of the control in year 15, the regulator would determine whether the market was competitive, if this was the case then the relevant valuation would be the lower of the competitive market value and the new entrant's costs otherwise the adjustment would continue to apply.

Figure 9: crystallisation of an over-recovery



5.34 Ofcom therefore proposes the following: that the future over-recovery achieved on BT's 1996/97 asset base (i.e. assets in use in 1996/97), will be disallowed from 2004/05 by setting the value for these assets equal to NBV rather than NRC. This will only apply to the assets present in 1996/97, any additions since 1996/97 will be treated under the CCA standards. Ofcom proposes to review competition in the market in 2009/10, and take a decision then either to continue to disallow this over-recovery, or to let prices be set by the lower of the competitive market price or the current cost valuation.

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

Section 6

Proposals

Introduction

6.1 In this section Ofcom summarises its analysis by providing four possible approaches to the valuation of BT's copper access network and recommends one approach in particular. Estimates of the effect this would have on the annualised cost of a copper line are presented in Section 7.

Proposal 0: continue with the existing methodology

6.2 One of Ofcom's regulatory principles is to intervene only where necessary and this option provides the opportunity to make a decision not to intervene in the way in which BT currently undertakes its valuation of the copper access network.

6.3 However, as was stated in Section 4, Ofcom has identified significant issues with the current approach which cast doubt on the accuracy of the results BT is producing under this method. Ofcom does not, therefore, believe it is in line with its regulatory principles to adopt this proposal.

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

Proposal 1: adjust the existing methodology

6.4 This proposal is in line with Option 1 from the original consultation paper. Under this approach Ofcom would continue to use BT's valuation methodology, i.e. take the GRC calculated by BT, but make adjustments for a number of anomalies that have been identified:

- **Disallow the over-recovery prospectively**
Ofcom would disallow the amount of the over-recovery achieved by BT through the switch from HCA to CCA assets in 1997 expected to crystallise over the period over which the conclusions about the competitiveness of the local access market from the Telecommunications Strategic Review are likely to remain current. Thus the over-recovery on the asset base of 1996/97, would be calculated as of 2004/05 and an abatement made to BT's NRC, the CCA depreciation charges calculated from BT's NRC would be adjusted in line with this abatement.
- **Adjustment to asset lives prospectively**
BT's current asset lives for duct and copper are 25 and 15 years respectively, though depreciation for duct is calculated on a reducing balance basis giving an effective life of 38 years, a change to these lives will change the depreciation charge and hence the annual charge. Ofcom proposes to use 40 years for duct and 20 years for copper; both applied as a straight line depreciation.
- **Operational costs**
These could potentially be reduced to represent any inefficiency in BT's copper access network operations. As described in Section 4, Ofcom does not propose to make an adjustment for operational costs as part of this

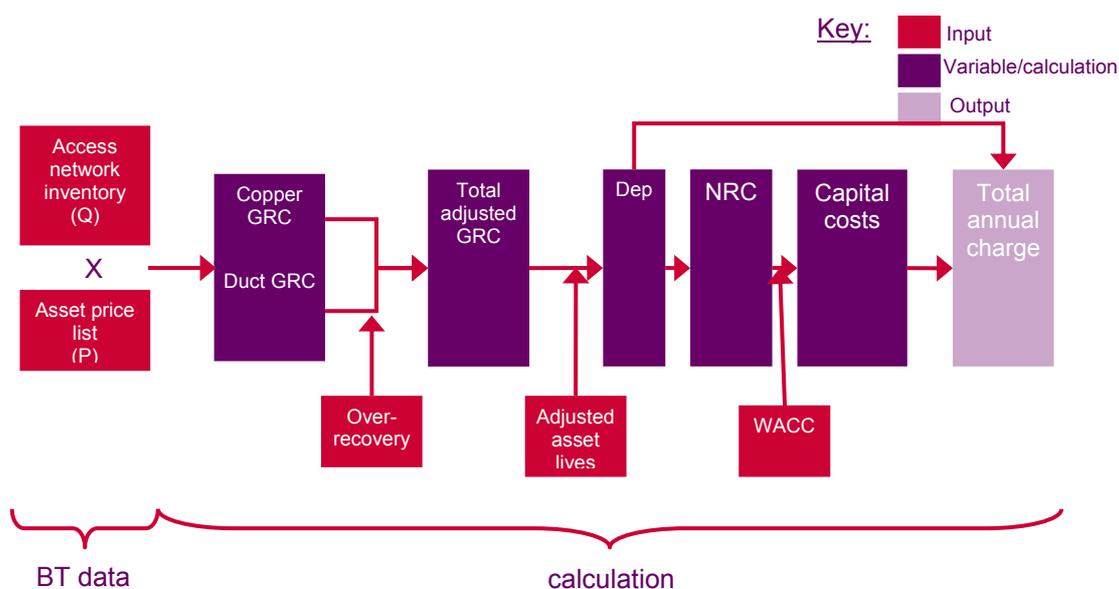
consultation but to leave such adjustments for price determinations of wholesale services which use a copper loop.

- **Cost of capital**

The weighted average cost of capital for BT's access network may change from its current value of 13% as used in the recent PPC consultation³¹, dependent on the current consultation being conducted by Ofcom on the cost of capital³². BT's accounts for 2003/2004 use a figure of 13.5%.

- 6.5 In addition, Ofcom would address the statistical error issue by urging BT to migrate as quickly as possible to PIPeR, but with safeguards such as independent audits to ensure that it is fit for purpose; that any resulting changes in the valuation are managed within an agreed framework; and that there is a fall-back measure of an increased LLCS sample size should PIPeR be delayed.
- 6.6 These adjustments are interdependent. A flow chart of the calculation is shown in Figure 10.

Figure 10: calculation flowchart for Proposal 1



- 6.7 The network GRC is calculated based on the results of LLCS, but migrating to PIPeR or a larger sample size, and is scaled, if sampling is used, to reflect the entire network with each individual asset type multiplied by the current price.
- 6.8 Ofcom then proposes to adjust the resultant GRC, by disallowing the forecast over-recovery. The historical depreciation is then adjusted by the movement in asset lives. This adjusted depreciation factor is used to derive the NRC.
- 6.9 Capital costs are calculated by multiplying the mean NRC for the year by the weighted average cost of capital. The annual charge is therefore the sum of

³¹ http://www.ofcom.org.uk/consult/condocs/ppc_charge_control/

³² http://www.ofcom.org.uk/consult/condocs/cost_capital/

depreciation, capital costs, and operational costs, which can also be adjusted in line with assumptions about the inefficiency of BT's network.

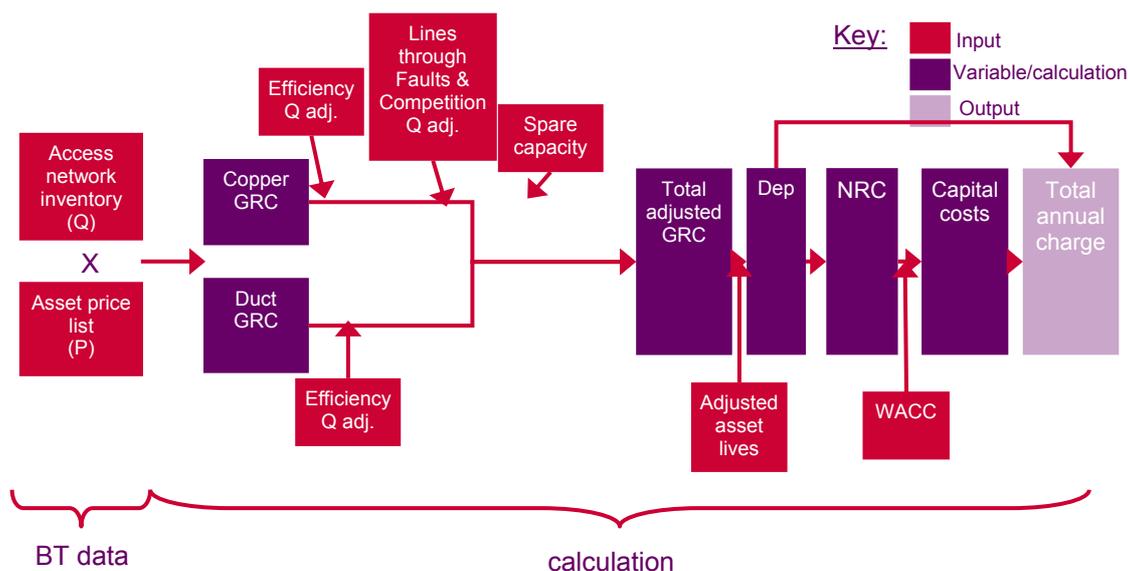
Question 17: *What is your view of adopting a proposal which applies the adjustments described to the existing approach?*

Proposal 2: adjust the existing methodology and add a network efficiency factor

6.10 This approach is similar to Proposal 1, proposed above, but adds a network efficiency factor derived from the modelling work undertaken by WIK Consult (i.e. Option 2 from Part 1) in order to adjust BT's GRC to remove inefficiencies due to sub-optimal planning. In addition to the adjustments described in Proposal 1 above, the following adjustments would also be applied:

- **Efficiency adjustment**
An abatement to BT's quantities of both duct and copper based on the WIK Consult study of an efficient network design.
- **Lines lost to faults**
An abatement to reflect copper lines which are faulty and can no longer, therefore, be used.
- **Lines lost to competition**
An abatement to reflect copper lines which are no longer in use due to customers switching to competitors and therefore represent stranded assets.
- **Spare capacity**
An abatement to adjust the level of spare capacity in the network.

6.11 These adjustments are interdependent; the reduction of GRC as a result of an abatement for efficiency, for example, is equivalent to removing some assets from the network. However, if a further abatement is made for faulty lines, this should only impact the valuation after the efficiency adjustment. A flow chart of the calculation is shown in Figure 11.

Figure 11: calculation flowchart for Proposal 2

- 6.12 The network GRC is calculated based on the results of LLCS, but migrating to PIPeR or a larger sample size, and is scaled, if sampling is used, to reflect the entire network with each individual asset type multiplied by the current price.
- 6.13 Ofcom then proposes to adjust the GRC for copper for quantity abatements: efficiency, lines lost through faults and competition, and finally spare capacity (in that order). The GRC for duct is adjusted for the efficiency factor. The annual cost is then calculated in the same way as for Proposal 1, using adjusted asset lives, weighted average cost of capital and operational costs. Any holding loss that arises from these adjustments will be offset against the over-recovery, the calculation of which was discussed in Section 5.

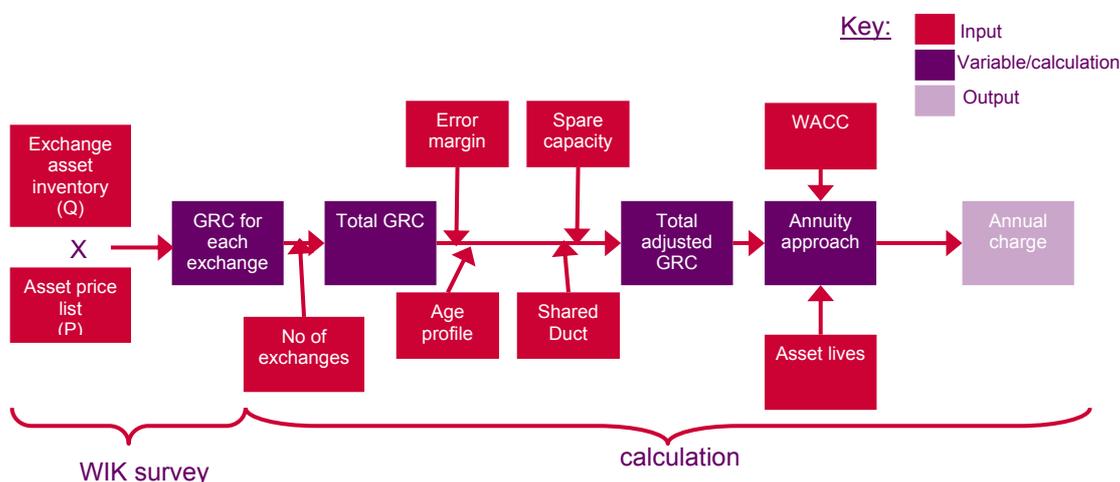
Question 18: What is your view of adopting a proposal which applies the adjustments described in proposal 1, plus an efficiency adjustment derived from the WIK Consult work, to the existing approach?

Proposal 3: hypothetical modern equivalent asset

- 6.14 Proposal 3 uses a theoretical calculation of the network an efficient new entrant would be expected to build to derive an annual charge using current technology, this proposal is in line with Option 2 from the first consultation paper. It does not use BT's valuation. This approach uses the software model developed by WIK Consult to produce a GRC for the optimised network design that an efficient new entrant could be expected to deploy. It is based currently on a sample of five exchanges.
- 6.15 Due to the limited size of the sample, Ofcom has allowed for a margin of error of $\pm 20\%$ on the base valuation (this compares with $\pm 8\%$ that BT claims for its sample of 176 exchanges), furthermore Ofcom has conducted the valuation under different assumptions on the age profile of the asset base, the impact of these assumptions are detailed in Section 7.
- 6.16 Having calculated a GRC, adjustments are made as appropriate for any error margin, the age profile and spare capacity. The annual charge is calculated

from an annuity approach taking into account asset lives, the weighted average cost of capital and the adjusted GRC. Operational costs are taken from BT's accounts but, in line with Proposals 1 and 2, are not adjusted to reflect any increased efficiency of the network. A flow chart of the calculation is shown in Figure 12.

Figure 12: calculation flowchart for Proposal 3



- 6.17 A further adjustment is made to reflect that under this approach the network operator would still be expected to share some duct between access and core in the interests of efficiency.
- 6.18 Were this option to be used for valuing the access network, it may be more appropriate to use economic depreciation or a tilting annuity approach to calculate the annual charge, rather than a simple constant annuity.

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?

Ofcom's preferred proposal

- 6.19 It is Ofcom's preference to adopt Proposal 1; i.e. adjust the existing approach for those issues described in Section 4, and derived from Option 4 in Part 1, and disallow any prospective over-recovery achieved by BT as a result of the switch from HCA to CCA from 1 August 1997.
- 6.20 Ofcom does not believe it would be appropriate to adopt Proposal 0 as this would not address the problems that Ofcom has identified with the existing approach.
- 6.21 Ofcom feels that Proposals 2 and 3 should also be rejected. This is because both proposals rely, at some level, on the assumption of a hypothetically efficient new entrant building a network today. Proposal 2 makes an efficiency adjustment to reflect the savings on the amount of duct and copper required to connect all BT's existing customers, while Proposal 3 is a stand alone bottom-up model of an efficient network. BT's network has been constructed over a number of years as a response to changing demand and topographical conditions. Using Proposals 2 or 3 as a cost standard relies on the

assumption that BT should have perfect foresight. These approaches ignore real world planning difficulties, e.g. the difficulty in procuring wayleaves, and fail to take into account significant proportions of the cost of providing service.

6.22 Ofcom believes that Proposal 1 is most closely aligned with the principles outlined in Section 3 and, as such, with its statutory duties in section 3 of the Act, most notably its duty to further the interests of consumers, where appropriate by promoting competition:

- it is the simplest approach other than Proposal 0, i.e. to make no changes;
- it offers the opportunity to value the copper access network in line with Ofcom's desire to set wholesale prices at a level which balances the interests of all stakeholders, but in a manner which minimises intrusive regulation and regulatory burden, no other Proposal offers this;
- it provides certainty during the period of its application, which Ofcom is proposing to be five years, and certainty as to the alternative actions which can be taken at the end of that period, only Proposal 0 also offers this;
- it uses BT's own data which increases the approach's objectivity and transparency, only Proposal 0 also offers this; and
- in common with the other proposals, it is based on a CCA approach which was adopted by Oftel in 1997 for sound economic principles which Ofcom continues to hold to be true.

6.23 Ofcom therefore considers that Proposal 1 offers the most appropriate approach which meets its criteria and produces results in which all stakeholders can have confidence.

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

Section 7

Implementation

Introduction

- 7.1 This section measures the impact of the various proposals detailed in Section 6 on the annual charge for a copper loop from BT. For each proposal a number of scenarios were modelled to give a range for the possible change in valuation.
- 7.2 The potential change to the annual charge is compared with BT's valuation in percentage terms. All calculations were based on 2003/04 financial information, which is the latest available data. The impact of each adjustment in each proposal is measured independently of the other adjustments, and on a cumulative basis.
- 7.3 For reference, the copper loop component accounts for approximately 80% of the current fully unbundled local loop charge and approximately 70% for WLR.

Parameters

- 7.4 The parameters that could be adjusted to affect the valuation of the copper access network were discussed in detail in Section 4 and Section 5. Figure 13 details which parameters have been adjusted in each proposal.

Figure 13: the parameters that apply to each proposal

Parameter	Proposal 1	Proposal 2	Proposal 3
Margin of error			√
Age profile			√
Over-recovery	√		
Efficiency		√	
Faulty		√	
Competition		√	
Spare capacity		√	√
Shared duct			√
Asset life	√	√	√
Cost of capital	√	√	√

Margin of error

- 7.5 In Proposal 3 Ofcom has assumed a margin of error of $\pm 20\%$ on the valuation, to reflect the fact that only five exchanges out of more than 5,500 were surveyed by WIK Consult, this compares to the $\pm 8\%$ that BT claims is the margin of error on its own LLCS survey of 176 exchanges. Thus under the different scenarios the valuation is adjusted by the following:

Low	Medium	High
+20%	0%	-20%

Age profile

7.6 In Proposal 3 Ofcom has assumed a different age profile of the assets under each scenario. This was modelled by reducing the size of the asset base to reflect the level of accumulated depreciation that would accrue under each age profile. For example, if asset lives of 40 years for duct and 20 years for copper are assumed, a 50% reduction in the copper GRC would be equivalent to an assumption that the network was 10 years old (assuming no additions). The GRC of each asset type was therefore reduced by the following amounts (to become the NRC) under each scenario:

Asset	Low	Medium	High
Copper	0%	25%	50%
Duct	0%	12.5%	25%

Disallowance of the over-recovery

7.7 In Section 5 the method for calculating the over-recovery applied in Proposal 1 was presented. Also in Section 5 Ofcom demonstrated how the total over-recovery resulting from a switch from HCA to CCA was equal to the difference between the NBV and NRC as of 1 August 1997. This gap declines over time depending on the depreciation profile of each asset type. The remaining over-recovery in any year is equivalent to the difference between NBV and NRC in that year. Therefore the over-recovery to be disallowed in Proposal 1 is as follows:

$$\text{over-/under-recovery} = \text{NRC}_{04/05} - \text{NBV}_{04/05}$$

The range for this reduction varies with the method of calculating the appropriate NBV and NRC and the resulting HCA and CCA depreciation charges and is shown below. This percentage will fall in subsequent years as the proportion of the asset base made up of assets present in 1996/97 will decline over time.

Low	Medium	High
4.8%	6.7%	8.6%

Efficiency

7.8 In Proposal 2 an efficiency adjustment is made to BT's valuation. The efficiency adjustment is calculated based on the results of the work conducted by WIK Consult, on the level of potential savings in the amount of duct and copper in the network. In Figure 3 in Section 4 the reduction in total duct length for three surveyed exchanges are detailed. BT classifies each exchange as one of six geotypes depending on the nature of its location, e.g. rural, urban, etc. To get the potential total reduction in duct from the reductions in Figure 3, it is necessary to calculate a weighted average reduction for the entire network. Thus, the total efficiency saving of the network is a weighted average of the individual efficiency savings by geotype. It is applied to the GRC of both duct and copper as a % reduction. The high

point represents the reduction in value if Ofcom was to impose the full efficiency saving on BT. The range is as follows:

Low	Medium	High
2%	4%	8%

Abatement for faults and competition

7.9 In Proposal 2 an adjustment is made to reflect the fact that a proportion of BT's copper lines are out of use, either as a result of faults or because the customer has moved to a competitor. BT has stated that 14% of its total copper lines have been lost through competition. BT also supplied the average level of faulty lines by geotype, a weighted average was then calculated to give 3.5%. An abatement is therefore made to the copper GRC to reflect these percentages. The high point of this range is therefore the reduction in the copper GRC if Ofcom was to abate for all faulty lines and all lines lost through competition. The range is as follows:

	Low	Medium	High
Faults	0.9%	1.8%	3.5%
Competition	3.5%	7.0%	14.0%

Spare capacity

7.10 A proportion of BT's copper lines are not active, and have effectively been installed as spare capacity. In Proposal 2 Ofcom makes an abatement to remove spare capacity from BT's valuation. In Proposal 3, the bottom-up valuation assumes zero spare capacity, so an adjustment is made to allow for spare capacity, effectively increasing the valuation. The issue of spare capacity is discussed in Section 4. For modelling purposes Ofcom has used the weighted average of observed spare capacity across geotypes, giving an estimation of the total spare capacity at 36%. For Proposal 2, under the high scenario, Ofcom proposes to remove all spare capacity from BT's valuation. For Proposal 3, the high scenario effectively results in minimum spare capacity (i.e. 9%). However, the adjustment only impacts the material cost of the copper, as the variation in the installation costs of copper due to the size of cable is minimal. The level of spare capacity in BT's network, estimated at 36%, actually equates to an abatement of 4.6%. The range is as follows, with the impact in the copper asset base shown below.

	Low	Medium	High
Proposal 2	9%	18%	36%
Reduction in copper GRC	0.8%	2%	4.6%
Proposal 3	36%	18%	9%
Increase in copper GRC	4.6%	2%	0.8%

Shared duct

7.11 In Proposal 3 Ofcom proposes to make an abatement to reflect that a proportion of duct in the access network is shared with the core. The high scenario reflects the proportion of BT's access duct total GRC that is currently apportioned to the core. The range used is as follows:

Low	Medium	High
0%	3%	6%

Asset Lives

7.12 BT currently uses an asset life of 25 years for duct (effectively 38 years as depreciation is calculated on a reducing balance basis) and 15 years for copper cable. In Section 4 Ofcom proposes that the asset life for copper should be increased to 20 years, while the asset life for duct should be increased to 40 years. Higher asset lives have also been modelled for comparison. A change in the asset life impacts depreciation. The effect is calculated by dividing the old asset life by the new. For example, assuming the annual depreciation charge equals 100 with an asset life of 15, if the life were to be increased to 20, depreciation would fall to 75, i.e.

$$\frac{15}{20} \times 100 = 75 \text{ or by } 25\%.$$

The range used is as follows:

	Low	Medium	High
Duct life	38 years	40 years	50 years
Impact on dep.	0%	5%	24%
Copper life	15 years	20 years	25 years
Impact on dep.	0%	25%	40%

Impact of parameters

7.13 Figure 14 shows the impact on the annual charge of each parameter taken in isolation, and Figure 15 shows their cumulative impact. The percentages shown are with reference to the annual charge for a copper loop calculated from BT's existing valuation.

7.14 From Figure 15 it can be seen that for Ofcom's preferred approach of Proposal 1, the proposed range for the reduction in the annual charge of a copper loop would be between 4.8% and 14.2% (depending on whether the high, medium or low point is adopted for each of the parameters) holding the WACC constant at 13.5%.

7.15 Should the current consultation into the cost of capital result in a change in the WACC then that result would need to be applied to the range quoted above. A reduction in the WACC will act to increase the potential reduction whilst an increase in the WACC would reduce it.

7.16 In addition to the parameters detailed above, Ofcom has modelled the impact a change in the cost of capital for the access network from 13.5% to 10.3%³³ would have on the annual charge for a copper loop. The impact of this change on Proposal 1, on a discrete and cumulative basis, is shown below.

	Low	Medium	High
Discrete	11.9%	11.9%	11.9%
Cumulative	14.6%	19.3%	24.1%

³³ Based on the parameter values discussed in the cost of capital consultation.

Figure 14: individual impact of each parameter

	Proposal 1			Proposal 2			Proposal 3		
	Low	Mid	High	Low	Mid	High	Low	Mid	High
Base valuation vs. current	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-38.1%	-5.4%	21.6%
Over-recovery	4.8%	6.7%	8.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Efficiency	0.0%	0.0%	0.0%	1.5%	2.9%	5.8%	0.0%	0.0%	0.0%
Shared duct	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.9%	2.6%
Faulty	0.0%	0.0%	0.0%	0.3%	0.6%	1.1%	0.0%	0.0%	0.0%
Competition	0.0%	0.0%	0.0%	1.1%	2.2%	4.5%	0.0%	0.0%	0.0%
Spare capacity	0.0%	0.0%	0.0%	0.3%	0.7%	1.4%	-1.1%	-0.3%	-0.1%
Asset life	0.0%	2.7%	5.1%	0.0%	2.7%	5.1%	0.0%	1.3%	1.2%

Note: the sum of the individual impacts will not equal the cumulative impact as the parameters are interdependent.

Figure 15: cumulative impact of each parameter

	Proposal 1			Proposal 2			Proposal 3		
	Low	Mid	High	Low	Mid	High	Low	Mid	High
Base valuation vs. current	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-38.1%	-5.4%	21.6%
Over-recovery	4.8%	6.7%	8.6%	0.0%	0.0%	0.0%	-38.1%	-5.4%	21.6%
Efficiency	4.8%	6.7%	8.6%	1.5%	2.9%	5.8%	-38.1%	-5.4%	21.6%
Shared duct	4.8%	6.7%	8.6%	1.5%	2.9%	5.8%	-38.1%	-3.5%	24.2%
Faulty	4.8%	6.7%	8.6%	1.7%	3.5%	6.9%	-38.1%	-3.5%	24.2%
Competition	4.8%	6.7%	8.6%	2.8%	5.6%	11.0%	-38.1%	-3.5%	24.2%
Spare capacity	4.8%	6.7%	8.6%	3.1%	6.2%	12.1%	-39.2%	-3.8%	24.1%
Asset life	4.8%	9.5%	14.2%	3.8%	9.6%	17.5%	-38.7%	-2.2%	25.3%
Total	4.8%	9.5%	14.2%	3.8%	9.6%	17.5%	-38.7%	-2.2%	25.3%

Note: a negative value indicates an increase over the current cost.

Section 8

Responding to this consultation

How to respond

Ofcom invites written views and comments on the issues raised in this document, to be made by **5pm on Friday 29 April 2005**.

Ofcom strongly prefers to receive responses as e-mail attachments, in Microsoft Word format, as this helps us to process the responses quickly and efficiently. We would also be grateful if you could assist us by completing a response cover sheet (see Annex 2), among other things to indicate whether or not there are confidentiality issues. The cover sheet can be downloaded from the 'Consultations' section of our website.

Please can you send your response to first Graeme.Hodgson@ofcom.org.uk.

Responses may alternatively be posted or faxed to the address below, marked with the title of the consultation.

Graeme Hodgson
Competition and Markets
4th Floor
Ofcom
Riverside House
2A Southwark Bridge Road
London SE1 9HA

Fax: 020 7783 4109

Note that we do not need a hard copy in addition to an electronic version. Also note that Ofcom will not routinely acknowledge receipt of responses.

It would be helpful if your response could include direct answers to the questions asked in this document, which are listed together at Annex 5. It would also help if you can explain why you hold your views, and how Ofcom's proposals would impact on you.

Further information

If you want to discuss the issues and questions raised in this consultation, or need advice on the appropriate form of response, please contact Graeme Hodgson on 020 7783 4417.

Confidentiality

Ofcom thinks it is important for everyone interested in an issue to see the views expressed by consultation respondents. We will therefore usually publish all responses on our website, www.ofcom.org.uk. We will do this on receipt of responses, unless respondents request otherwise on their response cover sheet.

All comments will be treated as non-confidential unless respondents specify that part or all of the response is confidential and should not be disclosed. Please place any

confidential parts of a response in a separate annex, so that non-confidential parts may be published along with the respondent's identity.

Ofcom reserves its power to disclose any information it receives where this is required to carry out its functions. Ofcom will exercise due regard to the confidentiality of information supplied.

Please also note that copyright and all other intellectual property in responses will be assumed to be licensed to Ofcom to use, to meet its legal requirements. Ofcom's approach on intellectual property rights is explained further on its website, at http://www.ofcom.org.uk/about_ofcom/gov_accountability/disclaimer.

Next steps

Following the end of the consultation period, Ofcom intends to publish a statement around June 2005.

Please note that you can register to get automatic notifications of when Ofcom documents are published, at http://www.ofcom.org.uk/static/subscribe/select_list.htm.

Ofcom's consultation processes

Ofcom is keen to make responding to consultations easy, and has published some consultation principles (see Annex 1) which it seeks to follow, including on the length of consultations.

This consultation is shorter than Ofcom's standard 10 week period because it is the second part of a two part consultation. The overall consultation period for both parts will be around 12 weeks.

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, you can alternatively contact Philip Rutnam, Partner, Competition and Strategic Resources, who is Ofcom's consultation champion:

Philip Rutnam
Ofcom
Riverside House
2A Southwark Bridge Road
London SE1 9HA
Tel: 020 7981 3585
Fax: 020 7981 3333
E-mail: philip.rutnam@ofcom.org.uk

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, other than on dispute resolution.
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

Consultation response cover sheet

- A2.1 In the interests of transparency, we will publish all consultation responses in full on our website, www.ofcom.org.uk, unless a respondent specifies that all or part of their response is confidential. We will also refer to the contents of a response when explaining our decision, without disclosing the specific information that you wish to remain confidential.
- A2.2 We have produced a cover sheet for responses (see below) and would be very grateful if you could send one with your response. This will speed up our processing of responses, and help to maintain confidentiality by allowing you to state very clearly what you don't want to be published. We will keep your completed cover sheets confidential.
- A2.3 The quality of consultation can be enhanced by publishing responses before the consultation period closes. In particular, this can help those individuals and organisations with limited resources or familiarity with the issues to respond in a more informed way. Therefore Ofcom would encourage respondents to complete their cover sheet in a way that allows Ofcom to publish their responses upon receipt, rather than waiting until the consultation period has ended.
- A2.4 We strongly prefer to receive responses in the form of a Microsoft Word attachment to an email. Our website therefore includes an electronic copy of this cover sheet, which you can download from the 'Consultations' section of our website.
- A2.5 Please put any confidential parts of your response in a separate annex to your response, so that they are clearly identified. This can include information such as your personal background and experience. If you want your name, address, other contact details, or job title to remain confidential, please provide them in your cover sheet only so that we don't have to edit your response.

Cover sheet for response to an Ofcom consultation

BASIC DETAILS

Consultation title:

To (Ofcom contact):

Name of respondent:

Representing (self or organisation/s):

Address (if not received by email):

CONFIDENTIALITY

What do you want Ofcom to keep confidential?

Nothing

Name/address/contact
details/job title

Whole response

Organisation

Part of the response

If there is no separate annex, which parts?

Note that Ofcom may still refer to the contents of responses in general terms, without disclosing specific information that is confidential. Ofcom also reserves its powers to disclose any information it receives where this is required to carry out its functions. Ofcom will exercise due regard to the confidentiality of information supplied.

DECLARATION

I confirm that the correspondence supplied with this cover sheet is a formal consultation response. It can be published in full on Ofcom's website, unless otherwise specified on this cover sheet, and I authorise Ofcom to make use of the information in this response to meet its legal requirements. If I have sent my response by email, Ofcom can disregard any standard e-mail text about not disclosing email contents and attachments.

Ofcom seeks to publish responses on receipt. If your response is non-confidential (in whole or in part), and you would prefer us to publish your response only once the consultation has ended, please tick here.

Name

Signed (if hard copy)

Annex 3

Cable modularity

Introduction

- A3.1 The purpose of this analysis was to estimate the potential uplift to the copper GRC resulting from the need to use the nearest modern equivalent for those copper cables deployed in the network which are no longer stocked by BT, and hence have no unit price.
- A3.2 BT currently stocks around 70 different cable types but there are up to 2,500 different cable types deployed within its network. BT has provided Ofcom with the cable data, extracted from LLCS, on seven of its exchanges. In addition, BT has provided a list of all the cable types, and their unit costs, used in the GRC calculation and a mapping of the cable types currently installed to the cable types currently used.

Analytical method

- A3.3 This analysis establishes an estimate for the difference between the GRC as calculated using BT's nearest modern equivalent method versus what it would be if a cable price related to the actual capacity of the installed cable were used. To do this it was necessary to derive a cost function for each cable type which relates total cable unit cost per metre to the capacity, in number of pairs. The effect of gauge is neglected as this is expected to be very small and, in any case, is difficult to model without more data.
- A3.4 As a cable is constructed from a number of common elements, such as the sheath and core, together with a variable element, the number of pairs, it is assumed that the cost function can be approximated by an equation of the form:

$$y = mx + c$$

In this equation y is the unit cost, m is the incremental cost per pair, x is the number of pairs and c is the cost of the common elements.

- A3.5 An appropriate equation was derived from the current stock list data for each combination of cable construction and gauge, resulting in 12 cost functions. The 12 combinations of cable construction and gauge are shown in Figure 16.
- A3.6 Using these cost functions a unit price for the more than 2,000 cable types not present in BT's stock list could be derived and a new GRC calculated for each sample exchange.

Figure 16: cable cost function combinations

Cable construction	Gauge
Aerial	0.5mm
	0.6mm
	0.9mm
Armoured	0.5mm
	0.6mm
Ducted D-side cable	0.5mm
	0.6mm
	0.9mm
Ducted E-side cable	0.32mm
	0.4mm
	0.5mm
	0.63mm

Conclusions

- A3.7 Each cable in the LLCS sample for each of the seven exchanges was given a new GRC based on a unit price calculated using one of the 12 cost functions. This resulted in a reduction to the copper GRC for that exchange. These results were then weighted based on the relative proportions of each geotype within the entire exchange population to arrive at an overall, network-wide reduction in the copper cable GRC. This produced an overall reduction in the network-wide copper GRC of <0.2%.
- A3.8 It is clear from this analysis that the cable modularity effect is actually quite small. This is because the bulk of the cost of the cable is contained within the common elements of sheath and core, with the unit cost varying little by capacity for any particular cable construction. However, it is important to recognise that this analysis did not quantify the effect of assuming a larger wire gauge in the nearest equivalent cable. Also, this analysis is based on a sample of only seven exchanges from a population of over 5,500 which could lead to a level of statistical inaccuracy. Nevertheless, it is not expected that either of these effects would result in a significant change to the result obtained. It is Ofcom's view, therefore, that applying an adjustment for this effect would be disproportionate given the complexity of implementation.

Annex 4

Shared duct

Introduction

A4.1 In Section 6 of Part 1 Ofcom discussed how the costs of shared duct should be recovered and a number of options that could be used were listed. There was also a discussion on what the most appropriate way to attribute common costs was and the following methods were considered:

- the Ramsey principle;
- equal proportionate mark-ups over incremental cost (LRIC+EPMU); and
- the efficient component pricing rule (ECPR).

A4.2 The Ramsey principle, although in theory the most efficient way of recovering these costs, in practice is rarely used due to the difficulties in determining the elasticities needed. This would be particularly true for the access network, because of the strong cross-elasticity effects with calls and other services. The LRIC+ principle was stated as having an advantage in its use as it would lead to charges being consistent with those already set, and the ECPR was not considered appropriate in this case as this is used either when market power is not entrenched or the market is new and innovative.

A4.3 The means of recovering the cost of shared duct, and in what proportions, was also considered with reference to Ofcom's six principles of cost recovery³⁴. However, it was considered that the principles did not offer clear guidance regarding the most appropriate method. A variety of options were put forward including BT's current method for allocating shared duct. The remainder of this annex presents the results of Ofcom's analysis into each of these options.

Option A: current methodology

A4.4 Part 1 set out BT's current basis for allocating shared duct. BT attributes duct cost on the basis of cross-sectional area where those cables which are largest and require most space are allocated more costs. In this case access takes a larger share of the overall cost of duct, as access cables are usually large than core cables.

A4.5 As discussed in Part 1 it is arguable that there is some causal relationship between the opportunity cost of the duct and the size of the cable, where an access cable has an opportunity cost in that the duct space it occupies cannot be used for a core cable and this cost is greater the more duct it uses. The document also suggested however, that the incremental cost of laying additional bores was relatively small compared to the initial cost involved in laying duct when the additional bores are laid at the same time. Thus, in practice there may not be such a clear relationship between the cross-sectional area of the cable and the cost of the duct. The other principles of cost recovery therefore need to be assessed.

³⁴ The six principles of cost recovery are: cost causation, distribution of benefits, effective competition, reciprocity and practicability.

- A4.6 The other principles of cost recovery, as noted in the first consultation document, do not give clear guidance as to the proportions in which the costs of shared duct should be recovered from the access and core networks. However, these principles are unlikely to support any extreme allocations.

Option B: bandwidth

- A4.7 Under this option the cost of shared duct could be attributed according to the bandwidth of the cable. One possible justification for this option would be that it is an approximate indicator of consumers' willingness to pay and thus could perhaps to some extent be consistent with the Ramsey principle. Thus, if a customer makes more extensive use of relatively expensive high-speed data services (greater bandwidth) then the access cable linking them may be considered to be more valuable due to the increased revenue it generates. However, the relationship between bandwidth and willingness to pay is unclear.
- A4.8 There are a number of practical problems in implementing this solution. Firstly, the bandwidth which each cable type could offer would need to be measured as bandwidth actually used varies over time. In order to perform such an attribution this would then require the determination of the bandwidth potential of each asset category which is likely to be a subjective process, especially since the equipment on the end of a line is able to influence the bandwidth used. As such the assumed bandwidth of the assets would need to be carefully chosen to avoid any severe distortion in the attribution of shared duct between access and core.
- A4.9 It should also be noted that any move to this methodology would result in a change to those charges that have a cost element included in them relating to access fibre as well as access copper. Thus, if access fibre took a greater proportion of the cost, the attributed cost of those products which use access fibre, e.g. PPCs, would increase. If the principle of allocation by bandwidth were applied within access, then the costs attributed to high bandwidth products, such as Digital Subscriber Line services would rise.
- A4.10 Ofcom believes that Option B would be highly subjective and subject to practical difficulties. Therefore this option has not been considered as a viable alternative to Option A.

Option C: incremental costs of access only

- A4.11 The implication of using this methodology is that all duct shared between access and core is allocated to core.
- A4.12 One suggestion is that the allocation could differ by area, that is, all shared duct in some areas could be allocated to access and in other areas to core, so as to be consistent with the six general principles of cost recovery, in particular, the principle of cost causality. For example, if the common duct was mainly located in a residential area it could be claimed that its primary purpose is to provide network access services. If so, the common costs could then be allocated entirely to access with the exception of those costs which are incremental to core. In rural areas, however, the opposite would occur where ducts are mainly tailored to provide core services. The application of this may be arbitrary as 'residential' and 'rural' would need to be specifically defined. Another way would be to consider which ducts have more than a

given number of access lines in them and state that these are mainly used to provide access services, however, again how many access lines needed to make a duct access-only would be subjective.

A4.13 The other principles of cost recovery may also provide some guidance here. It could be said this methodology does not align with that of the distribution of benefits principle, as both access and core users (in this case network service operators / providers) should bear the cost of shared duct as both sets of users are making use of it. It is also not clear that Option C gives good incentives for cost minimisation as it is possible that it distorts the incentive on BT to share duct where this is the cost minimising solution. As discussed below there may also be practical problems in using this option.

Option D: equal proportionate mark-ups

A4.14 This method looks at how to treat cost recovery, where the costs of shared duct would be allocated in proportion to the incremental costs of core and access respectively. Part 1 highlighted the fact that this method would be consistent with charges which have already been set on this basis.

A4.15 Ofcom has undertaken further analysis regarding this option, both in terms of the reasoning behind whether this is a more appropriate methodology to use and in terms of what a change would imply for the copper access network.

A4.16 There are a couple of ways the EPMU methodology could be applied in this case:

- The costs of shared duct could be allocated in proportion to the incremental costs of the access and core networks as a whole. There are a number of practical difficulties with this approach as discussed further below.
- The costs of shared duct could be allocated in proportion to the incremental costs of unshared access and core duct respectively. It should be noted that there are a number of difficulties in performing such a calculation, partly to do with the data available and other reasons which are discussed below. The analysis undertaken has shown that there would be little difference to the current attribution of shared duct costs in using this method.
- Figure 17 shows how the allocation of shared duct between access and core would change for each of the options under EPMU. The columns marked Result (Shared) and Attribution show how the different methods compare in the attribution of shared duct.

Figure 17: effect of each EPMU option

	Shared	Result (Shared)	Attribution
1) EPMU across whole network	attribute on EPMU basis	On this basis the 40% of shared duct under Option A would be split 22% access and 18% core.	76:24
2) EPMU across duct	access and core figures are for LRIC+	On a proportion basis the costs are split in a similar proportion to the current split of 75:25	72:28

A4.17 As with Option A, the cost recovery principles offer no clear guidance as to the proportions that the cost of shared duct should be split by. However, in performing the analysis for this methodology a serious problem regarding it has been highlighted. Fundamental to using this methodology is the way that the increments BT uses are defined where the increment for access is the access network as a whole. Currently under the EPMU methodology the common cost component is inflated due to the way in which the common cost of shared duct is recorded. At present duct is considered common if the cables in the duct share the route, but any duct that comes off a shared duct is also considered as a common cost, even if the duct is only used by either an access or core cable. As such the common cost component includes within it incremental cost. Thus any means of trying to apportion this cost to core and access is difficult on an EPMU basis because any apportionment to access and core will include incremental costs to both networks. This problem is also a reason why Option C is not appropriate as it would result in incremental costs of access being recovered from core services. The reason for this is the way in which the access and core increments have been defined and are reported.

A4.18 This suggests that if this methodology was used then the outcome would offer an inaccurate description of the access and core networks, and costs could be wrongly attributed. In principle this might be addressed by a change to the way in which the increments are defined so that fewer of the incremental costs are common. However, Ofcom does not believe it would be proportionate to require BT to change the way in which it compiles and reports its cost figures for these purposes.

Conclusions

A4.19 At present Ofcom believes that the current methodology offers the most practical means of attributing shared duct costs between the access and core networks. Although the case for Option A is not compelling in terms of the six principles of recovery guiding the appropriate allocation of shared duct, it is at least easy and practical to implement and would not unfairly allocate incremental costs as common costs. There is, therefore, no uniquely correct answer to this question, however on a fully allocated cost basis cross-sectional area is likely to be a better choice of cost driver, although on an incremental cost basis cross-sectional area as a driver is likely to be weaker. No other option appears to offer clear advantages whilst they also have significant disadvantages.

Annex 5

Consultation questions

Policy aims and the regulatory framework

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

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

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

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

Valuation options

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

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

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

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?*

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

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?*

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

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?*

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?*

Calculating over-recovery adjustments

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

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

Proposals

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

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

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?*

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?*

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

Annex 6

Regulatory Impact Assessment

- A6.1 The analysis presented in Sections 6 to 7 of this document, when read in conjunction with the rest of this document, represents a Regulatory Impact Assessment (RIA), as defined by section 7 of the Communications Act 2003. You should send any comments on this RIA to us by the closing date for this consultation. We will consider all comments before deciding whether to implement our proposals.
- A6.2 RIAs provide a valuable way of assessing different options for regulation and showing why the preferred option was chosen. They form part of best practice policy-making and are commonly used by other regulators. This is reflected in section 7 of the Act, which means that generally we have to carry out RIAs where our proposals would be likely to have a significant effect on businesses or the general public, or when there is a major change in Ofcom's activities. In accordance with section 7 of the Act, in producing the RIA in this document Ofcom has had regard to such general guidance as it considers appropriate, including related Cabinet Office guidance.

Annex 7

Glossary

Item	Description
21CN	BT's 21 st 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'.
ART	The French telecommunications regulator, see www.art-telecom.fr for more information.
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.
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 DP.
D-side	Distribution side of the access network between the PCP 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 PCP.
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
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.
PPC	Partial Private Circuit

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.org.uk 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