Annex 26

LLCC Model

Introduction

A26.1 We have developed a revenue and cost forecasting model (2016 LLCC Model) in order to calculate values of X for the TI and Ethernet baskets in the charge control. For each basket, we are requiring BT to ensure that its charges for the services in question do not increase by more than CPI plus or minus the value of X. In Volume II, Section 4, we discuss our approach to designing the charge control framework, which provides background to the more detailed aspects covered by this Annex.

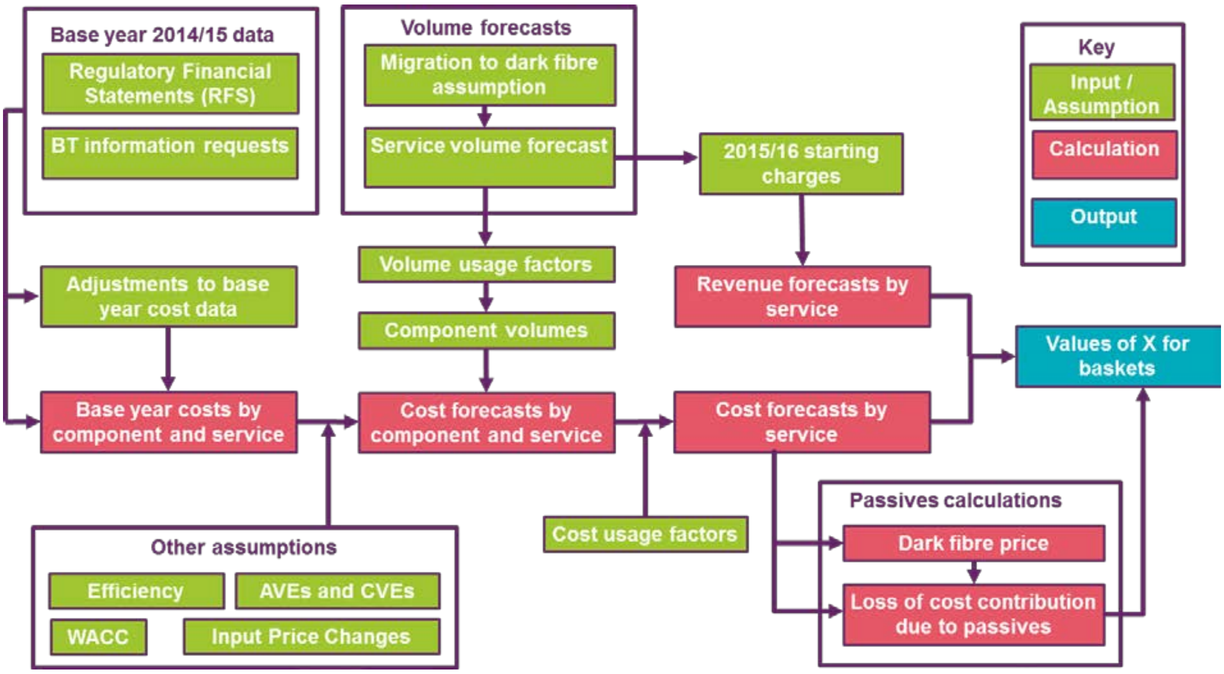
A26.2 In this Annex, we:

- provide an overview of the 2016 LLCC Model;
- explain our revenue forecasting approach;
- explain our cost forecasting approach;
- discuss some detailed modelling issues; and
- set out the values of X we have calculated.

Overview of model structure

A26.3 The objective of the 2016 LLCC Model is to forecast how the efficient costs of providing the relevant business connectivity services will change over the period of the charge control. In developing the 2016 LLCC Model, we have updated the approach used for the 2013 LLCC to take into account market developments, the latest available evidence and the impact of the dark fibre remedy. We have structured the 2016 LLCC Model as illustrated in Figure A26.1 below.

Figure A26.1: The 2016 LLCC Model structure



A26.4 In summary, we first calculate the base year costs for services within business connectivity markets. For the June 2015 LLCC Consultation, the base year of the charge control model was 2013/14, whereas for this statement the base year is 2014/15, as discussed in Annex 27. The base year cost data comes from BT's 2014/15 RFS, as well as data supplied by BT in response to a number of formal s135 information requests. We make a number of adjustments to these data to reflect our view of forward looking efficient costs. In Annex 27, we set out the adjustments we have made to BT's base year costs.

A26.5 Second, we forecast revenues in each year until the end of the charge control. These forecasts are based on two inputs: the charges for each service that we expect to be in place during the control; and the volumes of each service. We explain our approach to determining charges below and we explain our volume forecasts in Annex 32.

A26.6 Third, we forecast costs for each year of the period ending 2018/19. We forecast how costs will vary from the base year over the modelling period on the basis of: i) volume changes (the impact of which are determined by cost-volume and asset-volume elasticities), ii) efficiency, iii) input price changes, and (iv) WACC. Annexes 29 to 32 describe our approach to calculating these forecasting assumptions.

A26.7 Fourth, we calculate the cost uplifts necessary as a result of our dark fibre remedy. As set out later in this section, we have included uplifts to reflect:

- the loss of fixed and common cost contribution as a result of active services migrating to dark fibre. As explained in Volume II Section 5, the lost cost contribution is added into the charge control (specifically the Ethernet basket). We provide details on the per circuit cost contributions for actives and dark fibre in Annex 33; and

- the dark fibre implementation costs and stranded assets adjustment. We discuss why we consider these costs should be recovered from the Ethernet basket, as well as what an appropriate level would be in Annex 33.

A26.8 Finally, based on our basket definitions, we assign forecast costs and revenues into the TI and Ethernet baskets. For each basket, we first apply a starting charge adjustment to revenues. Volume II Section 7 sets out our approach to calculating the level of the starting charge adjustments for the TI and Ethernet baskets. We then calculate the values of X for each basket. Based on our glide path approach, the value of X is calculated to gradually bring revenues in line with costs such that in the final year of the control revenues equal our forecast of efficiently incurred costs (including a return on capital employed). In this section we explain how we calculate the values of X.

Revenue forecasting approach

A26.9 In order to forecast revenues for services in our TI and Ethernet baskets, we require two inputs:

- service charges; and
- volume forecasts.

A26.10 We explain how we have produced our volume forecasts in Annex 32. In terms of service charges, we obtained data on BT's average revenues by service for 2014/15 as well as the charges that were in place at the end of the first year of the current control (2013/14) and at the start of years two (2014/15) and three (2015/16). These charges are based on the BT Wholesale[1] and Openreach[2] price lists and were confirmed in a formal s135 information request.[3]

A26.11 In order to forecast revenues during the control period, we need to determine what the charges will be for services in our basket in each forecast year absent a charge control. For this statement, we have used the most recent charges available with the aim of taking into account the charges that are in place at the end of the current charge control (i.e. on 31 March 2016) and have included the impact of the starting charge adjustments (as set out below). In practice, we project revenues to the final year of the control by applying our forecast of volumes to these charges (i.e. in effect, we assume that these charges remain constant until the final year of the control).

A26.12 The use of the charges that are published in the BT Wholesale and Openreach price lists have raised various detailed modelling issues, for example differences in how certain services are charged for in the price list and how they are treated in BT's regulatory accounts. We discuss these issues and the resulting adjustments we have made below.

[1] BT Wholesale, Carrier Price List, https://www.btwholesale.com/pages/static/help-and-support/pricing/carrier-price-lists.htm
[2] Openreach, Ethernet services price list, https://www.openreach.co.uk/orpg/home/products/pricing/loadProductPrices.do?data=2qYKQipGu8lEldEpdH2SyFnqs1m6OcKz301sgolk8P2FdiaKKPEfrCsJCb3sZkzJ
[3] BT response to 13th s135 notice dated 26 February 2015, questions A1 and A2.

Starting charge analysis

A26.13 In determining the starting charges that are used in our revenue forecast, we have considered the case for a starting charge adjustment (SCA). Our framework is set out in Volume II Section 4, while our considerations on balancing the SCA and glide path and our decision on the level of SCAs for the Ethernet and TI baskets are detailed in Volume II Section 7.

A26.14 In considering whether there is a case for SCAs, we have assessed:

- Whether the risks to economic efficiency or competition from distorted pricing signals are particularly significant; and
- Whether prices are significantly above or below cost for reasons other than efficiency or volume growth.

A26.15 In order to assess whether any of BT's charges run the risk of significantly distorting consumption or investment decisions, we have compared BT's charges for each service with two different measures of cost, DSAC and DLRIC, in 2016/17. In order to forecast DSAC and DLRIC, we requested service-level DSAC, DLRIC and FAC data from BT for 2014/15. This information allows us to calculate DSAC-to-FAC and DLRIC-to-FAC ratios for 2014/15. We then apply these ratios to our FAC forecasts in 2016/17 to derive forecast DSAC and DLRIC estimates for each service, i.e. we assume the ratios are constant going forward. This is consistent with the approach we adopted in the 2013 LLCC. We then compare service charges with the different measures of cost, in particular DSAC and DLRIC.

A26.16 As discussed in Volume II Section 7, when carrying out this comparison we consider each service in aggregate (rather than considering individual connection and rental charges) over a customer lifetime of three years. For a given service, our cost and charge estimates therefore consist of a single connection and three years of rental charges. For certain services, the rental charges can include a distance-based element. This includes main link charges for certain Ethernet services and distribution and regional trunk charges for PPCs and RBS services. We have used the same distance assumptions that are set out in the June 2015 LLCC Consultation.[4]

A26.17 In order to assess whether BT's charges are significantly above costs for reasons other than volumes or efficiency outperformance of the 2013 LLCC, we have used our 2013 LLCC Model and replaced the assumptions about the forecast volumes and efficiency improvements with the outturn values for 2012/13, 2013/14 and 2014/15. We have then compared the resulting returns with those estimated by the 2013 LLCC model using the original assumptions on volumes and efficiency.

A26.18 BT has the flexibility to apply the basket SCAs to all services within the respective basket, or apply different levels of SCA to individual services within each basket, as long as the overall reduction for the basket achieves the basket SCA stipulated by our decision. In our modelling, we have taken the simplifying assumption that the basket SCA will be applied uniformly across all services in the respective basket, thus reducing the starting charges for all services in the Ethernet basket by 12% and in the TI basket by 9%. We consider this a reasonable assumption in the

[4] See Annex 6, paragraphs 6.22 to 6.23 of the June 2015 LLCC Consultation

absence of evidence to suggest what distribution of SCAs among its individual products BT will choose. These starting charges are then multiplied by our volumes forecast for each of the services to generate our revenue forecast before the impact of the basket X. The level of basket X is thus determined by the level of SCA for the respective basket, a higher SCA resulting in a less negative X and vice versa.

Cost forecasting approach

A26.19 Cost forecasting models can take a number of different forms. When building cost models for setting charge controls, we have historically used one of two broad types of models, depending on the case in hand:

- Top-down model – based on the SMP operator's accounting data on its network component and service costs, which are mapped together on the basis of usage factors; or

- Bottom-up model – based on engineering models of how much network equipment is needed for a projected level of volumes for specified cost drivers.[5]

A26.20 Consistent with previous LLCCs, we have built the 2016 LLCC Model using a top-down cost modelling approach based on cost data from BT's regulatory financial reporting systems. This approach is consistent with the approach adopted in the most recent WBA[6] and WLR/LLU[7] charge controls. We henceforth refer to this as our top-down modelling approach.

A26.21 The top-down modelling approach is an accounting approach that forecasts how BT's efficiently incurred costs will change over time relative to the base year.

A26.22 We forecast capital costs and operating costs separately and discuss each in turn below. We start by explaining the steps in generating our forecasts.

Our three-step forecasting approach

A26.23 The top-down modelling approach forecasts costs using the following three-step process:

Figure A26.2: Cost forecasting process

- **stage one** of the process is to establish the relevant costs in the base year[8] for the charge control. These base year costs are based on regulatory accounting

[5] On occasion hybrid models, based on bottom-up cost drivers and then calibrated against top-down cost data, have also been used.

[6] Ofcom, *Review of the wholesale broadband access markets, Statement on market definition, market power determinations and remedies, Statement,* 26 June 2014, Section 7 http://stakeholders.ofcom.org.uk/consultations/review-wba-markets/

[7] Ofcom, *Fixed access market reviews: wholesale local access, wholesale fixed analogue exchange lines, ISDN2 and ISDN30 – Volume 2: LLU and WLR Charge Controls, Statement,* 26 June 2014 http://stakeholders.ofcom.org.uk/binaries/telecoms/ga/fixed-access-market-reviews-2014/statement-june-2014/volume2.pdf

[8] In the case of the 2016 LLCC Model, the base year is 2014/15.

data provided by BT. This regulatory accounting information is BT's view of its costs. As set out in Annex 27, we make a number of adjustments to this accounting data to reflect Ofcom's view of BT's efficiently incurred costs;

- **stage two** involves forecasting the various cost types based on volumes for the components remaining unchanged from the base year. This is referred to as the 'steady state' forecast. As is demonstrated further below, this stage is typically driven by forecast changes in asset values and assumed changes in forecast efficiency; and

- **stage three** then involves supplementing the steady state forecast to include the changes in costs associated with the forecast component/service volume changes (referred to as the 'additional costs' below). As demonstrated further below, the forecasts generated at this stage are driven by the forecast volume changes along with forecast changes in efficiency and the AVEs and CVEs.

A26.24 Under this approach, we sum together the steady state cost forecasts and the additional cost forecasts to produce a forecast of total costs with which we calculate the value of X for the TI and Ethernet baskets.

A26.25 BT's efficiently incurred costs include the costs it incurs for: i) acquiring assets that are used to provide its services (capital costs or capex); and ii) operating those assets and providing the services more generally (operating costs or opex). In the 2016 LLCC Model, we forecast capital costs and operating costs separately. We discuss each in turn below.

Forecasting of capital costs

A26.26 In this section, we first set out the terminology we use to discuss capital cost forecasting. Second, we provide details of the steady state and additional elements of our forecasting approach and explain how we have applied the approach in the 2016 LLCC Model. Third, we set out the forecasting equations we use in the 2016 LLCC Model.

A26.27 Table A26.1 explains the terminology used in this section.

Table A26.1: Explanation of accounting terms

Name	Description
Gross Replacement Cost (GRC)	The Current Cost Accounting (CCA) equivalent of Gross Book Value, i.e. the cost of BT replacing its assets with new ones now.
Net Replacement Cost (NRC)	The CCA equivalent of Net Book Value, i.e. depreciated replacement cost of BT's assets.
Operating capability maintenance (OCM)	A CCA convention, where the depreciation charge to the profit and loss account relates to the current replacement cost of the firm's assets, taking account of specific and general price inflation. As the name suggests, the OCM approach seeks to maintain the operating capability of the firm.
Financial Capital Maintenance (FCM)	An alternative approach to CCA in which an allowance is made within the capital costs for the holding gains or losses associated with changes over the year in the value of the assets held by the firm. In contrast to OCM, the FCM approach seeks to maintain the financial capital of the firm, and hence the firm's ability to continue financing its functions.
OCM depreciation (OCM	The reduction in value (as measured by the GRC) of the assets over the course of the

dep)	financial year associated with the reduction in the asset's remaining life.
Cumulative OCM depreciation (Cum OCM dep)	The sum of the individual in-year OCM depreciation over the asset life up to the year being forecast, adjusted to reflect any changes in asset values over time.
Input price changes (IPC)	Changes in the prices of the underlying inputs to costs. This includes changes to assets prices and changes to operating costs.
Holding gains and losses (HGL)	The change in the value of the underlying assets used by the company over the course of the financial year.
Disposals (Disp)	The assets that the firm disposes of (e.g. an asset that becomes fully depreciated or an asset that the firm sells) over the course of the financial year.
Capital expenditure (Capex)	The firm's level of investment in fixed assets over the course of the financial year.
Net Current Assets (NCA)	A measure of the amount of capital being used in day-to-day activities by the company. It is equal to the current assets less current liabilities.
Mean capital employed (MCE)	BT's definition of Mean Capital Employed is total assets less current liabilities, excluding corporate taxes and dividends payable, and provisions other than those for deferred taxation. The mean is computed from the start and end values for the period, except in the case of short-term investments and borrowings, where daily averages are used in their place.
Fully allocated costs (FAC)	An accounting approach under which all the costs of the firm are distributed between its various services.
Inflation	The general change in prices across the economy.
WACC	BT's weighted average cost of capital.
Return on capital employed (ROCE)	The ratio of accounting profit to capital employed. The measure of capital employed can be either HCA or CCA.

Top-down modelling approach to capital cost forecasting

A26.28 As set out in Volume II Section 5, we have used the CCA FAC cost standard for setting the 2016 LLCC. We adopt the Financial Capital Maintenance (FCM) approach to CCA for establishing the allowed capital costs for BT.[9] The FCM approach, as set out in Table A26.1 above, seeks to maintain the financial capital of the firm, and hence the firm's ability to continue financing its functions. For modelling purposes, this involves including an allowance within the capital costs for the holding gains or losses associated with changes over the year in the value of the assets held by the firm, in addition to an allowance to undertake the capital expenditure (capex) required to retain the output capability of the firm's assets.

A26.29 Under the top-down modelling approach, we forecast steady state and additional capital costs separately. The purpose of steady state capex is to replace the assets that have come to the end of their life over the year, and therefore are disposed of, so that the firm can maintain its output capability in the steady state. Additional capex on the other hand is the investment in assets the firm makes to meet changes in demand.

[9] As opposed to the OCM approach which is explained in Table A26.1.

A26.30 Under our typical top-down modelling approach, steady state and additional capex interact in the following way:

- both steady state and additional (positive and negative) capex are derived from the gross replacement value (GRC) of the firm's asset base. This implies that steady state and additional capex (be that positive or negative) all relate to new assets, i.e. assets that are yet to have depreciated in value;[10]

- when volumes increase, the firm increases the size of its asset base by investing in positive additional capex in addition to steady state capex; and

- when volumes decrease, the firm decreases the size of its asset base by means of a flow of negative additional capex in addition to steady state capex. For modelling purposes, negative additional capex is either where the firm forgoes investing in steady state capex, or where it disposes some of its assets i.e. additional disposals:[11]

    - in the case of the former, modest volume decreases result in positive steady state capex being offset against negative additional capex such that the resulting total capex (steady state + additional) is positive, or at the limit, 0; and

    - in the case of the latter, greater volume decreases mean negative additional capex outweighs positive steady state capex, resulting in negative total capex. The value of negative total capex represents the forecast of additional disposals required to reduce the firm's asset base, in addition to the disposals that the firm makes in the steady state.

<u>Application of our typical capital forecasting approach to Ethernet and TI services</u>

A26.31 In markets where demand is stable and services are anticipated to be provided for the foreseeable future, the implementation of our typical top-down modelling approach is relatively straightforward.

A26.32 For example, in the case of Ethernet services we have forecast year-on-year increases in rental volumes between 2014/15 and 2018/19 (as set out in Annex 32). Our approach predicts that BT will invest in both steady state and positive additional capex for the purposes of supplying Ethernet services, such that new assets will be used both to replace assets that have come to the end of their lives and to meet the increases in demand.

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[10] In the base year, BT's steady state capex is set equal to OCM depreciation (see row 5 of Table A26.1). OCM depreciation is a function of the gross replacement cost (GRC) of the firm's assets (see row 1 of Table A26.1). In subsequent years, steady state capex is derived from the previous year's steady state capex, taking into account input price changes and efficiency. GRC represents the value of a firm's assets before taking into account depreciation. Additional capex (both positive and negative) is derived from the firm's GRC in the previous year. Both steady state and additional capex are then used to calculate steady state and additional GRC respectively. Steady state and additional GRC are used to derive net replacement costs (NRC) (see row 2 of Table A26.1), and ultimately return on mean capital employed. NRC reflects the value of a firm's assets taking into account the effect of depreciation. Hence, by deriving NRC from capex that has been calculated on the basis of the previous year's GRC, the top-down modelling approach assumes that all capex, (steady state, positive additional and negative additional) relates to assets that are yet to have depreciated in value.

[11] For example, where the firm sells its assets on the secondary market or redeploys them within its business.

A26.33 Similarly, in cases where volume declines are modest, the top-down modelling approach appears to forecast capital costs in a reasonable way. As both steady state and negative additional capex are valued on the same basis (the GRC value of the firm's asset base), offsetting steady state capex with some negative additional capex is equivalent to assuming that the firm can achieve a sufficient decrease in the size of its asset base by simply not replacing assets that reach the end of their lives, i.e. investing a lower amount of steady state capex (or at the limit, no steady state capex). We note that a lower amount of capex on new assets has the effect of increasing the average age of the firm's asset base over time, but do not consider this to be an unrealistic scenario in a declining market.

A26.34 On the other hand, where volume declines are so great that additional disposals are also required, as is the case for TI services, the application of our typical top-down approach may not necessarily realistically reflect the underlying changes in the asset base as a consequence of the volume changes. In particular, the value of the assets being removed in response to rapid volume declines may be different to the value of assets being acquired in stable or growing market situations. Due to the fact that negative additional capex is derived from the firm's GRC, our typical top-down approach implicitly assumes that the firm would reduce its asset base solely by disposing of new assets. This treatment is symmetric with how the value of the asset base is assumed to grow when volumes increase. However, while it may be reasonable to assume that the firm invests in new assets to meet new demand, it seems unreasonable to assume that any disposals beyond deferring steady state disposals will also involve new assets; by definition such disposals involve disposing of assets from within the existing asset base which will have been subject to some form of depreciation charge.

<u>We have amended the approach to additional disposals to more appropriately forecast capital costs when volumes are in rapid decline</u>

A26.35 Given the forecast rapid decline in demand for TI services, over the control period, and the potential limitations of our typical approach to forecasting capital costs in such circumstances (as set out above), we have considered whether adjustments to our typical capex forecasting equations are required for this control.

A26.36 In circumstances where volumes are in continuous decline and the end of production of the product or service is expected in the short to medium term, a firm in a competitive market would need to manage its asset base in order to have sufficient productive assets available to meet demand until it decides to cease production, but not too many as this would lead to productive inefficiency and, therefore, either losses and/or uncompetitive pricing.

A26.37 There is likely to be a broad range of possible asset portfolio mixes that the firm could adopt for managing its asset base until production ceases:

- the firm could operate a portfolio of relatively new assets of which a large proportion may therefore still have significant life, and therefore likely value, remaining when production ceases; or

- the firm could operate a portfolio of relatively older assets for which there would likely be fewer, if any, assets with life remaining when production ceases.

A26.38 The firm's choice of the asset age mix within its asset portfolio would normally affect the costs of production. Older assets are likely to require more maintenance expenditure (i.e. operating costs) to maintain their output capacity. Newer assets are likely to require less maintenance, but incur higher capital costs (e.g. return on capital employed) as newer assets usually have a higher value.[12] These impacts are typically related in well-functioning asset markets as the higher value of the newer assets reflects, at least in part, the lower operating costs. Where asset markets are well-functioning, we may expect the firm to be indifferent between operating a newer or older portfolio of assets. If the firm uses newer assets it will have higher capital costs and lower operating costs, but will need to dispose of the asset when production ceases to recover the residual value. If the firm uses older assets, it has higher operating costs but lower capital costs and a reduced requirement to dispose of the asset when production ceases.

A26.39 However, there may be reasons why the firm is not indifferent between the options and therefore would need to establish the profit maximising mix of asset age. The rational profit maximising firm would need to adopt an asset mix that minimises its costs of production by balancing the costs of acquiring, maintaining, financing and disposing of its assets. Relevant factors to this decision may include:

- **asset values may not accurately reflect maintenance costs**: although we would expect firms to be broadly indifferent between operating an older or newer portfolio of assets where asset markets are well-functioning, in practice asset values could over or under reflect maintenance costs. In such cases an optimal balance between maintenance and capital costs may need to be struck;

- **costs of disposal/redeployment**: firms may incur costs associated with disposing of, or redeploying, assets which will form part of the firm's profit maximising portfolio mix decision. Higher costs of disposal/redeployment are likely, all else being equal, to lead a profit maximising firm to adopt an older asset base;

- **risk of unexpected holding losses**: if the firm chooses to operate a relatively young mix of assets, there is likely to be a greater emphasis on disposing of those assets at the end of production. The value of the asset at any point in time will reflect an expectation of the potential other productive uses for that asset in the future. In a competitive market, the firm will price on the basis of this valuation. If this valuation turns out to be incorrect, the firm will experience unexpected holding gains (if the asset values are higher than expected) or losses (if the asset values are lower than expected) that would not necessarily be reflected in prices. Therefore, operating a relatively younger portfolio of assets is likely to introduce greater risks of cost recovery for the firm than an older portfolio of assets. We might expect a risk-averse firm to maintain an older portfolio of assets for this reason; and

- **penalties associated with poor service** – even with enhanced maintenance, it may be reasonable to assume that older assets may be more prone to failures which could disrupt quality of service. If service quality failures are associated with significant commercial implications, either through demand effects or through penalty payments, we would expect such risks to typically form part of the firm's

[12] Specifically, higher capital costs would likely result from the values of (i) the return on capital, as NRC should reflect the value of the assets in alternative uses (i.e. newer assets have a higher value than older assets); and (ii) depreciation charges, as the firm is likely to set depreciation profiles to allow it to recover the costs associated with the investments taking into account any (net) redeployment or disposal revenues at the end of production.

decision over its asset age mix. We would expect such risks to point towards a younger portfolio of assets.

A26.40 As is clear from above, some of these factors point to the optimal average asset age being lower, while others point to it being higher. Quantifying these various considerations in the context of the LLCC is difficult and impractical for the purposes of the 2016 LLCC. For the purposes of setting the charge control, we therefore propose a simplified, pragmatic approach in which we adopt the following assumptions:

- if the requirement for productive assets declines over time, i.e. volumes are reducing year-on-year, then we assume that BT manages the declining asset demand in the first instance by not investing in steady state capex. This is consistent with our typical top-down approach; and

- where the decline in demand for assets is so large that the decline cannot be met through forgoing steady state capex, we assume that BT will make additional disposals of averagely aged assets. The average age of BT's assets is derived from NRC:GRC ratios.[13] Table A26.3 below sets out the specific equation we use to calculate additional disposals.

A26.41 We consider that this approach strikes an appropriate balance between the potentially competing considerations.

Application of asset disposals approach to individual asset types

A26.42 BT has argued that it will be difficult in practice to dispose of certain asset types in response to the decline in TI volumes. As set out in Volume II Section 6, we consider that it is reasonable to assume that for the majority of asset types it will be possible for BT to make additional disposals by either redeploying the assets elsewhere in the BT business or selling the assets on secondary markets. For example, in the case of duct where a customer upgrades from a TI circuit to an Ethernet circuit, it is likely that the duct used to provide the TI service will be used to provide the Ethernet service. In the case of other asset types such as other network equipment[14], there may be opportunities to sell equipment on the secondary market. We have therefore applied the additional disposals approach to the following asset types:

- cable (i.e. fibre);

- duct;

- computers & OM;

- other network equipment;

- other;

- motor transport; and

[13] Due to circularity considerations, in practice we use the prior year NRC:GRC ratio.
[14] We understand that one of the main plant groups within other network equipment relates to the electronics equipment located at customers' premises.

- intangibles.

A26.43 In contrast, we consider that BT would likely face significant challenges in disposing of transmission and accommodation[15] assets. The application of the additional disposals approach to transmission and accommodation assets would imply that BT could quickly respond to volume declines by reducing the size of its SDH network. For the reasons set out in Volume II Section 6, we consider that in practice such a programme to rationalise BT's SDH network would likely take a significant period of time and result in transition costs. We consider that it would be necessary to take into account such transition costs to ensure that BT can recover its efficiently incurred costs. Recognising the practical difficulties of implementing the additional disposals approach with a transition cost allowance, we have decided to adopt an alternative approach that assumes that BT will largely retain its current SDH network over the forecasting period. Therefore in our modelling of TI transmission and accommodation assets we have assumed that:

- BT will not make any additional disposals in response to volume reductions; and

- BT will dispose of the assets that reach the end of their economic life and not replace them by investing in steady state capital expenditure.

2016 LLCC Model capital cost equations

A26.44 Table A26.2 below sets out the abbreviations used in the cost forecasting equations.

Table A26.2: Abbreviations used in cost forecasts

Abbreviation	Description
SS	Steady state
Add	Additional
Total [x]	Steady state [x] + Additional [x]
CVE/AVE	Cost-volume elasticity or Asset-volume elasticity
eff	Efficiency change percentage
Pay(t)	Pay operating costs in time period t
Non-pay(t)	Non-pay operating costs in time period t

A26.45 Table A26.3 below presents the steady state and additional capital cost equations used in the 2016 LLCC Model.

A26.46 As Table A26.3 shows, steady state costs are primarily driven by asset lives, forecast changes in input price and assumed improvements in efficiency, while additional costs are primarily driven by volume changes and the asset-volume and

[15] Accommodation assets are referred to as 'land and buildings' in BT's regulatory cost system.

cost-volume elasticities, as well as input price changes and efficiency improvements.

Table A26.3: Approach to forecasting steady state capital costs

Cost	Steady state (SS)[16]	Additional (Add)
GRC	SS GRC(t) = SS GRC(t-1) * [1 + IPC(t)] + SS Capex(t) – SS Disp(t)	Add GRC(t) = Add GRC(t-1) * [1 + IPC(t)] + Add Capex(t)
OCM dep	We assume straight line depreciation, and calculate as: SS OCM dep(t) = SS GRC(t) / asset life Where asset life is equal to the ratio GRC/OCM dep in the base year.	Add OCM dep(t) = Add GRC(t)/asset life
Cum OCM dep		Add Cum OCM dep(t) = Add Cum OCM dep(t-1) * [1 + IPC(t)] + Add OCM dep(t)
Capex	Base year capital expenditure is assumed to be equal to OCM dep. Subsequent years are calculated as: SS Capex(t) = SS Capex(t-1) * [1 + IPC(t)] * (1 – eff)	It is assumed Add Capex is required where: SS Capex(t) + Add Capex ≥ 0. Add Capex(t) = total GRC(t-1) * [1+IPC(t)] * AVE * %change vol(t) * (1 – eff)
Disp	Base year disposals are assumed to be equal to OCM dep. Subsequent years are calculated as: SS Disp(t) = SS Disp(t-1) * [1 + IPC(t)]	It is assumed Add disposals are required where: SS Capex(t) + Add Capex <0. (No Add disposals applied to Transmission and Land & Buildings assets) Add Disp(t) = ([SS Capex(t) + Add Capex] * NRC/GRC(t-1)) - SS Capex(t)
NRC	SS NRC(t) = SS NRC(t-1) * [1 + IPC (t)] + SS Capex (t) – SS OCM dep (t)	Add NRC(t) = Add GRC(t) – Add Cum OCM dep(t)
NCA	NCA(t) = NCA(t-1) * [1+ volume change %] * [1 + Inflation]	
HGL	HGL(t) = -SS NRC(t-1) * IPC(t)	Add HGL(t) = -Add NRC(t-1) * IPC(t)
Return on capital	Return on capital (t) = [NRC(t) + NCA(t) + HGL(t)] * pre-tax nominal WACC	

A26.47 As mentioned above, we have forecast the total capital cost as the sum of the steady state and additional elements for each cost category set out in Table A26.3 above.

Forecasting of operating costs

A26.48 Table A26.4 below presents the equations used in the 2016 LLCC Model to forecast operating costs. Under our approach, operating cost forecasts are driven by forecast volume changes and CVEs, in addition to forecast changes in input price changes and assumed improvements in efficiency.

[16] Base year values of GRC, OCM dep, NRC, NCA and HGL are taken from BT's responses to s135 information requests and include the Ofcom base year adjustments set out in Annex 27. Subsequent years are forecast using the equations set out in Table A26.3.

Table A26.4: Approach to forecasting operating costs

Calculation	Description[17]
Pay	Pay(t) = Pay(t-1) * [1 – eff] * [1 + IPC(t)] * [1 + %volume change(t) * CVE]
Non-pay	Non-pay(t) = Non-pay(t-1) * [1 – eff] * [1 + IPC(t)] * [1 + volume change %(t)* CVE]

A26.49 Annex 29 provides details of our assumptions on operating cost efficiency. Annex 32 provides details on the volume forecasts, CVEs and input price changes used to forecast operating costs.

Network component costs and administrative and other costs

A26.50 We obtained base year cost data from BT disaggregated to the service and component levels. We also obtained from BT matrices of usage factors that allow us to convert component level costs into service level costs. BT's regulatory costing systems record two distinct types of costs:

- network component costs – the calculation of the cost of service provision represents the utilisation of one or more network components which have measurable cost drivers in the form of cost usage factors. Such costs are therefore determined by an attribution of component costs;[18] and
- administrative and other costs (admin) – the calculation of the cost of service provision represents a top-down allocation, for example, on a pro-rata basis using full-time equivalents (FTEs). As such, BT has not identified cost drivers for such costs and the cost usage factors reported in the RFS represent the percentages of admin component costs that have been attributed to services.[19]

A26.51 For network component costs, our standard approach is to forecast costs on a component-by-component basis using the equations set out in Tables A26.3 and A26.4 above. The inputs and assumptions used for these calculations (e.g. volumes, input price changes and CVEs and AVEs) are therefore also on a component-by-component basis. In order to calculate component volumes, we applied volume usage factors to our forecast of service volumes. Usage factors are therefore an important input to our cost modelling. Below we provide details on the usage factors used in the modelling.

A26.52 For admin costs, we forecast costs on a service-by-service basis as it is not possible to convert component level costs to service level costs using usage factors. In order to forecast these costs, we have taken the base year allocations of admin components to services provided by BT and have applied the equations set out in Tables A26.3 and A26.4 above. As some of the forecasting inputs we use

[17] Base year values of Pay and Non-pay operating costs are taken from BT's responses to s135 information requests and include the Ofcom base year adjustments set out in Annex 27. Subsequent years are forecast using the equations set out in Table A26.4.

[18] BT, *Detailed Attribution Methodology (DAM) 2014*, 2014, p. 206. https://www.btplc.com/Thegroup/RegulatoryandPublicaffairs/Financialstatements/2014/DAM2014.pdf

[19] For example, see SG&A partial private circuits in Appendix 1.1, page 128 and explanation of footnote (a) on page 147 of BT's 2013/14 RFS. http://www.btplc.com/Thegroup/RegulatoryandPublicaffairs/Financialstatements/2014/Current_Cost_Financial_Statement_2014.pdf

have been provided by BT on a component-by-component basis (e.g. AVEs and CVEs, input price changes), we have converted them to the service level by weighting component level data by the relevant service costs. For example, we have calculated service pay operating cost CVEs by weighting component pay CVEs by base year service pay operating costs.

Calculation of total service cost forecasts

A26.53 In order to calculate cost forecasts for the charge control baskets, it is first necessary to convert the forecasts of network component costs into service costs. We do this by carrying out the following steps:

- Unit component costs(t) = component costs(t) / component volumes(t);
- Unit service *a* costs(t) = matrix multiplication of unit component costs(t) and cost usage factors by service *a* for each of the components; and
- Service *a* costs(t) = unit service *a* costs(t) * service *a* volumes(t).

A26.54 We then calculate forecasts of total service costs by summing the service cost forecasts of these network component costs and the service-level admin costs described above.

Dark fibre cost uplift

A26.55 In order to ensure that following the introduction of dark fibre BT continues to have the opportunity to recover efficiently incurred costs from regulated services, we consider it necessary to make an adjustment to the cost forecast of the Ethernet basket. In particular, we have taken into account the following three impacts of the dark fibre remedy:

- The lost contribution to common costs from cannibalised active circuits as a result of migration to dark fibre products.[20] We explain how we have calculated this uplift (which reflects differences in forecasts of fixed and common costs and variable passive component costs between EAD 1Gbit/s (upon which the dark fibre price is based) and those circuits which are forecast to migrate to dark fibre) in Annex 33. This results in £1.3m of costs that we add to the Ethernet basket in the final year of the control.
- Stranded assets due to cannibalisation of existing circuits. These costs can be considered as holding losses for some assets due to the implementation of dark fibre. We discuss why these costs are relevant and how much they amount to in Annex 33. This results in an uplift to the Ethernet basket of £0.7m in the final year of the control.
- Implementation and development costs of the dark fibre remedy (e.g. for changes to BT's internal planning and billing systems, and additional operational and training and spend). We set out in Annex 33 our calculation of these costs, which result in an uplift to the Ethernet basket of [✂] in dark fibre development costs in the final year of the charge control.

[20] The rationale for including these costs in the Ethernet basket is set out in Annex 33.

A26.56 Therefore we have uplifted the Ethernet basket cost stack in the final year of the control by £[✂] in total, or about [✂]% of Ethernet basket costs, in order to provide BT with an opportunity to recover its efficiently incurred costs.

Calculating the value of X

A26.57 Having selected the appropriate services to include in the charge control baskets, the model calculates total basket costs and total basket revenues (absent a charge control):

- Total basket costs(t) = Sum of individual service costs(t); and
- Total basket revenues(t) in the absence of a charge control = Prices(0) * Service volumes(t), where Price(0) is the start charge for each service.

A26.58 To determine the value of X for each basket, the model compares the total costs and revenues, expressed in real terms (2015/16 prices), in the final year of the charge control.

A26.59 The start charges used to forecast revenues are the service prices in 2015/16, adjusted to take into account the start charge adjustments outlined above. In effect, we forecast revenues in the absence of a charge control.

A26.60 The model forecasts costs on a nominal basis. In order to ensure costs are expressed on the same basis as revenues (i.e. 2015/16 prices), we have applied a forecast CPI deflator to forecast costs, using 2015/16 as the base year. We have used the average of independent forecasts of CPI compiled by HM Treasury.[21]

A26.61 We calculate the value of X as follows:

$$X = ((\text{Costs}_T \,/\, [\text{Price}_0 * \text{Volumes}_T])^{1/3} - 1) * (1 + \text{Inflation}_{Avg})$$

Where:

Costs_T = Forecast costs at the end of the charge control (2018/19)

Price_0 = Service prices at the start of the charge control (2015/16)

Volumes_T = Service volumes at the end of the charge control.

Inflation_{Avg} = Geometric average of forecast inflation during the charge control period[22]

A26.62 The term "* (1 + Inflation_{Avg})" is applied when calculating the value of X to enable the resulting X value to be applied to prices as a CPI-X price cap.[23]

A26.63 Finally, we round the calculated values of X to the nearest 0.25%, consistent with the approach adopted in the March 2013 BCMR Statement.

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[21] HM Treasury, *Forecasts for the UK economy*, February 2016, Page 16, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/500929/201602_Forecomp_February_2016_v2.pdf

[22] The value of CPI forecast for each of these years is 1.2%, 1.9% and 2.0%, giving a (geometric) average of 1.69% over the period.

[23] It makes use of the Fisher Equation.

Detailed modelling issues

A26.64 In this section, we discuss below how we have approached a number of detailed modelling issues concerning the following:

- level of aggregation used in the model;
- calculation of usage factors;
- modelling of revenues;
- calculation of holding gains/losses;
- implementation of MEA approach;
- implementation of dynamic elasticities; and
- geographic cost adjustments.

Level of aggregation used in the model

Ethernet services

A26.65 In the 2014/15 RFS, BT reports the costs of regulated leased lines on what it refers to as a service level (see annex 11 of the 2014/15 RFS) and a component level (see annex 17 of the 2014/15 RFS).[24] Both of these measures have been subject to a degree of aggregation by BT. In building the 2016 LLCC Model, we considered the appropriate level of aggregation to use.

A26.66 The components reported in the RFS are in fact super-components, which are made up of more detailed components. For example, the 'Wholesale & LAN extension services fibre etc.' (ICO450) super-component that is used by Ethernet services is made up of twelve components that include 'Ethernet Access Direct fibre' (CW609), 'OR systems & development – Ethernet' (CO772) and 'Other Ethernet rentals – internal' (CW617). The ICO450 super-component unit cost reported in Annex 15 of the RFS is therefore a weighted average of the unit costs of its constituent components.

A26.67 Our general view is that the use of more disaggregated input data is likely to provide more accurate forecasts of costs. For example, if the relative weights of the components that make up a super-component were to change over the forecasting period,[25] the base year super-component unit costs implied by the usage factors may not be representative of super-component unit costs in subsequent years. As a result, we gathered cost and usage factor data from BT on a cost component basis (rather than on a super-component basis). In light of this, in the 2016 LLCC Model we have forecast Ethernet network component costs at the component level (rather than the super-component level).

[24] BT's 2014/15 RFS, section 8 "Review of Business Connectivity Markets", Annexes 11 and 17. http://www.btplc.com/Thegroup/RegulatoryandPublicaffairs/Financialstatements/2015/RevisedCurrentCostFinancialStatements2015.pdf
[25] For example, due to a change in the volume mix of services using the various components.

TI services

A26.68 As explained, in Volume II, Section 6, we consider it necessary to forecast TI service capital costs by splitting the TI components into their constituent asset types.[26] This is a more complex and detailed approach that is a departure from our standard approach to forecasting BT's costs at the component level. However, we consider that this approach is warranted due to the apparent risk to forecast accuracy associated with averaging errors when forecasting TI service capital costs at the component level. The potential for averaging errors appears to be particularly high for TI services because:

- TI components reflect a broad mix of inputs each of which responds differently to volume changes; and
- the forecast reduction in the volume of TI services during the control period is particularly large.

A26.69 Asset types, on the other hand, are groupings of cost categories that are similar in nature and more likely to respond in a similar way to volume changes (i.e. the AVEs of cost categories within an asset type are likely to be similar). In light of this, we have addressed the averaging issue by modelling TI capital costs as follows:

- we disaggregate each of the TI network component capital costs into their various constituent asset types;
- we then calculate a separate cost forecast for each asset type using the specific asset type AVEs; and
- finally, we sum up the asset type cost forecasts to aggregate back up to the component level.

A26.70 As in the November 2015 LLCC Consultation, due to the complexity of modelling on an asset type basis, for the statement we have forecast only network component costs in this way. Our forecast of TI network component costs is contained in a simplified cost model, entitled "2016 TI cost forecast model", which uses 2014/15 as the base year and uses the same forecasting methodology as the main 2016 LLCC Model (save for the level of aggregation). In order to take into account admin costs, we have applied an uplift to the network component cost forecasts based on the split between TI network component costs and admin costs. As network component costs represent the majority of costs for the TI basket (about 93%), we consider that this approach provides a practical way of addressing this issue, whilst ensuring that any loss in accuracy is minimal.

Level of service aggregation

A26.71 As set out in paragraph A26.57, in order to calculate cost forecasts for the charge control baskets, we convert forecasts of network component costs into forecasts of service costs (using cost usage factors). In addition, as set out in paragraph A26.52, we forecast the costs of admin components at the service level. Therefore it is also necessary for us to select an appropriate level of aggregation for services.

[26] We have, however, retained our typical forecasting approach for TI operating costs (i.e. we forecast them at the component level).

A26.72 The services reported in the RFS are in fact groupings of more disaggregated service variants sold by BT. For example, the WES 100Mbit/s rentals services BT reports are made up of standard WES 100Mbit/s rentals, WES Local Access 100Mbit/s rentals and WES Aggregation 100Mbit/s rentals. While BT records volume and pricing data on the basis of individual service, we understand that it is not possible for BT to provide cost and usage factor data to the same level of disaggregation.[27] As a result, in the model we have forecast costs at the service group level, which implicitly assumes the mix of service variants within service groups will remain constant over the forecasting period. In order to ensure that revenues are forecast on the same basis as costs, we have aggregated the volume and pricing data to the service group level. Below we provide details of our approach to modelling revenues.

Calculation of usage factors

A26.73 We received base year data from BT in the form of service level costs, split by component. We also gathered from BT matrices of usage factors that describe how much component costs/volumes are used to provide TI and Ethernet services. As the 2016 LLCC Model forecasts costs on the basis of both components and services, we rely on usage factors to accurately:

- convert (network) component level costs to service level costs and vice-versa; and
- convert service volumes to component volumes and vice-versa.

A26.74 In the 2016 LLCC Model, we used the cost usage factors we calculated on the basis of the Ofcom adjusted base year cost data. To do this, we built a matrix of unit costs split by components and services and divided the unit cost of each component-to-service combination by the relevant total component unit cost. We found that the results of this calculation reconciled with the cost usage factors submitted by BT and were largely consistent with the usage factors that can be derived from Annex 16 of the 2014/15 RFS. As an additional check, we used the calculated cost usage factors to convert base year component level costs to service level costs,[28] and found that the total level of service costs post-conversion reconciled to the total level of component costs pre-conversion.

A26.75 We have used the volume usage factors that BT provided. In order to check the accuracy of the volume usage factors, we calculated component volumes by summing the product of the volumes of each service and the relevant component-to-service volume usage factors. We found that the results of this check calculation were largely consistent with the super-component volumes reported in Annex 15 of the 2014/15 RFS.

[27] This is because BT's regulatory cost system, ASPIRE, uses broadly the same level of service disaggregation reported in the RFS.

[28] Using the approach set out above: (i) Unit component costs(t) = component costs(t) / component volumes(t); (ii) Unit service a costs(t) = matrix multiplication of unit component costs(t) and cost usage factors by service a for each of the components; and (iii) Service a costs(t) = unit service a costs(t) * service volumes(t).

Modelling of revenues

Service aggregation

A26.76 As we implement a top-down model, we forecast costs and revenues for the leased line services that are reported in BT's regulatory accounts. In some cases, these reported services (or service groups) aggregate a number of individual services which sometimes have different charges. For example, the regulatory reports for external EBD 1000Mbit/s rentals outside the WECLA include both the standard and extended reach products for three different bands (A, B and C). Although each of these has a different charge, our model requires a single charge in order to ensure that service revenues are consistent with costs.[29]

A26.77 In order to calculate a single charge for a service group that encompasses several charges, we calculate a charge that is weighted by the volumes reported in the 2014/15 financial year (which is our base year). For example, if a reported service includes two charges (£500 for A and £1,000 for B) and the relevant 2014/15 volumes were 100 for A and 50 for B, then the weighted average charge would be £666.67.[30] As we use charges at the end of the current control period as our starting point to determine charges for the entire duration of the next control, this means that we are implicitly assuming that within a service group the relative proportions of different variants are constant over time.

A26.78 Although this represents a simplification, it is consistent with our cost forecasts, which also assume the same mix over time.[31] Furthermore, in the majority of cases where a reported service group includes several charges, there is usually one particular charge that accounts for the majority of 2014/15 volumes; for example in the case of external EBD rentals outside the WECLA, the standard band A variant accounted for around 70% of volumes in 2014/15.

Ethernet Service Charges

2015/16 charges

A26.79 As discussed above, for this Statement our starting point for determining charges during the control period is to use the most recent charges, which will be in effect on 31 March 2016 (i.e. at the end of the current control).

A26.80 We requested Openreach's most recent version of its compliance spreadsheet for Ethernet services outside the WECLA. This showed that, based on prior period revenues, Openreach does not need to make any additional price reductions to comply with the existing control for 2015/16.

ECC Connection Charge

A26.81 As discussed in Volume II Section 8, in May 2014 we implemented a Direction that allowed Openreach to exempt new provisions of EAD services from the first £2,800 of ECCs and to make up the resulting loss of its revenue with a balancing charge of

[29] As BT does not report costs at the disaggregated level (e.g. it does not report costs separately for different EBD bands), we cannot model service costs on this basis.
[30] As A accounted for two-thirds of volumes, the weighted charge is £500*0.67+£1000*0.33=£666.67.
[31] It is not possible to forecast costs assuming a different mix for a service group because we do not have the information to calculate how the relevant component usage factors would change.

£548 on new EAD connections. For the purposes of assessing compliance with the 2013 LLCC, the Direction allowed BT to exclude £548 from its published price list for EAD connections. As we continue to control ECC charges and the balancing charge outside of the Ethernet basket, we have excluded the £548 charge from all EAD connections in our model.

Discounts

A26.82 As set out in Annex 34, Openreach currently offers 5 and 7 year term discounts on certain EAD products. We have decided that such discounts will not count towards the charge control and will not be included in the starting charges.[32] In modelling the starting charges, we have assumed that the charges for a 5 or 7 year term product are the same as the equivalent 1 year standard products. Given that the magnitudes of Openreach's current discounts are relatively small (as discussed in Annex 34) the decision to exclude discounts does not have a material impact on the overall level of charges.

TI Service Charges

RBS, SiteConnect and NetStream charges

A26.83 Although we forecast the costs and volumes of different elements of RBS, SiteConnect and NetStream (i.e. for local ends, links, distribution and regional trunk) BT Wholesale's rental charges are simplified so that there is a simple charge based on bandwidth and distance. In order to calculate charges for these services, BT Wholesale calculates total revenues and divides these by circuit volumes; the charges are then reported against the local end services.[33] We therefore apply the overall charge for RBS, SiteConnect and NetStream services against the local end. Although this means that revenues do not match costs for each individual service (i.e. revenues will be overstated for local ends and understated for links, distribution and trunk), they will match in aggregate.

Enhanced Maintenance

A26.84 PPC customers have the option to pay additional charges for enhanced maintenance. These charges are published on the BT Wholesale Carrier Price list and are raised on a per circuit basis. BT's regulatory accounts make an allocation each year to match revenue from enhanced maintenance with the local end and Main Link services published in the RFS.[34] We have therefore used this information to apply an uplift to PPC charges where enhanced maintenance revenues have been allocated. For example, if the enhanced maintenance charge for an internal 2Mbit/s PPC local end was £200 and the 2014/15 regulatory accounts include a 50% allocation of enhanced maintenance charges to this service, we add £100 (£200*50%) to the standard local end charge.

Services without charges

A26.85 There are some services in our model where we (and BT) are unable to map a relevant charge from BT Wholesale's price list. These accounted for around 3% of

[32] As detailed in Annex 34, whereas we have decided not to count term discounted products towards compliance, we have allowed three and five year products subject to the Total Cost of Ownership (TCO) restriction to count towards compliance.
[33] BT response to 1st s135 notice dated 7 August 2014, question A1.
[34] BT response to 13th s135 notice dated 26 February 2015, question A2.

low bandwidth TI revenues in 2014/15.[35] The majority of these relate to separation and diversity, where BT captures certain revenues that are not included in the protected path service groups, and third party equipment services.[36] Given that we cannot use a charge in BT Wholesale's price list for these services, we instead use average revenues based on 2013/14 data.[37]

Calculation of holding gains/losses

June 2015 Consultation

A26.86 We proposed to calculate the asset price change for each component on the basis of the average asset price change across all cost categories, weighted by their respective gross replacement cost values. Holding gains/losses are then calculated by applying the forecast asset price changes to the net replacement cost of assets for each year. As duct and copper cable assets were forecast to increase in line with RPI and all other assets were forecast to have zero nominal price changes, this resulted in a forecast of a small holding gain in each year.

Stakeholder comments

A26.87 In its response to the June 2015 LLCC Consultation, BT argued that the change in Ofcom's modelling approach from real to nominal has caused an error in the calculation of the holding losses over the control period. BT argued that because nominal holding losses are close to zero, the implied real holding losses (calculated as: nominal holding gain/loss / (1 + CPI)) are also close to zero. BT considers that Ofcom's method of converting the holding loss from nominal to real may be incorrect. BT argued that as CPI inflation is higher than the majority of nominal asset price changes, there should be a real holding loss added to the cost stack.[38]

Our conclusions

A26.88 BT is concerned that the effect of general inflation has not been correctly taken into account when calculating holding gains/losses. Below, we explain that we consider that the effect of inflation is correctly taken into account. In short, as the 2016 LLCC Model is in nominal terms, the effect of inflation on the value of BT's assets is taken into account in the WACC, instead of in holding gains/losses.

A26.89 Under our approach to charge controls, the 'X' per cent by which BT is required to change its prices is over and above the impact of general price inflation (as measured by CPI). All charge control models therefore need to rebase the cost forecast to remove the impact of general inflation before setting the 'X'. There are broadly speaking two approaches to doing this within the model:

- to forecast costs throughout the model by expressing all relevant inputs relative to the price index used for the control (i.e. CPI) – this is commonly referred to as modelling in 'real terms'; or

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[35] BT response to 13th s135 notice dated 26 February 2015, question B1;
BT response to 19th s135 notice dated 11 May 2015, questions F2-F4.
[36] Email dated 24 April 2015 from [✂] (BT) to [✂] (Ofcom), entitled 'RE: POH meeting notes and housekeeping issues', subsequently confirmed in BT's response to 19th s135 notice dated 11 May 2015, questions F2-F4.
[37] We consider that updating to 2014/15 is unlikely to make a material difference.
[38] BT Response to June 2015 LLCC Consultation, paragraphs 98 to 102.

- to forecast the various elements of the cost forecast without taking into account the effect of general inflation,[39] but to then deflate the cost forecasts (and key components of them) by the chosen inflation forecast just before calculating 'X' – this is commonly referred to as modelling in 'nominal terms'.

A26.90 We have modelled the 2016 LLCC in nominal terms. One of the key differences between this approach and the real terms approach is where in the cost stack general inflation is taken into account. Under the nominal terms approach, inflation is taken into account by applying a 'real' WACC to BT's asset base. The real WACC includes the effect of inflation:

$$(1 + \text{WACC}^{\text{Nominal}}) = (1 + \text{WACC}^{\text{Real}}) * (1 + \text{Inflation})$$

A26.91 Under the real terms approach, the WACC does not include the effect of inflation. However, under this approach the effect of inflation on the value of BT's assets is taken into account as the holding gain/loss will be based on changes in real asset price changes (i.e. including the effect of inflation). It does not make any difference whether general inflation is taken into account in the WACC (as in the nominal terms approach) or in holding gains/losses (as in the real terms approach).

A26.92 To illustrate, consider an example where nominal asset price changes are zero and the rate of general inflation is +1%, meaning that real asset price changes are -0.99%.[40] In this example, the real WACC is 9.0%, resulting in a nominal WACC of 10.09%.[41] In addition, let us assume that the firm's asset base in year t-1 equals 1000 and there is no year-on-year volume growth or efficiency meaning that NRC in year t is simply calculated as NRC(t-1) * (1 + nominal asset price changes). Under a nominal terms approach:

- the NRC in year t would remain at 1000 (calculated as 1000 * (1 + 0%);
- the holding gain/loss would be zero (calculated as –(1000 * 0%);
- the nominal return on capital employed would be 100.9 (calculated as (1000 + 0) * 10.09%);
- the real holding gain/loss would be zero (calculated as 0 / (1 + 1%);
- the real return on capital employed would be 99.9 (calculated as 100.9 / (1 + 1%));
- The total holding gain/loss + return on capital employed would be 99.9 (calculated as 0 + 99.9).

A26.93 Under a real terms approach:

- the NRC in year t would be 990.1 (calculated as 1000 * (1 – 0.99%);

[39] Whereas general inflation is not taken into account at this stage of the process, nominal asset price inflation and nominal operating cost inflation are taken into account.
[40] Applying the Fisher Equation, Real asset price change = (1 + nominal asset price change) / (1 + inflation)) - 1
[41] Applying the Fisher Equation, Nominal WACC = (1 + Real WACC) * (1 + inflation) – 1: (1 + 9.0%) * (1 + 1.0%) = 10.1%.

- the holding loss would be 9.9 (calculated as –(1000 * -0.99%);
- the real return on capital employed would be 90.0 (calculated as (990.1 + 9.9) * 9%);
- The total holding gain/loss + return on capital employed would be 99.9 (calculated as 9.9 + 90.0).

A26.94 This example shows that the two approaches produce consistent forecasts of capital costs. We note that in order for the nominal terms to give exactly the same cost forecast as the real terms approach, it is necessary to include holding gains/losses in the calculation of return on capital employed. Hence, in the 2016 LLCC we have amended the formula for return on capital employed as follows:

Return on capital(t) = [NRC(t) + NCA(t) + HGL(t)] * nominal WACC[42]

A26.95 In light of the above, we have decided to maintain the approach of using the nominal terms approach for the 2016 LLCC. We consider that the consistent application of inflation across holding gains/losses and WACC will ensure that BT (and its investors) will receive a return to cover inflation, and that this return is received only once.

Implementation of MEA approach

A26.96 As discussed in Volume I Section 5, we have decided to adopt a MEA approach for the purposes of modelling the costs of legacy WES and BES services up to and including 1Gbit/s. We have modelled the costs of these services using the costs of what we consider to be the modern equivalent, following a similar modelling methodology and product mapping to what was used in the 2013 LLCC.[43] We note that this mapping is independent of the actual decisions that customers may make when transitioning from legacy to new services and whether they take the opportunity to upgrade their bandwidth at the same time.

A26.97 Table A26.5 below shows the mapping rules we have adopted for the purposes of forecasting the costs of providing WES and BES services up to and including 1Gbit/s. For example, the cost of a WES 10Mbit/s service has been set with reference to an EAD 10Mbit/s service.

[42] We note that this change to the return on capital equation has an immaterial effect on the X values for the 2016 LLCC.

[43] Ofcom, Business Connectivity Market Review, *Review of retail leased lines, wholesale symmetric broadband origination and wholesale trunk segments,* Statement, 28 March 2013. Paragraphs A12.62-A12.66, http://stakeholders.ofcom.org.uk/consultations/business-connectivity-mr/?a=0.

Table A26.5: Mapping of services between legacy and newer Ethernet services

Legacy service	MEA equivalent
WES 10Mbit/s	EAD 10Mbit/s
WES 100Mbit/s	EAD 100Mbit/s
WES Other	EAD 100Mbit/s
WES 1Gbit/s	EAD 1Gbit/s
BES Other	EAD 100Mbit/s
BES 1Gbit/s	EAD 1Gbit/s

A26.98 Having applied this mapping, we carry out the following steps to forecast costs under the MEA assumption within the 2016 LLCC Model:

- we produce two service volume forecasts: (A) without MEA mapping, and (B) with MEA mapping;
- we apply volume usage factors to service volume forecasts (A) to generate component volume forecasts;
- we forecast total network component costs using the component volume forecasts on the basis of the forecasting equation set out in Tables A26.3 and A26.4, and calculate unit network component costs by dividing by the component volumes;
- these are converted into unit service costs by applying cost usage factors; and
- we calculate the forecast of total service costs by multiplying the unit costs by service volume forecast (B) (i.e. volume forecasts with MEA mapping applied).

A26.99 In short, the 2016 LLCC Model forecasts component costs assuming there is no MEA assumption. Service volume forecasts which include the MEA assumption are then applied to service unit costs once costs have already been forecast on a component basis. This ensures that the model produces realistic forecasts of component costs, i.e. that the forecasts do not reflect economies/diseconomies of scale that are purely the result of our assumptions on the mapping of legacy Ethernet services to the MEA services. This is consistent with the approach adopted in the 2013 LLCC.

Implementation of dynamic elasticities

A26.100 As set out in Volume II Sections 5 and 6, we have forecast costs using dynamic CVEs and AVEs that adapt to the changing mix of incremental and fixed and common costs over the control period.

A26.101 To forecast operating costs, we have applied the dynamic AVEs approach in the following way:

- we estimate the implied fixed and common operating costs for each component in the base year using the component pay and non-pay CVEs[44];

- the base year fixed and common costs for the component operating costs are forecast to 2018/19 by taking into account assumed efficiency and pay and non-pay input price changes in each year[45];

- the implied incremental costs for the component in each year are calculated as the total costs less the fixed and common costs in that year;

- the CVE for each component for year t is then calculated as the ratio of the incremental costs to the total operating costs in year t-1[46]; and

- the CVE for the component in year t is used to forecast the total costs in year t.

A26.102 Our approach to adapting AVEs follows a similar logic to the approach to adapting CVEs set out above, but is necessarily more complex given the more complex nature of forecasting capital costs. As noted above, the total component cost stack comprises of three capital cost items:

- OCM depreciation, which is derived from the GRC value of the asset base;

- return on capital employed, which is derived from the NRC value of the asset base; and

- holding gains and losses, which are also derived from the NRC value of the asset base.

A26.103 Therefore, both the GRC and NRC values of the asset base are important to our cost forecast. However, as we set out above, it is the GRC value of the asset base that is most relevant to estimating the AVEs applied in our modelling. The NRC value of the assets is derived from the GRC, taking into account capex and depreciation.

A26.104 We therefore propose to calculate adjusted component AVEs as follows:

- we estimate the implied fixed and common GRC for each component in the base year using the base year component AVE;

- we forecast how the fixed and common GRC will change with efficiency and input price changes using our GRC forecasting equation[47], assuming that component volumes are unchanged;

- the implied incremental GRC for the component in each year is then calculated as the total GRC less the fixed and common GRC in that year;

- the AVE for each component for year t is then calculated as the ratio of the incremental GRC to the total GRC in year t; and

[44] Separately for pay and non-pay operating costs.
[45] i.e. Fixed and common costs in time t (FCC_t)= $FCCt_{-1}$*(1-efficiency)*(1+input price changes).
[46] Again this is done separately for pay and non-pay operating costs.
[47] As set out in Table A26.3.

- the AVE for the component in year t is used to forecast the total GRC (and therefore also NRC) in year t-1.

A26.105 This approach will ensure that in each year of the forecast the AVE will adapt to maintain the base year level of fixed and common GRC, save for input price changes and efficiency improvements. For the NRC value of BT's TI assets, this approach will ensure that the base year level of fixed and common costs is maintained, save for these factors and, in addition, for accumulated depreciation. We have decided not to impose a floor on total NRC as we consider that it is realistic to assume that a firm operating in a declining market would allow its asset base to depreciate over time. We note that the removal of a floor on NRC has a relatively small impact on the value of X and has the benefit of reducing some of the complexity of the TI cost forecasting.

Geographic adjustments

London Periphery

A26.106 In the March 2013 BCMR Statement, we defined a separate geographic market for low bandwidth AISBO services and MISBO services supplied to customers in the WECLA. We found that BT did not have SMP in the provision of MISBO services in the WECLA, while for low bandwidth AISBO services we found SMP and imposed a safeguard cap of CPI-CPI. As a result, our Ethernet charge control did not apply to services within the WECLA.[48] The current charge control basket for Ethernet therefore includes all Ethernet services outside the WECLA and BT's regulatory accounts report separate revenues and costs for Ethernet services in and outside the WECLA. As we have designed a top-down model, this means that our cost and revenue forecasts for individual services are also distinguished geographically, based on whether they are inside or outside the WECLA.

A26.107 In Volume 1, we have defined four geographic markets (Hull, the CLA, London Periphery (LP) and the rest of the UK excluding these three areas) for CISBO services. We have found that BT does not have SMP in the provision of these services in the CLA and the Hull area and that it has SMP in the other two geographic markets. Our charge control remedy for Ethernet services therefore applies to the LP and the rest of the UK excluding Hull. We have also defined additional BT exchanges and data centres as core network nodes within the CI market.[49]

A26.108 As the scope of our charge control includes the LP, which is part of the geographic market currently defined as WECLA, we need to ensure that services in this area are captured in our charge control model.

Volume adjustment

A26.109 In terms of adjusting the model to include services in the LP, we have analysed the circuit data inventory that BT submitted as part of the BCMR, which includes details of all Openreach Ethernet circuits as of March 2014, including the geographic location (postcode) of each circuit-end.[50] We have used this data to identify the

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[48] Section 21, March 2013 BCMR Statement.
[49] Section 4, Volume 1.
[50] BT response to 1st BCMR s135 notice dated 7 March 2014, question A1.

proportion of circuits in the WECLA that are in the CLA and the LP. We have done so according to the implementation of the current remedy, which is as follows:

- wholesale end to end services (i.e. circuits between two end-user sites) – should be classified as inside the WECLA only if both end-users sites are in the WECLA and other circuits should be classified as outside the WECLA (i.e. if one or more sites are outside the WECLA); and

- other circuits (i.e. circuits between an end-user site and a network node or between network nodes) – should be classified as being in the WECLA if the end user site is within the WECLA or in the case of backhaul circuits if the remote end of a backhaul circuit is within the WECLA.[51]

A26.110 We have therefore categorised WECLA circuits as being in the CLA as follows:

- end-to-end services between two end-user sites are classified as being in the CLA only if both ends are in the CLA;

- circuits between an end-user site and a network node are classified as being in the CLA if the customer site is in the CLA;

- circuits between two network nodes – in this case we do not know which is the remote end so we cannot identify whether it should be in the CLA. Given that the CLA includes a larger number of network and core nodes, we assume that these circuits are in the CLA. In practice, the number of circuits between two network nodes that have one end in the LP and one in the CLA is small (around 1 per cent of circuits in the WECLA) so this assumption does not make a material difference.

A26.111 All WECLA circuits that are not classified as being in the CLA are assumed to be in the LP. Having categorised these circuits accordingly, we can then estimate the proportion of different circuit types (e.g. EAD 100Mbit/s, EAD LA 1000Mbit/s, etc.) in the WECLA that are in the LP. Our estimates for circuits with material volumes range from 20 to 30%. We then use this information to reallocate a proportion of WECLA volumes in our model to the geographic area outside the CLA. For example, if 10% of EAD10Mbit/s volumes in the WECLA are in the LP, then in our model we reallocate 10% of EAD 10Mbit/s rentals in the WECLA service code to the EAD10Mbit/s service code outside the CLA.[52] We apply this reallocation to both our base year volumes and our volume forecasts (i.e. in each year of the control).

A26.112 The BCMR circuit data does not distinguish between internal and external sales and it only includes rentals. We therefore apply the same proportions for internal and external rentals and connections; for example, if 10% of EAD 10Mbit/s volumes in the WECLA are in the LP, then we apply a 10% reallocation to internal and external EAD10Mbit/s rentals and connections.

[51] Ofcom, *Business Connectivity Market Review, Review of retail leased lines, wholesale symmetric broadband origination and wholesale trunk segments, Statement, 2013,* paragraph 12.25, http://stakeholders.ofcom.org.uk/consultations/business-connectivity-mr/?a=0

[52] We use proportions rather than the absolute volumes because the circuit data we received in the BCMR does not fully reconcile with the volumes in BT's 2014/15 regulatory accounts. This is partly due to differences in timing (between when data was gathered for the May 2015 BCMR Consultation and when it would have been gathered for the RFS) and partly because our analysis of the BCMR circuit data drops circuits without complete postcode information.

Cost adjustment

A26.113 Following the June 2015 LLCC Consultation, we gathered information from BT on the unit costs of the circuits in the LP that have been added to the charge controlled area. BT identified three components, EAD Fibre (CW609), BES Fibre (CO447) and WES Fibre (CO450), for which there is a cost differential between LP circuits and circuits in the CLA. BT stated that the unit costs of these components are about [✂] higher in the LP as there are greater economies of scale in the CLA due to the use of larger cables serving more customers per fibre segment in this area. For all other components, BT did not identify a cost differential between the LP and the CLA.[53]

A26.114 We have taken into account this information to ensure that the unit costs of the LP circuits we have added to the charge control are accurately reflected. We have carried out the following adjustments:

- first, we calculated LP usage factors. We did this by assigning the usage factors of each WECLA service to an equivalent non-WECLA service (based on service technology, bandwidth and customer type). For the EAD Fibre, BES Fibre and WES Fibre components, we uplifted the usage factors by the LP versus CLA unit cost differential; and

- second, we calculated a revised set of non-WECLA usage factors. We did this by calculating the weighted average of usage factors of services in the non-WECLA excluding LP area and usage factors of services in the LP area (calculated in step one).

<u>CI Core</u>

A26.115 In Volume 1, we have included 34 additional BT exchanges and 63 data centres as CI core nodes.[54] We continue to identify the existing 56 TANs as core nodes, with circuits sold between Openreach Handover Points (OHPs) that belong to different TANs classified as part of the competitive core network. Therefore, any circuits that are classified as 'core' in Volume 1 will no longer be part of an SMP market and subject to regulatory remedies (including a charge control).

A26.116 In order to reflect this in the charge control, we have used the BCMR circuit data to identify the proportion of circuits outside the CLA that are considered 'core' under the 2016 BCMR's definitions (but were not previously). Our analysis indicates that the proportion of volumes affected is small; only 0-1% of most circuit types would be classified as 'core'. However, in order to ensure our control is consistent with our market definition, we have removed these volumes from our forecasts.[55]

The value of X

A26.117 We first take into account the impact on revenues of the starting charge adjustments set out in Volume II Section 7. In our modelling, we assume that the charges of all services within the baskets reduce uniformly by the level of the relevant starting charge adjustment. The revenues including the impact of the

[53] BT response to 33rd s135 notice dated 19 February 2016, question A1.
[54] CI Core represents the core conveyance market, which encompasses high capacity infrastructure between major urban locations and network hubs.
[55] Although we include them when calculating component costs as they remain relevant to the costs of charge controlled circuits, due to economies of scale and scope.

starting charge adjustments are then used as the starting point for modelling the glidepath X for the Ethernet and TI baskets.

A26.118 As described above, the model projects revenues of the Ethernet and TI baskets to the final year of the control (2018/19) by applying our forecast of volumes to these charges. The model then calculates the cost forecast based on the approach described above. The X values of the Ethernet and TI baskets are then calculated to ensure that forecast revenues equal forecast costs (including a return on capital employed) in the final year of the control.

A26.119 Sections 5 and 6, Volume II set out our proposed approach to setting charge controls for the Ethernet and TI baskets respectively. Based on this analysis, we propose the following controls:

- for the Ethernet basket, a starting charge adjustment of -12.0% and a charge control of CPI-13.25%; and

- for the TI basket, a starting charge adjustment of -9.0% and a charge control of CPI-3.5%.

A26.120 These X value are the amounts by which we forecast that charges in the Ethernet and TI baskets will on average need to decrease in real terms every year in order to bring them into line with forecast costs, including a return on capital, by the end of the charge control.

Annex 27

Base year costs and adjustments

Introduction

A27.1 The starting point when modelling a charge control using a top down approach is to establish a relevant cost base, which we refer to as the base year costs for the charge control. Our starting base year costs and adjustments have been calculated within a standalone model (2016 Base Year Model). The outputs of the 2016 Base Year Model have then been used as inputs into our 2016 LLCC Model (discussed in Annex 26) which we use to forecast the efficiently incurred costs (the costs that will be allowed for under the control) over the course of the charge control period.

A27.2 We discuss the base year costs and adjustments in a number of sections in Volume II of this statement. In Section 4, we set out our framework for determining base year costs. In Sections 5 and 6, we discuss whether to base the control on BT's costs of provision, the choice of cost standard, the technology upon which to base our cost forecasts, the data period used for base year, and the adjustments we have made to the base data. This annex describes how we have determined the base year cost adjustments by:

- setting out our starting point for our base year costs;
- setting out the relevant considerations when deciding whether or not to adjust the base year data for this charge control; and
- detailing the impact of our base year cost adjustments.

Summary of our decisions

A27.3 As set out in Volume II Sections 5 and 6, we have decided to use the 2014/15 RFS as our base year for the 2016 LLCC as this is the latest audited set of regulatory accounts at our disposal.

A27.4 We have decided to make the following adjustments within our 2016 Base Year Model:

Table A27.1: Summary of adjustments to our Base Year Model

	Impact on Ethernet Services FAC (£'m)	Impact on TI Services FAC (£'m)
2014/15 RFS total	548.8	268.9
Error in 2014/15 RFS	(6.4)	(1.3)
EE Acquisition costs	(1.8)	(0.7)
Transmission Equipment costs	(2.1)	-
Adjustments informed by CAR[56]	(45.1)	(6.9)
Restructuring costs	(1.1)	(0.7)
Property Rationalisation provision	(0.7)	(0.4)
QoS resource uplift	16.7	-
SLG payments	(4.7)	-
2014/15 revised total	503.5	258.9

Source: Ofcom

We have decided to use BT's 2014/15 RFS as our starting point for base year costs

A27.5 As set out in Volume II, Section 5, we have decided that the starting point for the base year costs will be BT's 2014/15 RFS. BT's 2014/15 RFS is the latest audited set of regulatory financial statements.

A27.6 The data supplied by BT in response to our information requests has provided us with detailed disaggregation of costs that have been derived from the 2014/15 RFS. BT has provided disaggregated financial data for 2014/15 on a component basis for business connectivity services at the same level of aggregation as those reported in the 2014/15 RFS.[57]

We have made a number of adjustments to derive our base year costs

A27.7 As we explain in Section 4 of Volume II, our objective in deciding whether or not to adjust base year data is to ensure that the information which we use is representative of the relevant level of costs for the respective baskets on a forward-looking basis for setting that specific charge control. There are two elements which

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[56] See Annex 28.

[57] Network components are the underlying elements of infrastructure/activities that make up each service. Every service reported by BT uses one or more components. For example, PPC 64kbit/s link uses the following components: PC rental 64kbit link, SG&A partial private circuits and SG&A private circuits. BT's total network costs are disaggregated into network components. The costs of a service are then dependent on the amount of costs attributed to these components, which is described in BT's 2014 DAM (available at https://www.btplc.com/Thegroup/RegulatoryandPublicaffairs/Financialstatements/2014/DAM2014.pdf)

are relevant to this assessment which we carry out as part of charge control processes:

- We review in detail BT's financial information and investigate any issues which arise from this review. We carry out this exercise to ensure that the base year data we use represents the best available information, given our statutory duties and obligations, upon which to base the specific charge control.

- We consider whether the information is representative of the relevant level of costs for the respective baskets. This involves a consideration of what an appropriate cost recovery profile should be for the charge control we are setting. In doing so, we assess whether adjustments are needed to ensure that the regulated firm is able to recover an appropriate level of costs including consideration of an appropriate pattern of common cost recovery (i.e. preventing any over- or under-recovery).

A27.8 We use our regulatory judgement when considering what adjustments should be made to the base year data to best meet these objectives.

A27.9 Considerations relevant to setting this leased lines charge control include[58]:

- **Is the base year data accurate and free from errors?**

- **Are the costs appropriate for the services which we consider should be subject to the leased lines charge control?** In considering this question, we assess whether the costs are relevant to the services in the control, whether they are attributed to the services which cause these costs to be incurred based on the best available information, and whether the amount of costs attributed to these services appears to us appropriate. This assessment includes, taking account of all relevant financial and operational data:

    - considering whether there is a causal link between the leased lines services and the costs allocated to those services;

    - where there is no causal link (e.g. because a specific cost driver cannot be identified for those costs) considering whether i) it is nevertheless appropriate that the leased lines services should be allocated a proportion of certain costs; and ii) the proportion of such costs attributed to leased lines is appropriate, ensuring that the attribution does not create undue bias towards any part of BT (i.e. that the outcome of any attribution is neutral in terms of the costs attributed to leased lines and regulated markets generally).

- **Are any adjustments needed to reflect one-off or abnormal levels of costs to ensure that the base year data reflect expected levels of future costs?** We consider that for charge control purposes the base year data should only include costs which are expected to recur on an on-going basis during the control period. Where we decide that an exclusion would not be appropriate, we go on to consider whether the levels of costs reflect expected levels of future costs and if not, whether adjustment is appropriate to smooth such movements of costs.

- **Has the base year data been prepared in a way which is consistent with our relevant decisions taken in other regulatory contexts?** By adopting a

[58] Other considerations may be relevant to setting other charge controls.

consistent regulatory approach where appropriate we are seeking to ensure that BT's ability to recover its efficiently incurred costs is not put at risk.

- **Are there any other adjustments needed to prevent under- or over-recovery?** In addition to the above questions, we consider whether there are any other circumstances relevant to the BCMR that require a base year adjustment in relation to under- or over-recovery. Such circumstances may relate to decisions we have made in this statement or our view of BT's future BCMR costs.

Cost Attribution Review

A27.10 In June and November 2015, we considered BT's cost attribution rules as part of the CAR. As explained in the 2014 Regulatory Financial Reporting Statement,[59] we undertook this review as an input into establishing Regulatory Accounting Guidelines. We also said that we would carry out this review alongside the business connectivity market review so that, where relevant, the analysis could feed into setting the charge control.

A27.11 In the June and November 2015 CAR Consultations we considered whether BT's cost attribution rules are appropriate for regulatory accounting purposes and the preparation of the RFS. We reviewed BT's attribution rules against the Regulatory Accounting Principles with which we proposed (in the May 2015 BCMR Consultation) BT should comply in preparing the RFS.[60]

A27.12 This analysis identified a number of errors and raised concerns about certain of BT's cost attribution rules which have been used in preparing the base year data. In particular, the analysis revealed that certain attribution rules under review did not appear causal and/or objective. We explained in these consultations that we would consider the appropriateness of BT's cost attribution rules in order to decide if there was a breach of the Regulatory Accounting Principles that required BT to change its approach to preparation of the RFS.

A27.13 As we explain in Annex 28, having undertaken the analysis in the CAR, we no longer consider that it would be useful to establish high level guidelines and accounting rules in the Regulatory Accounting Guidelines.

A27.14 Nevertheless, as we explained in paragraph A7.8 of the June 2015 LLCC Consultation and highlighted in the 2014 Regulatory Financial Reporting Statement, the process undertaken in the CAR for the purpose of regulatory accounting has identified potential adjustments which we consider are relevant to setting the leased lines charge control. The content of this analysis has therefore informed our assessment of what adjustments it is appropriate to make for charge control purposes. For example, as explained above, causality and objectivity are important considerations in determining whether the cost data obtained from the RFS are representative of the relevant level of costs for the purpose of setting charge controls. As such, our analysis of whether a cost attribution rule is appropriate for regulatory accounting purposes is in many cases relevant to considering whether the base year costs which reflect such an attribution rule are the relevant basis for setting a charge control.

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[59] http://stakeholders.ofcom.org.uk/binaries/consultations/bt-transparency/statement/financial-reporting-statement-may14.pdf

[60] BT has been required to comply with the Regulatory Accounting Principles in the fixed access and WBA markets since the conclusion of the last market reviews of these markets in June 2014.

A27.15 However, as explained above, the factors we have considered in the context of our review of BT's cost attribution rules for the purpose of the preparation of the RFS (as set out in the Regulatory Accounting Principles) are not the only relevant factors. Some of the other factors which we consider when making adjustments for charge control purposes are set out above.

A27.16 In addition, we noted in the context of the June and November 2015 CAR Consultations that BT remains responsible for the preparation of the RFS and, against that background, our approach for the purpose of assessing compliance with the Regulatory Accounting Principles had not been to look for methodologies that are superior to BT's current methodologies but to identify rules which were inappropriate. However, for the purpose of determining the most appropriate base year costs for setting prices, we may consider that it is necessary to reflect an alternative attribution rule because that results in a better basis for determining the leased lines charge control.

A27.17 Informed by the analysis carried out in the CAR and stakeholders' responses, we assess in Annex 28 whether we should make base year adjustments in respect of the attribution rules we identified in the June 2015 and November 2015 LLCC Consultations. In the remainder of this annex we set out our decisions about all other base year adjustments.

Our assessment of the base year adjustments

A27.18 In this sub-section, for each base year adjustment identified, we discuss our consultation proposals, stakeholder responses, assess whether an adjustment should be made and then calculate the potential impact of the adjustment on the costs[61] attributed to Ethernet and TI services. In the case of Ethernet, we mean the services currently included in the AISBO Non-WECLA market.[62] In the case of TI services, we mean low bandwidth services in the UK (excluding Hull) and services above 8Mbit/s outside the WECLA and Hull (the latter represent a small proportion of overall TI costs and they are excluded from our TI basket when forecasting costs and revenues).

BT has adopted a number of adjustments proposed in the June 2015 LLCC Consultation

June 2015 LLCC Consultation

A27.19 In the June 2015 LLCC Consultation we proposed a number of adjustments to BT's 2013/14 RFS in order to derive our base year cost data used for the June 2015 Base Year Model. BT subsequently adopted a number of these adjustments in its 2014/15 RFS. We have set these out in Table A27.2 below.

[61] These are CCA FAC costs with an assumed WACC of 9.8% (Annex 30).
[62] We have made an adjustment for the London Periphery (LP) at the modelling stage (Annex 26).

Table A27.2: Adjustments adopted in BT's 2014/15 RFS (at 9.8 WACC)

Adjustment	Proposed (AI+TI) £m	Adopted(AI+TI) £m
Access Cards	(35.6)	(29.7))
June 2015 CAR Errors	(17.4)	(1.8)
RAV	(12.4)	(9.1)
Credit Notes	(2.0)	n/a error
Cumulo[63]	25.7	16.2
TI Volumes	(8.5)	(2.0)

Source: Ofcom

Note: Differences between proposed and adopted adjustments are explained below.

Stakeholders' comments

A27.20 BT agreed with the proposed adjustments to Access Cards, June 2015 Cost Attribution Review errors, RAV and TI Volumes. It also said it has no comments on the Cumulo adjustment which it was directed to do with the March 2015 Directions Statement.[64]

A27.21 BT agreed in principle with the correction of the Credit Note error but said that Ofcom had incorrectly removed these costs from the base year. It said that Ofcom should reverse this adjustment and instead add £2m to the 2013/14 base year costs (effectively adding £4m to the base year costs in the model).[65]

A27.22 In relation to the RAV adjustment [✂] suggested that copper and duct should be valued in the model as the real terms original installation cost. This is because BT is now in a state of maintenance of existing duct and not laying new ones.[66]

A27.23 Other stakeholders did not raise any concerns in relation to these adjustments.[67]

Assessment of the adjustments

A27.24 BT has adopted the proposed adjustments in relation to Access Cards, June 2015 CAR Errors, RAV[68] and TI Volumes in its 2014/15 RFS. We have reviewed the 2014/15 RFS (and in particular the Change Control Notification[69]) and note that there are differences between the levels of the adjustments proposed in the June 2015 LLCC Consultation and the adjustments BT adopted in its RFS (see Table A27.2 above). This is due to differences in the timing of proposing the adjustments and their adoption by BT. The proposed adjustments were estimated impacts based on the 2013/14 RFS whereas the adjustments adopted by BT were the actual impacts processed through its Regulatory Accounting System in 2014/15. Based on

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63 This adjustment is based on BT's requirements in relation to Cumulo as set out in the March 2015 Directions Statement.

64 BT response to the June 2015 LLCC Consultation, paragraph 192.

65 BT response to the June 2015 LLCC Consultation, paragraph 488-493 and Table 21.

66 [✂] response to the June 2015 LLCC Consultation, page 17.

67 GTC response to the June 2015 LLCC Consultation, page 4; Vodafone response to the June 2015 LLCC Consultation, page 18 and 51; [✂].

68 Since the 2015 Directions for Regulatory Financial Reporting Statement BT has been required to prepare the RFS on a RAV basis in accordance with the methodology specified by Ofcom. The 2014/15 RFS were the first accounts prepared on that basis.

69 BT 2014/15 Reconciliation Report. http://www.btplc.com/Thegroup/RegulatoryandPublicaffairs/Financialstatements/2015/ReconciliationReport201415.pdf

our review we consider that BT's adjustments in relation to these costs reflect appropriately our proposals in the June 2015 LLCC Consultation. Therefore, we have not made any further adjustments in relation to these costs.

A27.25 In the 2014/15 RFS BT made the Credit Notes adjustment as indicated in its response to the June 2015 LLCC Consultation, i.e. by adding £2m to its costs in the TI basket, instead of removing them as we proposed. We agree with BT's approach to correcting this error because our adjustment would have doubled the error rather than eliminate it.

A27.26 BT has not strictly followed our requirements in relation to Cumulo as set out in the March 2015 Directions Statement. As a result, the Cumulo costs in the base year data have been understated with £[✂] in the Ethernet basket and overstated with £[✂] in the TI basket. Given that this impact is not significant, we have decided not to make any further adjustment in the 2016 Base Year Model related to Cumulo.

A27.27 The rest of the adjustments proposed in the June and November 2015 LLCC Consultations (EE Acquisition costs, Transmission Equipment costs, Restructuring costs, Property Rationalisation provision, QoS resource uplift and SLG payments) are discussed below. However, we first consider errors in BT's 2014/15 RFS that BT has recently disclosed.

Errors in 2014/15 RFS

Background

A27.28 On 16th February 2016, BT notified us that it had found an error of c£70m across all regulated markets within the 2014/15 RFS. In subsequent communications and, in particular, in meetings between BT and Ofcom on 17th February and 23rd February the error and impact on BCMR services was discussed in more detail.

A27.29 There were two errors which impacted the LLCC base year costs. These related to Project Services and CPE Switch.

Project Services

A27.30 According to BT, Project Services are provided over and above the provision of the underlying services and relate to Openreach managing (sometimes multiple) installations and product orders on behalf of customers.[70] In the 2014/15 RFS, there was £[✂] of reported revenue but no reported cost associated with this service in the Wholesale Residual Market.

A27.31 This was because the costs associated with employees in Organisational Unit Cost Centre (OUC) dedicated to providing these project services were being attributed across all supported Openreach services (rather than just to Project Services) using the 'BWE EXCEPT' code.[71] BT has confirmed this attribution was incorrect; the correct attribution was to allocate the Project Service OUC to Project Services. BT confirmed that the adjustment did not have a material secondary impact on any

[70] BT response dated 15 March 2016 to Section A of the 35th s135 notice dated 10 March 2016.
[71] BT Accounting Methodology Document, http://www.btplc.com/Thegroup/RegulatoryandPublicaffairs/Financialstatements/2015/AccountingMethodologyDocument201415.pdf p44

other allocations, particularly the adjustment in relation to Openreach Software methodology set out in Annex 28.[72]

CPE Switch

A27.32 According to BT this service relates to Openreach installing CPE Switch equipment on a customer's behalf. In the 2014/15 RFS, there was £[✂] of reported revenue but no reported cost associated with this service in the Wholesale Residual Market.

A27.33 BT discovered that within the 2014/15 RFS the costs associated with a number of Classes of Work (CoW)[73] were incorrectly attributed to copper repair costs. Some of the costs against these CoWs actually related to the CPE Switch service and should have been directly allocated there.

Calculation of the adjustment

Project Services

A27.34 To calculate the adjustment BT first estimated how direct costs attributed to plant groups should change by building a spreadsheet which replicated how costs are exhausted within BT's REFINE system. This approach is consistent with how BT estimated impacts of the base year adjustments informed by the CAR at a component, service and market level (see Annex 28). This provided an estimate of the impact on direct costs of correcting the error in relation to Project Services on component and then on service costs.

A27.35 In addition to the direct cost of providing this service, BT incorporated an allowance for indirect costs and overheads. BT uplifted the Ethernet (and WLR) direct cost by an estimated indirect/overhead factor based on the service management provision plant groups for Ethernet (and WLR) and estimating the proportion of direct and indirect costs included in the reported RFS costs. This calculation provided an uplift factor of [✂]. The direct cost was multiplied by this factor [✂] to allow for the impact of indirect/overhead costs. This resulted in a £2.8m decrease in Ethernet costs.

CPE Switch

A27.36 BT estimated the impact of correcting the error on BCMR services by recalculating how the cost attributions should have changed had the costs relating to CPE Switch been attributed correctly (i.e. attributed to CPE Switch rather than to copper and Ethernet services). This is relatively complex as there are a number of different CoWs involved which also impacted the allocation of costs to Time Related Charges (TRCs).

A27.37 The result was a decrease, by the value of costs in the relevant OUC, of the costs to be attributed to copper repair services from the affected CoWs. In a similar way to Project Services, the overall impact has been estimated by calculating how the direct costs attributed to relevant plant group should change because of this correction and building a spreadsheet that replicated how costs are exhausted within BT's REFINE system. This approach is consistent with how BT has estimated

[72] BT response dated 15 March 2016 to Section A of the 35th s135 notice dated 10 March 2016.
[73] Classes of Work (CoWs) specify a type of activity or asset type on which engineers are engaged at an aggregated General ledger (F8 code) level.

impacts of the base year adjustments informed by the CAR at a component, service and market level (see Annex 28).

A27.38 In addition to the direct cost of providing this service, BT also incorporated an allowance for indirect costs and overheads. To do so, BT uplifted the direct cost by an indirect/overhead factor. BT estimated an uplift factor of [✂] based on using the copper TRCs service. This overhead rate was calculated using the base data provided in response to question A7 of the 26th LLCC s135 notice (dated 4 December 2015) and estimating the proportion of direct and indirect/overhead costs related to the copper TRC service. This resulted in a total decrease of £3.6m to Ethernet and £0.8m to TI services.

A27.39 We set out the impacts of our proposals in Table A27.3 below.

Table A27.3: Impact on Ethernet and TI services of Error in 2013/14 RFS

Adjustment	Impact on Ethernet services FAC (£'m)	Impact on TI services FAC (£'m)
Project Services	[✂]	[✂]
CPE Switch	[✂]	[✂]
Total	(6.4)	(1.3)

Source: Ofcom

EE Acquisition cost - corporate costs and liquid funds and interest

November 2015 LLCC Consultation

A27.40 In the November 2015 LLCC Consultation we proposed to remove BT's EE Acquisition costs from the base year costs as they are not relevant to BCMR services.

Stakeholders' comments

A27.41 BT said that it had no comments in relation to this proposal. In view of the General Overheads adjustment, BT noted that Ofcom should ensure that there is no duplication of the cost adjustment.[74]

A27.42 Virgin and Vodafone agreed with the removal of BT's EE Acquisition costs from the base year costs.[75]

Assessment of the adjustments

A27.43 We consider that BT's EE Acquisition costs were incurred as a result of the activities associated with the acquisition of EE. The treatment that attributes these costs across all UK lines of business, including, for example, Openreach and BT Wholesale is not cost causal and we do not consider these costs relate to BCMR

[74] BT response to the November 2015 LLCC Consultation, paragraphs 12 and 16.
[75] Virgin response to the November 2015 LLCC Consultation, page 2; Vodafone response to the November 2015 LLCC Consultation, paragraph 4.10.

services. For this reason we have decided to exclude EE Acquisition costs from the 2014/15 base year costs in setting this charge control.

Calculation of the adjustments

A27.44 BT provided a breakdown of the allocation of EE Acquisition costs to business connectivity markets on a component by service basis for 2014/15.[76] We have incorporated this adjustment within our 2016 Base Year Model as set out in Table A27.4 below.

A27.45 In relation to BT's comment on double counting, we note that some EE Acquisition costs were included within Corporate costs and attributed using the Pay and ROA methodology for which we have decided to make base year adjustments as we explain in Annex 28. To prevent double counting, we asked BT to remove the impact of excluding EE Acquisition costs when calculating the base year adjustment relating to Corporate costs.

Table A27.4: Impact on Ethernet services of adjustment for EE Acquisition costs

Adjustment	Impact on Ethernet services FAC (£'m)	Impact on TI services FAC (£'m)
EE Acquisition costs	(1.8)	(0.7)

Source: Ofcom

Transmission Equipment costs

June 2015 LLCC Consultation

A27.46 In the June 2015 LLCC Consultation we proposed an adjustment of £8.4m from Ethernet services related to BT's Transmission Equipment costs.

Stakeholders' comments

A27.47 In its response to the June 2014 LLCC Consultation, BT made no comments in relation to this proposal.[77] In its response to the November 2015 LLCC Consultation, BT agreed with the proposed adjustment but noted that its magnitude will decrease.[78]

Assessment of the adjustments

A27.48 As noted in the June 2015 LLCC Consultation, until 2010/11, BT recovered the cost of the Transmission Equipment, which is deployed at either end of an Ethernet circuit and wholly dedicated to that service, through the local end connection charges. BT also capitalised and depreciated this equipment over its useful economic life.

A27.49 BT changed its RFS treatment in 2010/11 to recover the cost of Transmission Equipment through rental charges. It capitalised the cost of pre 2010/11 equipment

[76] BT response dated 7 September 2015 to question A9 of the 22nd s135 notice dated 18 August 2015.
[77] BT response to the June 2015 LLCC Consultation, paragraph 192.
[78] BT response to the November 2015 LLCC Consultation, Table 1.

which we excluded from the March 2013 BCMR Statement to prevent double recovery of costs. We made an adjustment to match costs and revenues by eliminating MCE and depreciation of the assets and replacing them with a measure of the fully expensed cost of the equipment on connection.

A27.50 As proposed in the June 2015 LLCC Consultation, we have decided to remove Transmission Equipment costs from the base year. This is consistent with how current prices are set and prevents BT from over-recovering these costs through rental charges that have already been recovered through connection charges prior to 2010/11.

Calculation of Adjustment

A27.51 BT has provided a breakdown of MCE and depreciation costs within the 2014/15 RFS relating to Transmission Equipment costs capitalised before and after 2010/11. In particular, BT provided information in relation to the Ethernet Electronics cost component (CO485) on a service basis. We have incorporated this adjustment in relation to Ethernet services only within our 2016 Base Year Model as set out in Table A27.5 below.

Table A27.5: Impact on Ethernet services of adjustment for Transmission Equipment costs

Adjustment	Impact on Ethernet services FAC (£'m)
Transmission Equipment costs	(2.1)

Source: Ofcom

Restructuring costs

June 2015 LLCC Consultation

A27.52 In the June 2015 LLCC Consultation we proposed to remove BT's Restructuring costs from the base year costs. The biggest element of Restructuring costs is associated with making employees redundant, known as leaver payments. This was because we had identified them as "one off costs" as part of our review of BT's 2013/14 Statutory Financial Statements.[79]

Stakeholders' comments

A27.53 In its response to the June 2015 LLCC Consultation, BT argued that these costs should not be excluded from the base year, as they represent necessary costs to ensure future efficiencies are realised.[80] BT reiterated this in its response to the November 2015 LLCC Consultation.[81]

A27.54 In its response to the November 2015 LLCC Consultation BT said that *"[o]nly restructuring costs relating to BT TSO, Openreach, BT Wholesale and BT Group were allocated to BCMR services in the RFS, as these are legitimate costs of*

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[79] BT plc, Annual Report, p.63 http://www.btplc.com/Sharesandperformance/Annualreportandreview/pdf/2014_BT_Annual_Report_smart.pdf

[80] BT response to the June 2015 LLCC Consultation, paragraphs 492.

[81] BT response to the November 2015 LLCC Consultation, paragraphs 18-21.

transforming these businesses. Any costs relating to downstream parts of BT Group (specifically BT Business, BT Consumer and BT Global Services) are allocated to retail residual services within the RFS."[82]

Assessment of the adjustment

A27.55 We recognise in our efficiency calculations that costs, such as leaver payments, are incurred to deliver net efficiencies (see Annex 29). These costs themselves should be efficiently incurred and should exclude costs that do not deliver efficiencies to BCMR services. Restructuring costs are an inevitable cost of BT's various efficiency programmes. For example, we note that in its press release about the 2014/15 financial year results[83] BT indicated EBITDA had increased by 3%, despite a fall in underlying revenue of 0.4%, due to BT taking costs out of the business.[84] The impact and importance of Restructuring costs on BT's financial performance was highlighted by further quotes. For example net labour costs reduced as BT "*increased productivity while reallocating [its] labour resource to be more efficient".*[85] BT also noted that *"we continue to focus on transforming our cost base"*[86] and that, *"Our extensive cost transformation programmes continue to deliver''.*[87]

A27.56 In order to examine a time series of costs, we asked BT to provide the impact on Restructuring costs[88] in the TI and Ethernet markets for 2012/13 and 2014/15. This is set out in Table 27.6 below alongside the BT Group costs.

Table 27.6: Impact on Restructuring costs in the TI and Ethernet markets

	2012/13	2013/14	2014/15
BT Group Provisions (£'m)	[✂]	[✂]	[✂]
TI + Ethernet impact (£'m)	[✂]	[✂]	[✂]
TI + Ethernet impact (%)	[✂]	[✂]	[✂]

Source: BT response dated 24 November 2015 to question A1 of the 29th s135 notice dated 20 November 2015.

A27.57 At a group level, the provision has increased markedly, up 35% in 2013/14 and 14% in 2014/15. Impacts on regulated BCMR services have been more volatile, both in absolute numbers and as a percentage of the group cost. Given the amount of reorganisation costs and their generally increasing nature, we are no longer of the view that these are 'one off costs'.

A27.58 Whilst we recognise that these costs can help to deliver efficiency gains, these costs represent a movement of a provision and therefore, as with the Property Rationalisation provision, are at BT's discretion. We note in Table A27.6 that

[82] BT response to the November 2015 LLCC Consultation, paragraph 19.
[83] http://www.btplc.com/News/ResultsPDF/q415-release.pdf
[84] BT's 2014/15 Q4 press release, page 1. Underlying revenue is "underlying revenue excluding transit".
[85] BT's 2014/15 Q4 press release, page 5.
[86] BT's 2014/15 Q4 press release, page 9.
[87] BT's 2014/15 Q4 press release, page 30.
[88] BT response dated 28 October 2015 to question A1 of 25th s135 notice dated 8 October 2015.

allocations of Restructuring costs to TI and Ethernet are more volatile than movement in the BT Group provision.

A27.59 On the basis of the additional information received from BT and our further considerations, we have decided that Restructuring costs are forward looking and deliver efficiency benefits. We have therefore concluded that they should be included in our base year costs. However, because of BT's discretion over movements in the provision, for the purposes of setting prices, these costs should be recovered on a smoothed basis over the period of the charge control (i.e. averaged over the three year period).

Calculation of the adjustment

A27.60 BT has provided a breakdown of the Restructuring costs in the business connectivity markets, which amounted to £[✂] in 2012/13, £[✂] in 2013/14 and £[✂] in 2014/15.[89] We combined the three years of data to produce a smoothed three year average. We then replaced the 2014/15 base year data with our smoothed calculation.

A27.61 The adjustment impacts Ethernet and TI services as set out in Table A27.7 below.

Table A27.7: Impact on Ethernet and TI services of the adjustment for Restructuring costs

Adjustment	Impact on Ethernet services FAC (£'m)	Impact on TI services FAC (£'m)
Restructuring costs	(1.1)	(0.7)

Source: Ofcom

Property Rationalisation provision

November 2015 LLCC Consultations

A27.62 In the November 2015 LLCC Consultation we proposed to smooth BT's costs related to Property Rationalisation provision.[90]

Stakeholders' comments

A27.63 BT did not make any comments in relation to this proposal.[91]

A27.64 TalkTalk, Virgin and Vodafone agreed with our proposal.[92]

[89] BT response dated 21 October 2014 to question B1 of 2nd s135 notice dated 3 October 2014. BT response dated 24 November 2015 to question A1 of the 29th s135 notice dated 20 November 2015.
[90] November 2015 LLLCC Consultation, paragraphs 3.20-3.27.
[91] BT response to the November 2015 LLCC Consultation, paragraph 12.
[92] TalkTalk response to the November 2015 LLCC Consultation, paragraph 3.2; Virgin response to the November 2015 LLCC Consultation, page 2; Vodafone response to the November 2015 LLCC Consultation, paragraphs 4.12-4.13.

Assessment of the adjustment

A27.65 BT's statutory financial statements show that amongst the various 'specific items' that affected BT's operating costs and net finance expenses in 2014/15 was a £45m charge for Property Rationalisation provision.[93]

A27.66 BT provided a breakdown of the attribution of these costs to business connectivity services together with an explanation for the attribution. In 2014/15 £1.3m was allocated to Ethernet and £0.3m to TI services. The costs of the 2014/15 Property Rationalisation provision were included within activity group AG414 (Property Provision[94]). Costs from this activity group are attributed to plant groups in the same way that costs from Group Property's trades relating to office space and general purpose buildings costs are attributed.[95]

A27.67 BT has provided data on the movements in Property Rationalisation provision since 2010/11 for TI and Ethernet services which shows a high degree of variability, as set out in Table 3.3 below.[96] In the case of Ethernet in particular, in years where the RFS have been used as a source of modelling the LLCC base year, costs were generally higher than compared to intervening years.

Table 27.8: Net P&L movement[97] of Property Rationalisation provision costs

	2011/12 £m	2012/13 £m	2013/14 £m	2014/15 £m
TI	[✂]	[✂]	[✂]	[✂]
Ethernet	[✂]	[✂]	[✂]	[✂]
Charge control base year	Yes	No	No	Yes

Source: BT response dated 27 October 2015 to question A2 of the 25th s135 dated 8 October 2015.

A27.68 BT has explained that the net movements are based on BT 'topping up' the provision by identifying "*additional costs that will be incurred either because of new mothballed sites or additional costs to existing mothballed sites due to additional workspace becoming redundant or because the previous provisions were insufficient*" whilst releases to the provision were made as a result of "*costs being rebased each year, against the previous provisions*".[98]

A27.69 The allocation of these costs is on a more generalised basis compared to how they are calculated. BT explained that "*Property rationalisation costs are allocated in line with AG414 (Property provision). This allocates costs to lines of business in proportion to transfer charges for office space and general purpose buildings. BT considers that the costs of optimising the estate can be considered to be akin to an overhead associated with use of the estate and therefore it is cost causal to allocate these costs to lines of business in proportion to their use of the relevant estate. In*

[93] BT's 2015 Annual Report and Form 20-F for 2015, page 161.
[94] See pages 136, 137 of BT's 2015 Accounting Methodology Document for an explanation of AG414.
[95] BT response to the 22nd s135 notice dated 18 August 2015.
[96] BT response dated 27 October 2015 to question A2 of the 25th s135 notice dated 8 October 2015.
[97] The net profit and loss movement is the net impact of movements on the Property Rationalisation Provision on the RFS returns in the year.
[98] BT response dated 27 October 2015 to question A2 of the 25th s135 notice dated 8 October 2015.

the case of AG414 lines of business's use of the estate is represented by the transfer charge to Group Property. Costs are then allocated from lines of business to business connectivity markets in proportion to other costs within that line of business allocated to business connectivity services. The specific driver used for each line of business is described in the AMD page 137. In general, these cost allocations follow the methodology used to allocate overhead costs in the lines of business".[99]

A27.70 The attribution of property costs has been considered as part of the CAR as set out in Annex 28. The analysis carried out in the CAR in the June and November 2015 Consultations did not identify any particular issue with respect to the attribution of costs included in activity group AG414 (Property Provision). We believe that the current attribution is broadly consistent with how other property costs are allocated.

A27.71 We have also considered whether these Property Rationalisation provision costs are forward looking and efficiently incurred and therefore whether they should be included in full in our 2016 Base Year Model. The impact of these costs is to reduce future property related costs and thus contribute to future efficiency gains. We have therefore considered to what extent this provision contributes to our assessment of efficiency gains. If we excluded these costs then this may lead to lower efficiency assumptions. On balance therefore we have decided to include these costs in the 2016 Base Year Model.

A27.72 Given the variability of how the provision has been 'topped up' and 'released', the amount of discretion that BT has in this process and the lack of transparency of the calculation, we have decided that for the purposes of modelling our base year costs, these costs should be smoothed over a three year period.

A27.73 In respect of Vodafone's point on the proceeds of property sales, our views on the current treatment are set out in Annex 28.

Calculation of the adjustment

A27.74 We have replaced the net profit and loss movement of the Property Rationalisation provision costs in 2014/15 by the average over the last three years.

A27.75 The adjustment impacts Ethernet and TI services as set out in Table A27.9 below.

Table A27.9: Impact on Ethernet and TI services of the adjustment for Property Rationalisation provision

Adjustment	Impact on Ethernet services FAC (£'m)	Impact on TI services FAC (£'m)
Property Rationalisation provision	(0.7)	(0.4)

Source: Ofcom

[99] BT response dated 27 October 2015 to question A2 of the 25th s135 notice dated 8 October 2015.

Quality of Service resource uplift

June and November 2015 LLCC Consultations

A27.76 In the June 2015 LLCC Consultation, we proposed an uplift to the base year costs to reflect BT's 2014/15 investment for improving the quality of its Ethernet services (now forming part of BT's QoS Improvement Programme[100]). We said that since the consultation uses BT's 2013/14 RFS as its base year for charge control modelling purposes, these costs are not going to be captured in the charge control unless the base year is adjusted. Given that we intended to base our 2016 BCMR Statement on BT's RFS data for 2014/15, we said that these costs should automatically be captured in our base year data.

A27.77 To calculate the adjustment we used BT's estimate of the business connectivity costs associated with its QoS Improvement Programme on a component by service basis for 2014/15 and its explanation of the methodology behind the calculations.[101] For the purposes of our 2015 Base Year Model, we excluded the additional cost relating to TI services given that our proposals on QoS only related to Ethernet. We also uplifted the depreciation costs by a factor of two to convert them into full year figures. This calculation resulted in an uplift of £4.2m which we applied to the base year costs.

Stakeholders' comments

A27.78 In Section 5 of Volume II, we summarise stakeholder responses on whether BT should be allowed to recover its efficiently incurred QoS resource costs and whether a base year cost uplift is appropriate in light of BT's QoS Improvement Programme. Below we set out the responses that relate to the level of this adjustment.

A27.79 In its response to the June 2015 LLCC Consultation, BT disagreed with how the QoS resource uplift has been applied in the 2015 LLCC Model. It said that Ofcom should amend its cost adjustment so that the resource costs of improving QoS are treated as a recurring annual cost throughout the duration of the charge control period. According to BT, such treatment would more accurately reflect the nature and timing of these costs and would allow BT to recover its efficiently incurred resource costs. BT estimated that applying this methodology will result in a cost uplift of [✂] in the final year of the charge control.[102]

A27.80 GTC disagreed with the proposed QoS resource uplift. It said that Ofcom should ensure that BT makes incremental investments to meet basic quality of service levels and that BT's investment in QoS is efficient, using the most cost effective approach, rather than expensive contracting staff.[103]

A27.81 Other stakeholders did not raise any concerns related to the calculation of the QoS resource uplift (as opposed to whether such an adjustment should be made).

[100] BT response to question B1 of the 9th s135 notice dated 2 February 2015.
[101] BT response to follow-up to question A3 of the 12th s135 notice dated 6th March 2015.
[102] £49.3m in cash terms. BT response to the June 2015 LLCC Consultation, paragraphs 186-191 and Table 8.
[103] GTC response to the June 2015 LLCC Consultation, page 4.

Assessment of the adjustment

A27.82 In Section 5 of Volume II, we set out our decision to allow BT to recover its efficiently incurred resource costs associated with improving its Ethernet quality of service on an on-going basis. In particular we set out our decision to allow BT to recover costs relevant to Ethernet services relating to its QoS Improvement Programme given that BT has demonstrated to us that these costs are reasonable and that the they have already been incurred in 2014/15 and 2015/16. We also set out our decision not to allow BT to recover costs relating to its Additional QoS Cost Request.

A27.83 In response to the comment from BT, we agree that the treatment of QoS costs in the June 2015 Consultation was incorrect and that QoS costs should be treated as a recurring annual cost throughout the duration of the charge control rather than a single one year cost. This is because in order to deliver BT's QoS Improvement Programme, labour costs need to be incurred each year on a cash basis. These costs are for the most part capitalised and depreciated over the life of the underlying assets (mostly fibre which has an accounting life of 15 years). This accounting approach is consistent with how BT currently accounts for connections.

A27.84 Therefore, because in subsequent years of the control there are cash costs and an element of depreciation for previous year/s, the underlying asset base increases every year for 15 years, and the depreciation and the return on capital also increases every year for 15 years. For each individual year the depreciation costs and return on capital flow through into the FAC cost base at a decreasing rate every year for 15 years, starting from the first year that the costs are incurred. Using a simplified example based on an annual cash cost of 15 and a WACC of 10%, the year two FAC charge will be just under 100% higher than the year one charge, the year three charge will be just under 50% higher than the year two charge, the year four charge will be just under 33.33% of the year three charge and so forth until year 15 when there is no increase and 'steady state' has been reached.[104] The net result is that BT's QoS costs increase each year which was not taken into account in our calculations for the June 2015 LLCC Consultation. Therefore, we have adjusted the QoS resource uplift to take this into account.

Calculation of the adjustment

A27.85 Before the June 2015 LLCC Consultation, BT provided the total additional annual pay related costs and other costs (incurred and expected) in relation to its QoS Improvement Programme in 2014/15 based on an estimated [✂] additional FTE which showed annualised cash costs of £[✂].[105]

A27.86 Since the June 2015 LLCC Consultation, BT has provided the LLCC impacts on a component by service basis that shows the 2017/18 QoS impact, adjusted back to 2014/15 and removing any assumptions for efficiency, inflation, volumes and cost of capital. This shows that the 2014/15 Ethernet impact on a FAC basis (using a 9.8% WACC) was £24m across BCMR services.[106]

[104] A simplified example ignoring CCA and accounting adjustments for depreciation.
[105] BT response dated 6 February 2015 to question B1 of the 9th s135 notice dated 2 February 2015.
[106] BT response dated 27 November 2015 to question A6 of the 29th s135 notice dated 20 November 2015.

A27.87 The impact BT provided was incremental to the costs in the base year data for 2014/15, as we would have already captured the cost for 2014/15 of the additional employees recruited in that year. The impact BT provided included the forecast cost of the additional employees recruited in 2015/16 and the impact of capitalisation as an annual cost for the period of the charge control.

A27.88 Given that the information BT provided before the June 2015 LLCC Consultation was based on an estimate of [✂] FTEs, we asked BT to confirm the number of additional staff that were in place as at 16 February 2016. BT responded that [✂] staff had been in place at the end of 2014/15[107] and that the total number as at 16 February 2016 was [✂] [800-1,000] staff.[108]

A27.89 Therefore, we have adjusted the data provided by BT upwards to take account of the [✂] [800-1,000] staff employed and adjusted the data downwards to take account of only [✂] staff being in place at the end of 2014/15. The downward adjustment was calculated using the model BT provided[109] to calculate what the 2018/19 costs would be taking into account the phasing of the resource. We applied the proportion between the phased/non-phased vs. non-phased to the BT data. We then pro-rated BT's data upwards by [✂] to factor in the actual rather than planned number of staff. In total, we have calculated a base year adjustment of [✂] for Ethernet services to be included within our 2016 Base Year Model as set out in Table A27.10 below.

Table A27.10: Impact on Ethernet services of QoS resource uplift

Adjustment	Impact on Ethernet services FAC (£'m)
QoS resource uplift	16.7

Source: Ofcom

Service Level Guarantees (SLGs) payments

<u>June and November 2015 LLCC Consultations</u>

A27.90 In the June and November 2015 LLCC Consultation we proposed to allow BT to recover SLG payments consistent with those incurred in 2011, on the basis that this could represent a reasonable level of SLG payments given our proposed minimum QoS standards. As a result, we proposed to remove £4.2m of costs to make the costs in the base year in line with the 2011 spend.

A27.91 We said that for the statement we intended to use BT's actual SLG payments from the 2014/15 RFS. This was because we expected that BT's actual additional resource costs associated with QoS improvements would bring the actual SLG payments in 2014/15 to a reasonable level. We said that, if SLG costs were not at a reasonable level, we were likely to make similar adjustments to the 2014/15 base year costs in the 2016 LLCC.

[107] BT response dated 27 January 2016 to question A2 of the 34th s135 notice dated 20 January 2016.
[108] BT response dated 15 March 2016 to Section B of the 35th s135 notice dated 10 March 2016.
[109] BT response dated 27 November 2015 to question A6 of the 29th s135 notice dated 20 November 2015.

Stakeholders' comments

A27.92 BT disagreed with the proposed method to adjust the SLG payments in the base year. It argued that Ofcom should use the actual incurred 2014/15 SLG costs as the basis for allowable cost.[110]

A27.93 BT said that, if Ofcom chooses to use SLG payments consistent with those incurred in 2011, it should adjust the allowed SLG costs to reflect the change in order mix towards higher bandwidth, rental, and SLG charges.[111]

A27.94 BT also said that, given the effect of the charge control to reduce prices over time, Ofcom should not project forward the average SLG cost per affected order. It therefore argued that, instead, Ofcom should take the historic price reductions on each of the product types over the period and project that forward with the forecast volume by bandwidth into the future.[112]

A27.95 BT also noted that Ofcom should allow a mechanism to update the view of allowable costs in light of the current industry negotiations on changes to the SLA and SLG regime.[113]

A27.96 Other stakeholders did not raise concerns in relation to the level of SLG payments BT is allowed to recover. We address UKCTA's comments in relation to whether SLG payments should be excluded from the base year in Section 5, Volume II.

Assessment of the adjustment

A27.97 SLGs are contractual payments made by BT to CPs to compensate for BT's failure to meet agreed performance criteria (such as time taken to complete an installation) set out in the Service Level Agreements.

A27.98 In the 2014/15 RFS, BT's spend on SLG payments was £[✁] which is £[✁] higher than in 2011. This indicates that, despite BT's 2014/15 investment in improving its service quality, the level of SLG payments has not yet come down to 2011 levels.

A27.99 BT has informed us that its new recruits take longer to execute tasks than fully competent engineers. Therefore, even when resources are released their impact on the work stack is diluted for a period. BT said that it expects the new employees it recruited as part of its 2014/15 QoS Improvement Programme will require six to nine months before they gain sufficient on-the-job experience to execute tasks with the expected level of efficiency for their role.[114]

A27.100 Therefore, we do not consider it appropriate to use BT's actual 2014/15 SLG payments, given they represent a period of poor performance and we expect BT's QoS to improve over the period of the charge control, as a result of its QoS Improvement Programme – for which we are allowing additional costs – and meeting our minimum QoS standards.

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[110] BT response to the June 2015 LLCC Consultation, paragraph 184.
[111] BT response to the June 2015 LLCC Consultation, paragraphs 177-182.
[112] BT response to the June 2015 LLCC Consultation, paragraph 183.
[113] BT response to the June 2015 LLCC Consultation, paragraphs 184-185.
[114] BT's response dated 27 January 2016 to question B3f) of the 34th s135 notice dated 20 January 2016.

A27.101 Consistent with our June 2015 Consultation, we continue to consider that 2011 is an appropriate starting point to determine an appropriate level of SLG payments in 2014/15. This is for two reasons. First, as noted in Section 13, Volume I, we have used BT's faster lead time performance for provisioning of Ethernet services in 2011 to form the final minimum standard for improved lead time performance. Second, we reviewed the SLG payments for this year in the 2013 LLCC and determined that there was no need to make adjustments to this level.[115]

A27.102 As noted by BT, we are aware that a new Ethernet provisioning process is being put in place and that new contractual arrangements with associated SLGs are currently being negotiated by industry. These are likely to change the structure of SLG payments relative to those in 2011.[116] We recognise therefore that there is uncertainty around SLG payments over the period of this charge control.

A27.103 Given we do not consider it appropriate to use BT's 2014/15 SLG payments and the level of uncertainty arising from industry negotiations, we need to exercise regulatory judgement in deciding on the level of SLG payments to include in the base year costs.

A27.104 In light of BT's concerns, we have further considered the method proposed in the June 2015 LLCC Consultation of calculating the efficient level of SLG payments for 2014/15 on the basis of the 2011 SLG incident rates and lead times. For the reasons set out below, we consider that estimating 2014/15 SLG payments, using the SLG payment incident rates and lead times in 2011, is unlikely to result in a more accurate estimate of an efficient level of SLG payments over the control period.

A27.105 BT argued that Ofcom's proposed method was likely to under-estimate the level of allowable SLG costs because it did not take into account the change in the mix of circuits and prices of those circuits over time.[117] We consider that it is not clear whether the collective impact of changes in the product mix and BT's pricing decisions has been to increase or decrease the level of SLG payments over time. Whereas the share of higher bandwidth circuits being provided in 2014/15 was higher than in 2011, BT has made significant reductions to the rental prices of these circuits over this period. In addition, we note that there has been a considerable increase in the share of the lower priced local access variants of EAD circuits being provided between 2011 and 2014/15. The changes over time of EAD provisions and rental prices are shown in Table A27.11 below.

Table A27.11: Comparison of mix of EAD connections and rental charges between 2011/12 and 2014/15

	Connections 11/12	Connections 14/15	Rental 11/12 (£)	Rental 14/15 (£)
EAD 10Mbit/s	[✂]	[✂]	3,382	2,615
EAD 100Mbit/s	[✂]	[✂]	4,153	2,528
EAD 1000Mbit/s	[✂]	[✂]	10,448	5,960

115 March 2013 BCMR Statement, paragraph 18.50.
116 It is also not clear how the overall quantum of SLG payments will change.
117 This is because SLG payments are calculated on the basis of the rental charges of the circuits where BT fails to meet its agreed performance level (e.g. installing a circuit by a certain date). BT considers that the increase in the mix of products towards higher priced, high bandwidth circuits would therefore result in an increase in SLG payments.

EAD LA 10Mbit/s	[✂]	[✂]	2,159	1,770
EAD LA 100Mbit/s	[✂]	[✂]	2,473	1,655
EAD LA 1000Mbit/s	[✂]	[✂]	4,832	3,764

Source: Ofcom analysis

A27.106 We agree with BT that it would be a complex task to calculate the value of the efficient level of SLG payments, taking into account the changes in product mix and the price changes on each of the product types.

A27.107 First, there is a risk of spurious accuracy if the 2011 incident rates and lead times of individual products are applied to the individual product connection in 2014/15. For example, it is possible that the incident rates and lead times for individual products in 2011 partly reflected the mix of products during this period.

A27.108 Second, it is likely to be difficult to accurately capture the change in rental prices over time. For example, the level of SLG payments over the control period will partly depend on which products BT decides to focus price changes on to comply with the charge control. We have defined a broad basket for Ethernet services which allows BT considerable flexibility to decide on which products it makes price changes to. Ofcom is not well placed to forecast how BT will structure its prices during the control period as BT's pricing decisions will depend on a wide range of factors.

A27.109 Taking into account these factors and the uncertainty about the SLG regime over the control period, we have decided to use BT's actual cash SLG payments in 2011 as a proxy for the efficient level of SLG payments. Given that BT's QoS performance in 2014/15 was significantly below that achieved in 2011, this adjustment involves removing a significant proportion ([✂]%) of BT's incurred SLG payments from the base year cost data.

A27.110 BT also commented that Ofcom should allow a mechanism to update the view of allowable costs in light of the current industry negotiations on changes to the SLA and SLG regime. We consider that it is unlikely to be proportionate to reopen the LLCC to take into account changes to the SLA and SLG regime. SLG payments currently represent a relatively small proportion of total Ethernet basket costs.[118] If the new regime results in different levels of SLG payments, these differences may not have a material impact on our modelled value of X. If we consider that the resultant changes to the levels of SLG payments are sufficiently large, we would likely consider in the 2019 BCMR whether it would be appropriate to make adjustments to take this into account in any new charge control.

Calculation of Adjustment

A27.111 In order to calculate this adjustment, we first calculated the total SLG payments Openreach made across all circuit provisions in 2011 (£[✂]).[119] Second, we calculated the total SLG payments costs included in the 2014/15 base year costs supplied by BT. We found that 100% of SLG payment costs were allocated to the OR Service Centre – Provision (CL573) component and that they amounted to £[✂] across all markets. Third, we calculated an adjustment percentage as BT's

[118] For example, we estimated that the adjusted SLG payment costs represented about [✂] of total Ethernet basket costs in 2014/15.

[119] We calculated 2011 total SLG payments on the basis of (i) SLG payments data provided by BT in response to q12 and q14g in 3rd s135 on 19 September 2014 and (ii) Completed orders data provided by BT in response to 5th s135 on 22 October 2014.

2011 SLG payment costs divided by BT's 2014/15 SLG payment costs minus one ([✂]). Finally, we applied the adjustment percentage to all CL573 costs in 2014/15.

A27.112 The impact of this adjustment on Ethernet services included in adjustment in our 2016 Base Year Model is set out in Table A27.12 below.

Table A27.12: Impact on Ethernet services of adjustment for SLGs costs

Adjustment	Impact on Ethernet services FAC (£'m)
SLG payments	(4.7)

Source: Ofcom

Our base year cost adjustments

A27.113 Our base year adjustments are set out in Table A27.13 and A27.14.

Table A27.13: Summary of all adjustments – Ethernet

	Ethernet Opex £'m	Ethernet Capital £'m	Ethernet FAC Impact (£'m)	Ethernet MCE £'m
14/15 RFS Total	394.4	154.4	548.8	1,575.4
Error in 14/15 RFS	(6.4)	-	(6.4)	-
EE Acquisition Costs	(1.8)	-	(1.8)	-
Transmission Equipment costs	(2.0)	(0.1)	(2.1)	(1.0)
Cost Attribution Review	(41.1)	(4.0)	(45.1)	(41.0)
Restructuring Costs	(1.1)	-	(1.1)	-
Property Rationalisation Provision	(0.7)	(0.0)	(0.7)	(0.4)
QoS resource uplift	9.0	7.7	16.7	78.4
SLG Payments	(4.7)	-	(4.7)	-
2014/15 Revised total	345.5	157.9	503.5	1,611.5

Source: Ofcom

Table A27.14: Summary of all adjustments – TI

	TI Opex (£'m)	TI Capital (£'m)	TI FAC Impact (£'m)	TI MCE (£'m)
14/15 RFS Total	216.9	52.0	268.9	530.6
Error in 14/15 RFS	(1.3)	-	(1.3)	-
EE Acquisition Costs	(0.7)	-	(0.7)	-
Cost Attribution Review	(4.6)	(2.3)	(6.9)	(23.8)
Restructuring Costs	(0.7)	-	(0.7)	-
Property Rationalisation Provision	(0.3)	(0.2)	(0.4)	(1.8)
2014/15 Revised total	209.4	49.5	258.9	505.1

Source: Ofcom