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Final report for the Australian Competition & Consumer Commission – public version

Assessment and verification of inputs into Telstra's Cost Allocation Framework

16 June 2015

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Contents

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For reasons of confidentiality, material has been redacted at various points in this document. In each case this has been replaced by either **[Telstra CiC]** or **[Optus CiC]**, as appropriate.

1 Introduction

The Australian Competition & Consumer Commission (ACCC) has commissioned Analysys Mason to conduct an assessment and verification of inputs into Telstra's Cost Allocation Framework (CAF). This document is the public version of the final report relating to this work.

1.1 Background

On 11 March 2015, the ACCC published its draft decision on the primary price terms for declared fixed-line services.[1] The ACCC's draft decision relies in large part on information supplied by Telstra as inputs to the Fixed Line Service Model (FLSM) which will be used to calculate the price terms of the final access determinations (FADs). The services to be priced are shown in Figure 1.1 below.

Service
Unconditioned Local Loop Service Band 1 - 3
Unconditioned Local Loop Service Band 4
Wholesale Line Rental
PSTN FOAS/FTAS
Local Carriage Service
Line Sharing Service
Wholesale ADSL

Figure 1.1: Services priced in FLSM [Source: ACCC/Telstra,[2] 2015]

The FLSM was developed by the ACCC in 2011 for the first fixed-line services FAD and updated in 2013 for the wholesale ADSL FAD. It is now being updated again, as part of this ongoing process to set fixed-line service FADs. As part of the draft decision published in March 2015, the ACCC indicated that it is minded to adopt a fully allocated cost approach based on the Cost Allocation Framework (CAF) proposed by Telstra to calculate the costs that should be recovered across the declared services.

In its draft decision the ACCC noted that it was still considering two aspects of its decision before issuing the FADs:

- whether the cost allocations proposed by Telstra in its CAF are appropriate, and

1 See https://www.accc.gov.au/regulated-infrastructure/communications/fixed-line-services/fixed-line-services-fad-inquiry-2013/draft-decision.

2 Based on services in the *Allocation Summary* sheet of the Amended FLSM submitted by Telstra on 17 December 2014. We note that the FLSM also calculates the price of WADSL ports, as well as WGVC/VLAN but the CAF does not appear to be used for this calculation. See https://www.accc.gov.au/system/files/ACCC%20Fixed%20Line%20Services%20Model%20version%202.0%20%28DRAFT%29%20-20Public%20version.xls.

- whether regulated prices should rise as a result of higher unit operating costs caused by declining demand as services are migrated from Telstra's fixed-line network to the expanding National Broadband Network (NBN).

1.2 Objectives

The objectives of the report was to assess and verify the inputs used in Telstra's CAF to ensure that it reflects the use of Telstra's fixed-line network by all services utilising the network and that the allocations of fixed-line network services are based on appropriate cost drivers.

Revenue requirements have been accepted 'as is' and were not be assessed as part of this report. In particular, we understand that a review of the level of expenditure forecasts was already undertaken in a different report[3] and was thus not revisited.

In preparing this report, we have relied on the CAF model and documentation provided by Telstra[4] and on copies of the input data that Telstra has used for the CAF. We have also relied on written answers to our clarification questions and explanations given by Telstra in person when we met to discuss our queries. We have not accessed Telstra's systems independently and therefore have worked on the assumption that the data provided to us has been modified only as described in the accompanying explanations.

Our assessment has considered mainly:

- whether the calculated allocation factors used reflect the ACCC's cost allocation factor fixed principles (set out in Annex B) and promote the Long Term Interests of End Users (LTIE),[5] and
- whether the data used to calculate the allocation factors is reasonable and can be verified.

1.3 Structure of this report

The remainder of this document is laid out as follows:

- Section 2 sets out the framework used to assess the CAF based on cost allocation principles
- Section 3 provides an overview of the routeing factor calculations and their implementation in the CAF
- Section 4 describes the calculations related to the asset classes in the customer access network (CAN)
- Section 5 describes the calculations related to the asset classes in the core network, including transmission platforms
- Section 6 contains our conclusions.

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3 Assessment on the efficiency and prudency of Telstra's expenditure forecasts, WIK Consult, 5 March 2015.

4 Described in Section 1.4 below.

5 The ACCC is required by the Competition and Consumer Act 2010 to consider the LTIE in its decision making.

The report includes a number of annexes containing supplementary material:

- Annex A contains the asset class and service definitions from Telstra's user guide
- Annex B contains the CAF fixed principles set out in the 2011 FAD
- Annex C contains diagrams describing how each service uses switching and transmission assets and how this is accounted for in the routeing factor calculation in the *routeing factor model*
- Annex D details the composition of service costs by asset class.

1.4 Documents and files referred to in this report

Figure 1.2 lists the main documents and files frequently referred to in this report together with a short name used in the report.

Figure 1.2: Key documents and files [Source: Analysys Mason, 2015]

Name	Short name	Author	Source
ACCC documents			
Public inquiry to make final access determinations for the declared fixed line services: Discussion paper	ACCC April 2011 FAD Discussion paper	ACCC	https://www.accc.gov.au/system/files/Discussion%20paper%20-20FADs%20for%20fixed%20line%20services%20-20public%20version.pdf
Public inquiry into final access determinations for fixed line services – primary price terms: Draft Decision	Draft decision	ACCC	https://www.accc.gov.au/system/files/FSR%20FAD%20-20Primary%20price%20terms%20draft%20decision%20-20Public%20Version%20-2011%20March%202015.pdf
Telstra documents			
Telstra amended FLSM FY2015 to FY2019 v1.2.xlsm	FLSM	ACCC with Telstra amendments	Provided by the ACCC; confidential version
FLSM Cost Allocation - Routing Factors (June 2014).xlsx	Routeing factor model	Telstra	Provided by the ACCC; confidential version
Cost Allocation Framework for the ACCC Fixed Line Services Model; Framework and Model Guide; Version 1	CAF user guide	Telstra	Provided by the ACCC; confidential version
Amendments to the Fixed Line Services Model	User guide for amendments to CAF	Telstra	Provided by the ACCC; confidential version

Name	Short name	Author	Source
Forecast Model v1.05; Framework and Guide to Forecast Assumptions	Guide to Forecast Assumptions	Telstra	Provided by the ACCC; confidential version
Public inquiry into final access determinations for fixed line services—primary prices: Response to Draft Decision	Telstra submission	Telstra	Provided by the ACCC; confidential version
Telstra's Response to Analysys Mason queries dated 20 April 2015 (as revised on 22 April 2015)	Telstra response to Analysys Mason queries (April)	Telstra	Provided by Telstra; confidential version
Telstra's Response to Analysys Mason queries dated 27 May 2015	Telstra response to Analysys Mason queries (June)	Telstra	Provided by Telstra; confidential version
Other parties' documents			
NBN Co Strategic Review	NBN Co Strategic Review	NBN Co	http://www.nbnco.com.au/content/dam/nbnco2/documents/NBN-Co-Strategic-Review-Report.pdf
Assessment on the efficiency and prudency of Telstra's expenditure forecasts	WIK assessment of Telstra's expenditure forecasts	WIK	Provided by the ACCC; confidential version

2 Framework for assessment of the CAF

In this section we explain that the CAF needs to be assessed against a consistent set of cost allocation principles. We also set our recommended framework for assessment of the CAF which incorporates these principles.

Section 2.1 sets out the background for why a framework for assessment of the CAF is required.

In Section 2.2 we describe the existing principles and international best practice that we rely on to define the CAF assessment framework.

In Section 2.3 we describe the proposed CAF assessment framework, including the steps to consider asset disposals and then allocate costs in the CAF (efficient costs and then any remaining overcapacity).

Finally, in Section 2.4.2 we suggest potential remedies that could be considered if the application of the principles described in Section 2.2 proved insufficient incentive for cost minimisation behaviour by Telstra, access seekers and end users.

2.1 Background

The ACCC's draft decision was to adopt a fully allocated cost (FAC) framework for estimating the costs of supplying the declared fixed-line services in the next regulatory period, since this:

- "will provide the opportunity for Telstra to recover the *efficient* costs of providing declared services and provides *incentives for efficient investment* in the network
- is most likely to reflect *relative use* of Telstra's fixed line network and in turn determine an appropriate share of costs to allocate to declared services
- is an appropriate basis for explicitly accounting for the use of Telstra's infrastructure by NBN Co *and other NBN related impacts*
- is consistent with the fixed principles provisions on cost allocation."[6]

The ACCC's view was that it was minded to accept Telstra's proposed CAF (implementing the decision to adopt a fully allocated cost framework), subject to a review that would aim to assess and verify that the cost allocations proposed by Telstra in its CAF are appropriate. This report aims to provide that review by investigating the areas noted by the ACCC. It therefore needs to use a consistent framework for assessment of the CAF.

6 ACCC's *draft decision* page ix (emphasis added).

2.2 Identifying cost allocation principles with which the CAF needs to be consistent

This section describes the ACCC's cost allocation factor fixed principles (set out in Annex B), the Long Term Interests of End Users (LTIE) and Ofcom's cost allocation principles as an example of international best practice.

2.2.1 Building Block Model fixed principles and LTIE statutory obligation

The ACCC has previously set a number of principles that need to be taken into account when assessing the CAF. These are the fixed principles that the ACCC set out in its previous FAD in 2011[7] and the statutory obligation to have regard to the LTIE.[8]

As part of the development of the Building Block Model (BBM) approach, the cost allocation factor principles (Annex B) were set out in the 2011 FAD as part of a wider set of pricing principles. These have set the precedent to which the ACCC refers in its pricing decisions. In its *draft decision* the ACCC referred to those fixed principles to reach preliminary positions on disposals and cost allocation.

The ACCC is also obliged to have regard to the LTIE. In the context of a legacy network that is being replaced by another, more modern, technology, encouraging cost minimisation[9] promotes the LTIE.[10] However, cost minimisation must be balanced against the need for Telstra to recover the efficient costs of operating its legacy network. We note that Telstra has presented arguments that it has not received any consideration for assets stranded as a result of the NBN. If those arguments were accepted it would be difficult to justify preventing Telstra from recovering the full costs of the regulated asset base (RAB), which is 'locked in' under the BBM approach with a fully allocated CAF.

2.2.2 Ofcom's cost allocation principles as an example of international best practice

In addition to having regard to the established position of the ACCC, the identification of a CAF assessment framework is usefully guided by regulatory precedent elsewhere in the world.

Ofcom's principles of cost recovery

Ofcom has set broad principles of cost allocation that have been accepted and applied for approximately two decades with respect to cost allocation and regulatory policy pertaining to BT

7 Available at http://www.accc.gov.au/system/files/FADs%20for%20Fixed%20Line%20Services%20-%20Final%20Report%20-%20public%20version.pdf, Chapter 15.

8 This is a requirement of the Competition and Consumer Act 2010.

9 That is, encouraging behaviour that achieves the most cost-effective way of delivering the relevant products or services (in this case regulated fixed-line services in particular, and other telecoms services more broadly).

10 As NERA submitted to the ACCC. See section 7.31 of the ACCC's July 2014 position paper. See https://www.accc.gov.au/system/files/FAD%20Inquiry%20-%20Primary%20Price%20Terms%20-%20Discussion%20Paper%20-%20July%202014.pdf.

(the UK equivalent of Telstra).[11] Various wholesale services provided by BT are subject to price regulation based on a FAC regime. These are described below in Figure 2.1 which also sets out the relationship between Ofcom's principles and those that the ACCC must consider.

11 See http://stakeholders.ofcom.org.uk/binaries/enforcement/competition-bulletins/open-cases/all-open-cases/cw_01126/Final_Determination_and_Statement.pdf.

Older forms of these principles have been published by Oftel (the predecessor to Ofcom) since the mid-1990s. For example, see http://www.ofcom.org.uk/static/archive/oftel/ind_info/numbering/port.htm (section 5.9).

Figure 2.1: Ofcom's principles of cost recovery[12] *[Source: Ofcom, 2014]*

Principle	Definition provided by Ofcom	Relationship to LTIE and fixed principles[13]
Cost causation	Costs should be recovered from those whose actions cause the costs to be incurred	The fixed principles for cost allocation state that "Direct costs should be attributed to the service." and "The cost allocation factors for shared costs should reflect causal relationships between supplying services and incurring costs."
Distribution of benefits	Costs should be recovered from the beneficiaries especially where there are externalities	The fixed principles for cost allocation state that "The allocation of the costs of operating the PSTN should reflect the relative usage of the network by various services."
Cost minimisation	The mechanism for cost recovery should ensure that there are strong incentives to minimise costs	This complements the fixed principles requirement for operating and capital expenditure to be prudent and efficient.[14] This is also in the LTIE, provided that costs to end users are minimised to the level required to operate the network efficiently.
Effective competition	The mechanism for cost recovery should not undermine or weaken the pressures for effective competition	LTIE is intended to promote effective competition.[15] One of the stated aims of Section 152AB of the Competition and Consumer Act 2010 is "[…] the objective of promoting competition in markets for listed services".
Reciprocity	Where services are provided reciprocally, charges should also be reciprocal	This is not relevant in this case, as services are not provided reciprocally.

12 See http://stakeholders.ofcom.org.uk/binaries/enforcement/competition-bulletins/open-cases/all-open-cases/cw_01126/Final_Determination_and_Statement.pdf.

Older forms of these principles have been published by Oftel (the predecessor to Ofcom) since the mid-1990s. For example: http://www.ofcom.org.uk/static/archive/oftel/ind_info/numbering/port.htm, section 5.9.

13 See Annex B for the full cost allocation factor fixed principles.

14 See the *ACCC April 2011 FAD Discussion paper,* page 255.

15 This is explained in the ACCC's submission to the Independent Cost Benefit Analysis Review of Regulation Telecommunications Regulatory Arrangements Paper; see https://www.accc.gov.au/system/files/ACCC%20submission%20to%20the%20Vertigan%20Committee%20Review%20of%20Telecommunications%20Regulatory%20Arrangements%20Consultation%20Paper%20April%202014.pdf, page 7.

Principle	Definition provided by Ofcom	Relationship to LTIE and fixed principles[13]
Practicability	The mechanism for cost recovery needs to be practicable and relatively easy to implement	Practicability is consistent with and required as part of the fixed principles. The fixed principles for cost allocation state that: • costs should reflect relative usage of the network "[…] to the extent that it is possible to obtain reliable information […]" • direct costs should be attributed to the appropriate services "[…] to the extent that it is possible to obtain reliable information […]". One of the justifications for introducing the fixed principles was to reduce the regulatory burden required each time prices were revised.[16]

16 See the *ACCC April 2011 FAD Discussion paper*, page 252.

2.3 CAF assessment framework for disposal and cost allocation

In order to assess the CAF proposed by Telstra, we needed to use a framework that is consistent with the cost allocation principles and the LTIE which the ACCC must have regard to. Figure 2.2 below introduces the CAF assessment framework that we developed and apply in the rest of this document to assess how the costs of asset classes have been treated in the CAF. This framework provides a series of logical steps that can be worked through to ensure that costs are disposed of or allocated in line with the principles described in Section 2.2. It represents a development of the principles set out in previous discussion papers and most recently in the ACCC's *draft decision*.

Figure 2.2: CAF assessment framework for disposal and cost allocation [Source: Analysys Mason, 2015]

Step	Description
1: Disposals	• The asset disposal mechanism is used to remove from the RAB all assets that are sold, decommissioned or could be decommissioned by an efficient operator. • Assets are *scalable* if an efficient operator would decommission them if they are not in use. An asset can be *partially scalable* if only a component of it can respond to being made redundant or if only a component of it is not in use. • Assets considered as scalable are made redundant as subscribers are disconnected from them and should be removed from the RAB if they are not in use. • Assets considered as unscalable would not be decommissioned by an efficient operator without additional incentives. Their cost must be allocated through the CAF, together with assets that are being actively and efficiently utilised.
2: Allocation of remaining assets in the CAF	
2a: Allocation of efficient costs	• Efficient costs should be allocated in line with the following principles: ○ cost causation ○ distribution of benefits ○ cost minimisation ○ effective competition (LTIE) ○ practicality (of gathering data). • Any remaining costs reflect overcapacity or diseconomies of scale that even an efficient operator would incur; these are considered in Step 2b below.

<table>
<tr><th>Step</th><th>Description</th></tr>
<tr><td>2b: Allocation of overcapacity</td><td>Issues of overcapacity cannot be dealt with through the asset disposal mechanism if the asset is unscalable; instead they will need to be dealt with via the fully allocated CAF. We note that the definition of a fully allocated BBM can come into conflict with the principles of cost causation and distribution of benefits for assets where diseconomies of scale are brought about by migration of subscribers to the NBN. Therefore, the allocation of overcapacity requires a compromise between these positions.
Where overcapacity is measurable and allocable it should be allocated in line with the principles in Step 2a
Allocation of overcapacity caused by diseconomies of density and scale should consider which party caused the overcapacity and/or which party has the right to use this overcapacity.
• If any party (or service) may use the overcapacity then it would be equitable and in line with the principle of distribution of benefits to use an equi-proportional mark-up (EPMU) on the current usage. The overcapacity can be considered to be a real option to deploy cabling that all parties (or services) can potentially exercise.
• If the spare capacity may only be used by one party (or service) then that party (or service) should bear the cost. In the case of Telstra, that party (or service) could be 'Telstra corporate' or the 'NBN-Telstra agreement' cost centre rather than 'Telstra fixed services', if the benefit is not specific to fixed-line services. However, in order to allocate this capacity to a particular party (or service) it should be measurable and capable of being allocated to a single party (or service). Where this is not possible, all subscribers should bear the cost of overcapacity, as in the case above.

Where overcapacity is not measurable or allocable:
Overcapacity that cannot be attributed to a particular identified service should be considered a cost or a benefit to all services. Therefore the cost of this overcapacity should be allocated as an EPMU on the known usage of the service.
This is analogous to the way in which business overhead costs such as the CEO or HR are typically allocated. For instance, the CEO office's costs and benefits are borne by all services but the relative benefits or drivers of cost causation are usually either not measurable or allocable.</td></tr>
<tr><td>2c: Measurement of overcapacity</td><td>In order to be allocated, spare capacity needs to be measured. It could be calculated in different ways, including two that we identify below:
• Average costing (each service pays for its own use according to its use of the capacity, and the remaining cost is the spare capacity). This approach may result in the calculated cost of overcapacity being high even if the incremental cost of the spare capacity is low.
• Incremental costing (the cost of spare capacity is the difference between the total cost of the assets and the cost of the assets that would have zero spare capacity). This approach may be difficult to implement, since it requires extensive data on costs and capacities in scenarios with and without the spare capacity in place.</td></tr>
</table>

2.3.1 Disposals

We also note that the CAF needs to be consistent with the ACCC's position on asset disposals and additions to the RAB, as the CAF allocates costs after the RAB has been modified. We understand that the ACCC is currently developing its views on this but the position that the ACCC is expecting to put to consultation is that certain assets exhibit characteristics of diseconomies of scale as a result of the migration of subscribers to the NBN. These are as follows:

- *Assets that become progressively redundant as the NBN is rolled out (scalable assets).* When these assets become redundant they should be removed from the RAB through the asset disposal mechanism
- *Assets that are not made progressively redundant as the NBN is rolled out and become progressively under-utilised (non-scalable assets).* When these assets become less utilised, they should not be removed from the RAB but the CAF should allocate the excess capacity appropriately.]

We understand that the approach that the ACCC will seek comments on is a development of that presented in the *draft decision.*[17] That can be summarised as follows:

1. assets sold to NBN Co should be removed from the RAB through the asset disposal mechanism
2. assets that NBN Co shares the use of with declared services should be accounted for in the CAF
3. assets that are categorised as under-utilised and therefore containing overcapacity as a result of migration to the NBN should be accounted for in the CAF
4. all disposals would be based on regulatory values.

Point 3 above is an addition to that presented in the ACCC's *draft decision*[18] in March 2015. In its *draft decision,* the ACCC indicated that assets decommissioned or under-utilised as a result of the NBN would be removed from the RAB.

In line with the ACCC's approach, the first suggested step for our CAF assessment framework (Step 1) relates to disposals from the RAB. In our view modifications to the RAB should be minimised in order to retain regulatory certainty and to remain consistent with the notion of a fixed BBM.

However, where an efficient operator would consider that an asset (or component of an asset) is no longer capable of contributing to providing a service in the fixed access network it should be removed from the RAB through the asset disposal mechanism. This would account for cases where assets are decommissioned or sold (to NBN Co or other parties). This is consistent with the

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17 For example, local switching equipment and data equipment are discussed on page ix.

18 For example, page ix and page 140.

submissions of parties to the ACCC as summarised in the October 2014 position paper[19] (we note that in the March 2015 *Telstra submission*, Telstra stated that it considered only sold assets should be disposed of through the asset disposal mechanism[20]).

The cost of assets which an efficient operator would continue to operate whilst under-utilised (unscalable) must be allocated through the CAF, together with assets that are being actively and efficiently utilised.

This is consistent with the LTIE, in that it provides incentives for cost minimisation but only to the extent to which this is actually achievable by an efficient operator. This is also in line with the principles of cost causation and distribution of benefits, since only costs caused by a service and of benefit to services being operated are left to be allocated by the CAF.

2.3.2 Allocation of remaining assets in the CAF

Allocation of efficient costs

The CAF should allocate the remaining efficient costs across all appropriate services. With respect to the impact of the NBN, this step (Step 2a in Figure 2.2) should therefore apply to asset classes where some assets are leased to NBN by Telstra. This is in line with submissions from Telstra, the Department of Communications and Frontier, according to the ACCC's October 2014 position paper[19] and the position adopted in the *draft decision.*

It is important to note that in a FAC framework (as opposed to the previous partially allocated approach) the allocation factors respond to demand for *all* services, not just fixed-line services. The FAC approach ensures that the use of the fixed-line network by both regulated services and non-regulated services is fully accounted for. This is one of the reasons the ACCC cites in its *draft decision* for suggesting that it is minded to adopt a fully allocated cost model.

In the first instance the cost allocation for each asset class should balance the principles of:

- cost causation
- distribution of benefits
- cost minimisation
- effective competition (LTIE)
- practicality (of gathering data).

The principles apply equally to efficient costs and to efficiently incurred overcapacity. If it is not possible to allocate the overcapacity then a pragmatic solution is to apply the EPMU approach described in Figure 2.2. This approach provides potentially fewer incentives for cost minimisation

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19 See https://www.accc.gov.au/system/files/Position%20statement%20on%20the%20treatment%20of%20the%20Telstra-NBN%20Co%20arrangements%20-%20October%202014_0.pdf, page 7–8.

20 For example, pages 13–14 and 39–40.

because it distorts the link between cost causation and cost allocation. However, it is a practical approach, it does ensure that all efficient costs are recovered (which is also a requirement of effective competition and LTIE) and it is less likely to introduce significant distortions given that it affects all services in the same way.

Where EPMU is used the allocation should be reviewed regularly, either with a view to moving to direct allocation if possible or to ensure that the EPMU is based on the latest information. In addition, the ACCC should consider ways in which to maintain or strengthen incentives that promote LTIE. This is discussed below in Section 2.4.2.

Application of framework to instances of overcapacity brought about by the NBN

In WIK's *assessment of Telstra's expenditure forecasts* it identified potential concerns related to Telstra's proposed CAF and the forecasts on which it relies. In particular, WIK identified potential problems relating to overcapacity arising from the migration of subscribers to the NBN in some asset classes (ducts and pipes, network land and buildings),[21] resulting in an over-allocation of cost to fixed-line services. WIK also raised potential concerns about the consistency of the rack usage forecast proposed by Telstra with the migration of subscribers to the NBN.[22]

According to the principles set out in the assessment framework above, the CAF should assign the overcapacity to the party (or service) that caused it and benefits from it, if the overcapacity is measurable and allocable. For some asset classes, or components of asset classes, it could reasonably be argued that overcapacity is caused by the existence of the Telstra–NBN agreements rather than by any particular service.[23]

Below, we outline two possible practical approaches that the ACCC could potentially choose from which offer a reasonable compromise between the fixed principles, the principles of a BBM, the use of a fully allocated framework and the LTIE.

► *Allocation across all relevant services*

As discussed above, if an identified overcapacity cannot be allocated to a particular party or group of services, then a practical approach is to allocate the cost of overcapacity to all relevant services in proportion to their relative use of that asset (EPMU).

► *Allocation to the Telstra-NBN agreement*

Under the Telstra–NBN agreements, Telstra has undertaken not to compete on fixed-line services with the NBN in areas where it is deployed. Therefore any overcapacity in those areas cannot reasonably be allocated to fixed services on grounds of cost causation or distribution of benefits.

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21 This is discussed in the *WIK assessment of Telstra's expenditure forecasts*, paragraphs 7 and 79–83, in relation to ducts and pipes as well as paragraphs 84–88 for land and buildings in terms of rackspace.

22 See *WIK assessment of Telstra's expenditure forecasts*, paragraphs 8 and 86.

23 For example, WIK outlines one justification in paragraph 94 of its *assessment of Telstra's expenditure forecasts*.

Similarly, the NBN services do not make use of this overcapacity, since the NBN Co lease payments only pay for the right to use defined quantities of Telstra assets which are transferred or leased to it. It is not the NBN services that cause the overcapacity as such, but rather the nature of Telstra's arrangements with NBN Co (including non-compete clauses and transfer/sale of assets). Whilst the existence of the Telstra–NBN Co agreement may have *caused* the overcapacity (and its costs) in some sense, it is unlikely that NBN Co would be the party able to accrue benefit from the overcapacity and therefore it would not be consistent with the principles identified previously to allocate the overcapacity only to the NBN services.

Thus, the overcapacity within assets considered as under-utilised does not accrue benefit either to CAN services or to services delivered over the NBN.[24]

Instead, Telstra (as a corporate entity) retains the right to use this overcapacity, subject to the restrictions it agreed to in the Definitive Agreements (DAs) with NBN Co.[25] It is conceivable that the NBN services' requirements could change in the future and NBN Co might wish to increase its use of Telstra's assets over time. However, if this scenario were to occur we expect that NBN Co would have to enter into a further commercial agreement with Telstra, which would have the opportunity to recover the cost of the overcapacity by leasing part of the overcapacity.

This implies that the cost of the resulting overcapacity could be allocated to an appropriate cost centre within Telstra. That cost centre would represent Telstra's corporate arrangement with NBN Co (as opposed to being applied to Telstra's regulated or non-regulated fixed-line services cost centres). This appears to be consistent with the recommendation in WIK's *assessment of Telstra's expenditure* to break asset classes down into components that are related to regulated fixed-line services, non-regulated fixed-line services, attributable to NBN and attributable to other services. We understand that Telstra's expenditure forecast model includes a cost centre called **[Telstra CiC]……………………………[CiC ends]**.[26] This may be an appropriate cost centre to which to allocate the cost of overcapacity brought about as a result of the NBN and avoid allocating diseconomies of scale to fixed-line service subscribers. This cost centre would then also retain the option to utilise this overcapacity in the future (e.g. leasing duct space to an alternative network deployment or leasing rack space to a data-centre provider or content delivery network).

The use of a BBM model and fully allocated CAF means that all required revenues calculated for the BBM should be recovered. Therefore this approach is an appropriate method of allocating the costs of NBN-induced diseconomies of scale as long as the NBN-Telstra agreement cost centre has recovered or is expected to recover the required revenues calculated by the BBM. These revenues might take the form of past or future consideration received by Telstra from NBN Co (Telstra has

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24 This is in line with the arguments described in the *draft decision* e.g. sections 9.5.3 and 10.

25 For instance, Telstra (corporate) could lease or sell duct overcapacity to a third party intending to deploy a further fixed-line access network that would compete with NBN. There may also be other services that Telstra could offer, depending on the precise details of the DAs.

26 This is specified in Telstra's document **[Telstra CIC]…………………………………………………[CIC ends]**

argued that this was not the intention of the currently agreed NBN Co's payments) or revenues from alternative uses of infrastructure.

We also note that in order to implement this approach, it is necessary to identify and quantify the value of the diseconomies of scale brought about by the NBN as distinct from diseconomies of scale brought about by other factors (such as fixed-to-mobile substitution).

Measurement of overcapacity

As identified above, overcapacity needs to be measurable in order to be allocated to a service or group of services.

Overcapacity could conceivably be calculated in two different ways:

- *Average costing:* each service pays for its own use according to its use of the capacity and the remaining cost is the spare capacity. This approach may result in the calculated cost of overcapacity being high even if the incremental cost of the spare capacity is low but is much easier to implement.

- *Incremental costing:* the cost of spare capacity is the difference between the total cost of the assets and the cost of the assets that would have zero spare capacity. This approach results in a lower cost of overcapacity but it may be difficult to implement since it requires extensive data on costs and capacities in scenarios with and without the spare capacity in place.

The main criteria for deciding which of the two methods to use would be: *firstly,* the availability of data on how cost varies with capacity (i.e. the less data there is, the more likely that the average costing approach will be chosen); and *secondly,* the extent to which capacity drives the cost of the asset (i.e. the more variable the cost of an asset is, the more likely it is that the average costing approach will be chosen).

2.4 Alternative approaches

Should the ACCC consider that neither the pragmatic EPMU approach nor the 'Telstra-NBN agreement' cost centre approach is suitable for allocating the costs of overcapacity, we would suggest that the ACCC considers alternatives, as detailed below.

2.4.1 Assuming a hypothetical ongoing CAN

We note that the ACCC is not bound to use a fully allocated CAF and therefore an approach open to it that avoids allocating costs to fixed-line service access seekers is to use a CAF that does not model the NBN and instead assumes a hypothetical ongoing CAN. This is the approach taken by Ofcom in setting its price controls for local loop unbundling and wholesale line rental services in the UK.[27] This could be implemented by using an ex-NBN demand forecast (such as that provided by Telstra in its proposed CAF model). This would ensure full recovery of the BBM's revenue requirements in an ex-NBN world which is the scenario the BBM and fixed principles were developed for. Choosing this approach is consistent with the view that it was Telstra's choice not to compete with the NBN and that the principles of the BBM, fixed principles and LTIE should not be compromised by Telstra's decision.

2.4.2 Incentives for cost minimisation

Should the ACCC identify a lack of incentives for cost minimisation and promotion of LTIE over the next regulatory period due to the constraints imposed by the BBM methodology and fixed principles, we discuss below two further approaches for strengthening the incentives for cost minimisation. These may not be necessary in the present regulatory period, but could be an option in the future if required. It should be noted that these approaches have potential costs in terms of additional pricing complexity and practicality (e.g. data requirements during the price-setting process).

A potential risk associated with for instance the allocation of spare capacity using EPMU is that incentives for cost minimisation might be eroded by cross-subsidisation. The logical remedy is therefore some form of disaggregation. We have identified two possible forms of remedy (although note that there may be other possible approaches):

- *Disaggregation by service:* If elements of the CAN continue to operate in certain areas purely to serve subscribers of special services[28] then the CAF could be modified to ensure that these costs can be distinctly allocated to those services. This would prevent PSTN subscribers from cross-subsidising special service subscribers (or *vice versa*).
- *Geographical disaggregation:* This would, for instance, allow a distinction to be made between areas where the NBN is not available and areas where both the CAN and NBN are available. This would prevent subscribers in CAN-only areas from cross-subsidising the cost of overcapacity in areas where most subscribers have migrated to the NBN.

Either approach could help to strengthen the cost minimisation incentives for parties that may not otherwise bear the costs of diseconomies of scale that they may be causing. These forms of disaggregation would enable appropriate price signals to be set that reflect the true costs of end-user, access-seeker or Telstra behaviour in each area, or for each service. This would encourage all parties to make rational choices which minimise cost for all parties.

[27] Ofcom's 'anchor pricing approach', described in "Fixed access market reviews: wholesale local access, wholesale fixed analogue exchange lines, ISDN2 and ISDN30 – Volume 2: LLU and WLR Charge Controls"; see http://stakeholders.ofcom.org.uk/binaries/telecoms/ga/fixed-access-market-reviews-2014/statement-june-2014/volume2.pdf para3.55.

[28] This may be rational behaviour on the part of special services subscribers who wish to avoid the short-term cost of migration to the NBN if this requires equipment changes or subscription to a more-expensive equivalent service on the NBN (e.g. updating equipment to be compatible with IP, or subscribing to a dark-fibre service if the NBN is not capable of supporting the required service natively).

3 Routeing factors

This section discusses the inputs which are primarily related to the routeing factors set out in the *Allocations* sheet of the FLSM (rows 1360–1384) and in the separate workbook: "*FLSM Cost Allocation - Routing Factors (June 2014).xlsx*". Later in the process the CAF uses these inputs to calculate the allocation factors.

3.1 Overview of FLSM cost allocation – Routeing factor calculations

The CAF relies heavily on the routeing factor table (*Allocations* sheet of the FLSM, rows 1360–1384) since it defines the relationship between asset classes and the services that they support. The routeing factor table is reproduced in Figure 3.1 below, in three parts. The calculation of the routeing factors for asset classes CO01–CO06 is described in Appendix B of the *CAF user guide*.

Figure 3.1: FLSM v1.3 routeing factor table [Source: FLSM v1.1, Allocations sheet with modifications based on descriptions provided by Telstra, 2015]

[Telstra CiC]

3.1.1 Access asset classes

The routeing factors for all asset classes relating to the CAN are relatively straightforward, in that they are either set to 1 (where a service is supported by an asset class) or 0 (where it is not).

- Asset classes CA01,[29] CA02,[30] CA06,[31] CA07,[32] CA08[33] and CA09[34] are assigned to the PSTN, ISDN-BRI, ULLS, WLR Retail DSL and Wholesale DSL services by band (to allow variation by geotype to be accounted for)
- Asset classes CA03[35] and CA05[36] are assigned to PSTN Retail Access and WLR[37]
- Asset class CA04[38] is assigned to PSTN Retail Access, ISDN-BRI and WLR.[37]

In answering one of our queries on how Copper-PRI services use the access network, Telstra[39] noted that in fact ISDN-PRI services use two copper tails where they use copper access infrastructure. Telstra also noted that the majority of ISDN-PRI services are in fact delivered over fibre access tails. Furthermore, Telstra noted that ISDN-PRI could not be delivered on copper cable routes where pair gain equipment was in place. Therefore Telstra issued an updated version of the FLSM results (v1.3) where routeing factors for ISDN-PRI were set to zero for all access asset classes. We note that we have not received the full model to check the correction but the changes described in the accompanying model documentation seem reasonable.

We have reviewed these routeing factors as presented in the *Allocations* sheet of the FLSM. Our assessment is that these are logical and we do not suggest any changes.

We note that the routeing factors for a number of Access asset classes[40] allocate costs to the 'Other DSL' service but not the 'Retail DSL' or 'Wholesale DSL' services. We understand that the 'Other DSL' service is not taken in conjunction with a fixed-line voice service, and therefore the cost of the access network serving these (mainly business) subscribers needs to be recovered through this service.

29 Ducts and pipes.

30 Copper cables.

31 Other CAN assets.

32 Other communications plant and equipment.

33 Network land.

34 Network buildings/support.

35 Other cables.

36 CAN radio bearer equipment.

37 These are not split by band and are therefore implicitly a national average distribution.

38 Pair gain systems.

39 *Telstra response to Analysys Mason queries (June)* Q6.

40 Asset classes CA01, CA02 and CA06–09.

3.1.2 Core asset classes

The routeing factors for all asset classes relating to the core network are a mixture of routeing factors calculated in the *routeing factor model* and engineering logic.[41] The routeing factors reflect the relative usage of each asset class by each service, since switches and links are used a different number of times depending on the call type. For instance, according to the calculated routeing factors a local call uses, on average, **[Telstra CiC]** local switches per call whereas a national call uses **[Telstra CiC]** local switches per call. The routeing factors vary between different types of switch and transmission link and between services.

For asset classes CO01 to CO06,[42] the *routeing factor model* is used to set the routeing factors for the following services based on geographic call volumes (and in the case of CO01,[43] also on services in operation (SIOs)) and the usage of each type of transmission link and node.

- PSTN local calls
- PSTN national STD
- PSTN international
- PSTN fixed to mobile
- PSTN OTA (Originating/terminating access service)
- LCS (Local carriage service).

The routeing factors for the ISDN voice service are based on the call volume weighted average of routeing factors for PSTN local, PSTN national STD, PSTN international and PSTN fixed to mobile. Telstra provided this calculation,[44] which uses 2014 call volumes, in addition to the *routeing factor model*. We have verified the calculations and believe this to be a reasonable approach for estimating the use of transmission and switching assets by ISDN for the purposes of the CAF, since it seems not unreasonable to assume that ISDN calls have the same distribution of local, national, international and fixed-to-mobile calls as PSTN calls and that an ISDN call uses the same switching and transmission assets once in the core.

In addition to the factors above, the routeing factors for ISDN-PRI (which were added by Telstra in its June modifications to its proposed CAF) assign a routeing factor of 1 to ISDN-PRI for asset classes CO04, CO05 and CO06 which facilitate core transmission by ISDN-PRI.

The routeing factors for asset classes CO11[45] and CO12[46] are based on engineering logic, which we have checked and agree with.

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41 See also the discussion in Annex C.

42 Switching equipment – local; Switching equipment – Trunk; Switching equipment – Other; Inter-exchange cables; Transmission equipment and Core radio bearer equipment.

43 Switching equipment – local.

44 This calculation is not included in the main *routeing factor model* that was provided in the initial tranche of information for review. The file *ISDN Routing Factor calculations.xlsm* was provided after we queried the source of the ISDN routeing factors.

45 LSS equipment.

Asset classes CO07,[47] CO08,[48] CO09[49] and CO10[50] do not use routeing factors but are instead allocated on the basis of the General Allocator method (as described in Section 5.6).

3.1.3 The routeing factor model

The *routeing factor model* relies on a combination of call dispersion data and engineering logic to build up the routeing factors used in the CAF.

Telstra defines service types per call which vary by geography (i.e. depending on whether each leg of the call is in a metro or non-metro area). According to the formula in column K of the *Data* sheet of *the routeing factor model* the following definitions apply:

- Local LAS calls have the same originating and terminating node
- Local Zone calls have the same originating and terminating area
- Other Zone calls are in the same state
- the remainder are interstate calls.

We are satisfied that these are logical.

Telstra also defines equipment usage by call type and geography as an input to the *routeing factor model*. We examined the logic of this table and checked its consistency with the call type definitions. This is discussed in Annex B and shown as an input in Figure 3.2. However, we noted one error with respect to the equipment usage for F2M Metro and F2M Non-metro services (as described in Annex B). Telstra acknowledged this was a mistake and corrected it in the revised CAF. However, we note that we have not been able to verify this, as the revised *routeing factor model* was not provided to us.

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46 Data equipment.

47 Other communications plant and equipment.

48 Network land.

49 Network buildings/support.

50 Indirect capital assets.

Figure 3.2: Routeing factor calculation structure [Source: Telstra routeing factor model, 2015]

[Telstra CiC]

Note that the tables above exclude F2M, OTA and International calling components.

The geographic call dispersion data indicates a national weighting for call types. This data is used to weight the information in the original service types per call type and geography table (Step 1 in Figure 3.2).

In turn this is multiplied by the usage of switch and transmission assets by geography to calculate the routeing factors in the final table of Figure 3.2 (Step 2). This indicates the average usage of each asset by call type.

Since the FLSM operates on the basis of asset classes rather than distinct switch or transmission link assets, the final step (Step 3) is to aggregate the routeing factors into routeing factors applicable to asset classes.

3.1.4 Call dispersion data

In addition to verifying the logic of the engineering inputs to the *routeing factor model* and its methodology we also considered the suitability of the call dispersion data. We noted the following points:

- **[Telstra CiC]**
- **[…]**
- **[…]**
- **[…]**
- **[…]**
- **[…]**
- **[…]**
- **[…]**
- **[…]**
- **[…]**
- **[…]**
- **[end Telstra CiC]**

We agree that the methodology used to produce the call dispersion dataset is reasonable in the context of its use in the CAF. However, we have some reservations about the age of the data used.

Telstra argued that network topography has not changed between [**Telstra CiC]** and 2015. In addition, Telstra argued that there has been no significant demographic change resulting in a shift of population between exchange areas such that call dispersion between nodes would have been distorted in a systematic way. Telstra's conclusion is that the risk of altering the routeing factor results was sufficiently low to outweigh the cost and delay involved in updating the call dispersion data extract.

Our view is that relying on a single [**Telstra CiC]** dataset is inherently risky, but that this is preferable to relying on a proxy measure for the use of switches and transmission by different call types. If we accept Telstra's statements that network topography remains unchanged since

[**Telstra CiC]** (since we are unable to independently verify this) and that population distribution and calling patterns are also stable then we would expect the materiality of the impact on the CAF of any changes in the intervening period to be reasonably small. We also note that Telstra expects the time and resource requirements for an update to call dispersion data to be large. On that basis we would be minded to accept the call dispersion data provided as a reasonable input to the CAF in this regulatory period in the way it is currently used. However, we would recommend that this input is fully updated for any future version of the FLSM.

3.1.5 Conclusion

We have reviewed the routeing factors as presented in the supporting *routeing factor model*. Our assessment is that these are logical and reasonable to rely on for the purposes of this CAF, with the exception of one error with respect to the equipment usage for F2M Metro and F2M Non-metro services that should be corrected.

We also note our reservations about the age of the call dispersion data which should certainly be updated for any future update of the FLSM.

3.2 Implementation of routeing factors in the Cost Allocation Framework

The routeing factors are brought into the FLSM in the *Allocations* sheet (rows 1360–1384 and replicated above in Figure 3.1). The routeing factors for CO01 to CO06 are based on those calculated in the *routeing factor model* and the remainder are set to 1 or 0 based on the engineering logic described in Section 3.1 above.

Asset classes CA10,[51] CO07, CO08, CO09 and CO10 use the General Allocator method rather than routeing factors as described in the relevant sections of our report, below.

The application of each set of routeing factors to calculate the allocation factors for each asset class is described in Sections 4 and 5 below.

51 Indirect capital assets (access).

4 Access network

This section discusses the inputs primarily related to the access network and the way in which they are used to allocate costs for each asset class. In each sub-section we briefly discuss the key characteristics of the proposed allocation methodology and provide our comments on its suitability for the CAF. More-detailed descriptions on the proposed methodology are available in Telstra's model documentation.

4.1 Ducts and pipes (CA01)

4.1.1 Description

CA01 is an important asset class, since it represents [**Telstra CiC]**of the total access and core revenue requirements over the ten years of the model period (according to data in rows 281–330 of the *6.Revenue Requirements* sheet of the current FLSM). In addition, CA01 makes up [**Telstra CiC]** of the total cost allocated to ULLS in bands 1–3 and [**Telstra CiC]** in band 4 in Telstra's proposed CAF in 2013/14. It also makes up [**Telstra CiC]** of the total cost allocated to WLR. It is therefore important to allocate this asset class appropriately, as it makes up a significant portion of the costs for a number of key regulated fixed-line services.

A "duct usage" forecast is used to allocate the cost of asset class CA01 between fixed-line services and other services on the basis of total duct km used by each service type (where other services might be NBN FTTN, NBN FTTP/dp, HFC or other services,[52] as shown in Figure 4.1). The proportion of cost that is allocated to fixed-line services is then further allocated between the services that use the CAN, on the basis of the number of subscribers to each relevant CAN service (by band). These are PSTN retail access, WLR, ISDN-BRI, ISDN-PRI, ULLS and Other DSL (i.e. business DSL services that do not take a PSTN line, or 'naked' broadband services).

52 This includes services such as wholesale duct usage by third parties.

[**Telstra CiC]**

Figure 4.1: Telstra's proposed duct usage forecast [Source: Telstra proposed CAF model, 2015]

4.1.2 Assessment

In this section we consider the duct usage forecast and whether it reflects the major changes that can be expected as a result of the NBN deployment. We also discuss the suitability of the duct usage km metric and make a number of other observations. We recommend changes to the CAF based on this discussion and show the impact of our recommendations in Section 4.1.3 below.

The duct usage forecast

In 2013/14 the CAN duct usage forecast developed by Telstra starts with [**Telstra CiC]** of duct usage, which can be split into four types of CAN area, discussed in turn below:

- areas where FTTN is deployed
- areas where HFC is deployed
- areas where FTTP/dp is deployed
- areas where no NBN is deployed.

► *CAN areas where FTTN is deployed*

- Where FTTN is deployed we would expect this to result in either a transfer of ownership of any existing Telstra fibre feeder to NBN Co or the deployment of an NBN Co fibre feeder in place of a decommissioned CAN copper feeder

- In either case the CAN usage of duct in FTTN areas will reduce as the CAN copper feeder is decommissioned. This is what Telstra does in its forecast: it allocates this duct usage to NBN FTTN and removes it from the CAN duct usage.

- In Telstra's forecast there are [**Telstra CiC]** of duct usage km reallocated from CAN usage to NBN FTTN usage by 2018/19 (and [**Telstra CiC]** by the end of the NBN roll-out).

► *CAN areas where HFC is deployed*

- We understand that Telstra's HFC assets will be transferred to NBN Co, and so there will be no physical change to the network for these assets. A change of ownership would therefore be consistent with NBN Co's usage directly replacing Telstra's usage.
- Telstra's forecast identifies [**Telstra CiC]** of duct usage by the HFC network. This entire usage is allocated to HFC. The progressive change in ownership of this network is not adjusted in the model to reflect the transfer to NBN Co, but this does not change the allocations made to CAN duct usage.
- We note that in areas where HFC is deployed, the CAN is also present. HFC subscribers take PSTN voice services over the CAN and data and/or cable TV from the HFC network. Therefore where the HFC network is migrated to the NBN, the CAN deployed in parallel should also be decommissioned (due to the non-compete agreements between Telstra and NBN Co). This could be represented in the duct usage forecast by subdividing the HFC usage forecast between NBN HFC and Telstra HFC. Over time the HFC network would be transferred from Telstra HFC to the NBN HFC, in line with the number of premises passed by HFC (see the *NBN Deployment Parameters* sheet of the FLSM). The usage transferred to the NBN HFC each year should be subtracted from the CAN.

► *CAN areas where FTTP/dp is deployed*

- In areas where FTTP is deployed [**Telstra CiC]** of duct usage is added to Telstra's forecast and allocated to NBN FTTP/dp usage by 2018/2019 (and [**Telstra CiC]** by the end of the NBN roll-out). Telstra has modelled no corresponding reduction in the usage of duct allocated to the CAN, since it argues that this usage is additive rather than substitutive.
- Telstra's implementation effectively duplicates duct usage in areas where FTTP/dp is deployed – the CAN duct usage remains in place and an additional volume of FTTP/dp duct usage is added. The duct usage allocated to CAN therefore remains unchanged in *absolute* terms, though its *relative* share is reduced due to the addition of FTTP/dp usage to the total usage (the denominator in the CAF).
  - Telstra takes this approach since it argues that there is little opportunity for economic rationalisation (i.e. the extraction cost of copper in these areas is greater than its recovery value). This is explained in Telstra's *Guide to Forecast Assumptions* (page 23).
- Our view is that the NBN's use of this duct in these areas is only additive if the CAN in these areas continues to operate, since the chosen metric is duct usage, rather than a measure that directly accounts for duct capacity (such as cross-sectional area). Given the non-compete agreements that have been signed between NBN Co and Telstra it seems that the CAN in these areas would not continue to operate. Therefore we would expect the CAN to be

decommissioned once the migration is complete, and hence it would no longer 'use' the duct in these areas.

- The implication is therefore that CAN usage in FTTP/dp areas should also decrease once the migration is complete. This should be represented in the duct usage forecast by subtracting the growth in the allocation of duct usage to FTTP/dp from the duct usage allocated to the CAN.

- In addition, we note that the assumed split between FTTP/dp areas and FTTN areas does not seem to be driven by actual data but by a simple assumption about the number of SIOs served by each technology. This attributes a higher share of duct to FTTP. However, this is only an issue if duct usage for FTTP/dp is not allocated to the NBN (i.e. treated as substitutive, like that of FTTN).

► *CAN areas where no NBN is deployed*

- In 2013/14 the CAN starts with [**Telstra CiC]** of duct usage and this grows to [**Telstra CiC]** in 2018/19. Of this total usage:
  - [**Telstra CiC]** is converted to NBN FTTP/dp usage by 2018/2019 in Telstra's forecast (and [**Telstra CiC]** by the end of the NBN roll-out)
  - [**Telstra CiC]** is converted to NBN FTTN usage by 2018/2019 (and [**Telstra CiC]** by the end of the NBN roll-out)
  - [**Telstra CiC]** represents the HFC usage of the network.

- By the end of the NBN deployment the total NBN duct usage is forecast by Telstra to be [**Telstra CiC]**. This is approximately half of the duct usage required by the CAN in 2013/14 to serve all of Australia (barring the small proportion of premises already migrated). Telstra suggested that this is because the NBN uses a different network topology and technologies (e.g. wireless and satellite in the most rural areas) to the CAN and may also make use of third-party ducts, utility poles and direct burial.[53]

- The [**Telstra CiC]** figure for the assumed total usage of duct by NBN Co at the end of its roll-out is the best currently available to us. Telstra explained these assumptions in its responses to our queries.[54] Its assumptions seem reasonable but are difficult to independently verify without detailed information from NBN Co. We recommend that the ACCC should review this forecast for future regulatory period to ensure that any changes to the deployment envisaged are taken into account.

The duct usage km metric

Telstra's implementation for duct kilometres seems to abstract the 'duct usage km' metric from the main driver of cost (that is, the cost of digging trench, laying duct and reinstating the surface). The

53 *Telstra response to Analysys Mason queries (June),* Q1.

54 *Telstra response to Analysys Mason queries (April)*, Q39 and *Telstra response to Analysys Mason queries (June),* Q1.

definition used multiplies the sum of ducts and sub-ducts by the length of cable route contained, so that a sub-duct has equal weight to an (outer) duct. It should be noted that this could distort the allocation of duct to different services, and it could distort the distribution by band.

Telstra has explained that copper and fibre cable sheaths that belong to the HFC network or to third parties are sub-ducted, whereas Telstra lays its own copper and fibre inside ducts without the use of sub-ducts. Telstra therefore argues that the only way to account for both groups of uses is to use the definition described above.

We have examined the distribution of the "Telstra Fixed Network Length"[55] and compared it to the calculated duct and subduct lengths.[56] These indicate that the distribution between bands 1–3 and band 4 does not vary too widely with duct length and sheath length.[57] The impact on the calculated allocation of costs of the weightings between the bands will be influenced by the definition of the duct usage km metric, but not significantly so.

We note that Figure 4 in the *CAF user guide* shows that the lead-in conduit is excluded from this asset class. Telstra confirmed this point in its response to our queries. Telstra also stated that there is some use of core network fibre in the duct network. Telstra did not provide evidence to substantiate the extent of this, but in its response to our queries it did explain that the majority of fibre in the CAN is used to support FTTP or nodes containing CMUX or DSLAM equipment. We understand that Telstra considers these to be part of the core, but for the purposes of the FAD these fall into the RAB and thus it is not a problem for this type of core fibre to be present in CAN ducts (and this explains why core fibre can be identified in the CAN).

Telstra has also stated that most inter-capital/intercity fibres (i.e. core fibre) are not run in ducts for most of their length. They are only run in ducts where core fibre is coincident to the CAN. Telstra stated that core fibre did not occupy a significant proportion of CAN duct,[58] which seems at odds with the proportion of core fibre present in CAN duct according to previous bottom-up modelling work.[59] We note that this bottom-up model represented a hypothetical efficient operator rather than that captured in the BBM, and therefore may overstate the proportion of core/CAN overlap in Telstra's actual network.

Ideally the usage of ducts by core fibre should be identified, and the cost of occupied duct allocated to it and in turn to the services that use it (a combination of fixed-line services and other services). Identifying the volume of core usage of duct and the correct allocation to services does not seem to be possible based on the data available and therefore a practical approach is to make

55 That is, the total length of the network as reported in the *conduit_usage_report* sheet of 'CA01 - Ducts and Pipes.xlsx'.

56 See the *Table* sheet of 'CA01 - Ducts and Pipes.xlsx'.

57 [**Telstra CiC]** of conduit is in band [**Telstra CiC]**of subconduit and [**Telstra CiC]** of route is in band 4.

58 *Telstra response to Analysys Mason queries (April)*, Q11.

59 In the 2010 bottom-up model of a hypothetical efficient operator built by Analysys Mason for the ACCC, there was [**CiC]** of core coincident with the CAN (where the CAN was **[CiC]**), representing a core presence in about [**CiC]** of the CAN duct.

no adjustment to the CAF for this as a robust alteration to the allocation cannot be made in the current regulatory period.

The most important observation we would make regarding the duct usage km metric is that it does not reflect the actual amount of duct in the network. This explains why Telstra's duct usage forecast can rise from a total of [**Telstra CiC]** in 2013/14 to [**Telstra CiC]** in 2018/19 despite a growth rate of under [**Telstra CiC]** per annum in each band for the actual duct length. According to Telstra's data,[60] the ratio of duct usage to actual duct length in 2013/14 is [**Telstra CiC]**. This implies that there is [**Telstra CiC]**of duct <u>usage</u> in the CAN for every 1m of duct. This should be reflected in the duct usage forecast when the CAN is decommissioned to make way for FTTN or FTTP: that is, for every 1m of FTTN or FTTP deployed, [**Telstra CiC]**of CAN should be subtracted. The same is true when HFC is migrated to the NBN: that is, [**Telstra CiC]**of CAN should be decommissioned for every 1m of HFC cut over to the NBN. This assumes that different uses (e.g. HFC, FTTP) are distributed uniformly between network elements (e.g. MDF to node, node to distribution point).

The base-year distribution of duct usage

Telstra provided a copy of its calculations and the underlying extract from its TPNI database (Telstra's Physical Network Plant Inventory[61]) for 2013/14. We have verified the calculations and are satisfied that this dataset is suitable, subject to the concerns raised above regarding the lack of evidence for core use of the duct network, and concerns discussed on page 33 below relating to overcapacity.

Other comments on the duct usage forecast

The usage forecast is clearly an important driver of the allocation of costs of asset class CA01 over the regulatory period, since it uses the base-year (2013/14) duct usage as recorded in TPNI, and extrapolates this into the future. It is important that the forecast reflects the evolution of the chosen usage driver (duct km) fairly, based on reasonable assumptions. We have discussed the mechanisms for allocating cost between uses in the first part of Section 4.1.2. Here we discuss how the usage forecasts themselves are driven.

We note that future duct usage will primarily be driven by changes as a result of migration to the NBN and that there is some uncertainty around the NBN's roll-out plans. We understand that Telstra has relied on the latest *NBN Co Strategic review* and NBN Co Corporate Plan[62] and we have verified the inputs used in the CAF that are sourced from this document. We are not aware of

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60 *Conduit_usage_report* sheet in *CA01 – Ducts and pipes.xlsx.* This shows that there is a total route length of **[Telstra CiC]** in Telstra's network, of which **[Telstra CiC]**is lead-in, indicating that **[Telstra CiC]** is the CAN duct length. The sum of conduit and subconduit length is **[Telstra CiC]** and this is what Telstra use to calculate their usage metric. Dividing the total duct and subduct usage by the total duct length gives a ratio of **[Telstra CiC]**.

61 The TPNI records the assets deployed in Telstra's network.

62 *NBN Co Corporate Plan: 2014-17*; see http://www.nbnco.com.au/content/dam/nbnco2/documents/nbn-co-corporate-plan-2014-17-Nov11.pdf.

any more-recent or more-reliable data that could be used, and on this basis we believe this is the most reasonable source to use until additional information becomes available.

Overcapacity

WIK[63] and other parties have identified that one of the impacts of migration to the NBN is the potential emergence of overcapacity in the duct network, due to decommissioning of the CAN and the higher duct usage efficiency of fibre over copper. In Section 2.3.2 we discussed that overcapacity could either be allocated to an 'NBN-Telstra agreement' cost centre or as an EMPU across all services. In the rest of this section we describe how the EPMU approach could be implemented in the case of CA01.

Based on our understanding of the duct usage forecast, the volume of overcapacity in NBN areas does not seem as severe as might have been expected:

- In FTTN and HFC areas Telstra's CAF already allocates duct usage to NBN
- In FTTP/dp areas Telstra's CAF splits duct usage between CAN and NBN. It would be easy to allocate duct usage to NBN only (as suggested above under "*CAN areas where FTTP/dp is deployed*")
- In non-NBN areas Telstra's CAF allocates duct usage to FLS, which is reasonable unless taking a national view of the scale, in which case there are diseconomies of scale brought about by the decommissioning of the CAN in NBN areas.

It would be possible to identify a more technically accurate definition of overcapacity by looking at the relative cross-sectional area of duct occupied by NBN fibre versus CAN copper. However, given the above considerations there does not seem to be a material justification for this. Earlier, we discussed that for every 1m of duct there was **[Telstra CiC]** of CAN duct usage. The difference between these two values (i.e. **[Telstra CiC]** per metre) represents the under-utilisation of duct after migration to the NBN and decommissioning of the CAN. The implication of removing **[Telstra CiC]** of CAN duct usage for each 1m growth in FTTP/dp, FTTN and HFC cutover to the NBN is that this 'overcapacity' is allocated to services in proportion to their actual usage, and all duct usage is assumed equal (i.e. duct usage is not weighted more heavily for some services).

If it were possible to calculate this unused *capacity* (as opposed to usage), it would be appropriate to allocate this as an explicit EPMU across all services, including the NBN. One advantage of this approach is that as the share of duct used by NBN increased over time, there would be commensurate growth in the share of overcapacity allocated to the NBN.

63 See *WIK assessment of Telstra's expenditure forecasts*, paras 79–83.

Timing of deployment

WIK raises a point in its report[64] regarding the profile of the duct usage forecast. NBN Co does need access to ducts before the NBN is active, and we agree with WIK that the forecast does not appear to take account of this requirement. However, it is unclear how far ahead the access to duct is required, and in which areas (since the deployment is so piecemeal).

We also note that the CAN needs access to ducts during the period of migration, but it is unclear how long this will be needed for. As a result, there is a possible implementation issue regarding how to allocate costs between the NBN usage of duct and the CAN usage of duct during this period of transition. We expect that a commercial agreement might lead to an equal allocation to each user (since the alternative to sharing be the full cost of an entire duct for each user, and so they both stand to save costs by sharing, compared to a scenario in which no agreement is reached). Given that there is a lack of information on the relative usage of duct by the two parties during this period (which would be likely to change dynamically), we recommend that both effects (early and late use) are assumed to net out over time.

4.1.3 Conclusion

Broadly, we believe that the approach taken by Telstra to allocate costs to FLS on the basis of a duct usage forecast and subsequently between FLS on the basis of forecast SIOs is not unreasonable. However, as discussed above there are limitations to the approach taken, due to the chosen metric of duct usage km as well as some flaws in the implementation of the forecast.

We have produced an amended forecast which we believe addresses these errors sufficiently for it to be a reasonable input to the CAF. In summary, the changes are as follows:

- FTTP/dp should not be considered as additive, and so when FTTP/dp is deployed there should be a commensurate deduction in the CAN. We have therefore amended the CAN forecast to deduct the growth in FTTP/dp.
- When Telstra's HFC migrates to NBN Co, the CAN in the same area is decommissioned, and so a commensurate amount of CAN should be decommissioned. We have therefore subdivided the HFC network into a Telstra HFC component and an NBN HFC component. The duct usage is transferred from the Telstra HFC component to the NBN HFC component in line with the cumulative percentage of premises passed by HFC. We have amended the CAN forecast to deduct the growth in NBN HFC duct usage.
- Since the CAN duct usage is greater than the length of duct, when the CAN allocation of usage is modified to account for the above migration its heavy duct usage should be recognised by reducing duct usage by [**Telstra CiC]**for every 1m of HFC, FTTP/dp or FTTN. Therefore we have modified the deduction from the CAN to reflect this.

64 *WIK assessment of Telstra's expenditure forecasts*, paragraph 83.

- Any overcapacity or diseconomy of scale could be allocated as an EPMU or to the 'NBN-Telstra agreement' cost centre (as discussed in Section 2.3.2). The EPMU approach is implicit in Telstra's implementation of its forecast (assuming the above changes are made). We have not modified the forecast to make an explicit allocation, as an explicit allocation of overcapacity would require it to be identified and measured, which is difficult to do robustly with the data available. Any overcapacity or diseconomy of scale should be allocated as an EPMU. This is implicit in Telstra's implementation of its forecast (assuming the above changes are made). Therefore we have not modified the forecast to make an explicit allocation, as an explicit allocation of overcapacity would require it to be identified and measured, which is not possible with the data available.

The impact of these changes is shown in Figure 4.2 below, which demonstrates that the changes described above also cause the allocation of cost to FLS to reflect the reduction in CAN subscriber numbers (albeit not to a full extent).

[Telstra CiC]

Figure 4.2: Proportion of cost allocated to FLS and CAN subscriber forecast [Source: Analysys Mason, 2015]

4.2 Copper cables (CA02)

4.2.1 Description

This asset class represents **[Telstra CiC]** of the total access and core revenue requirements over the ten years of the model period (according to data in rows 281–330 of the *6.Revenue Requirements* sheet of Telstra's proposed version of the FLSM. In Telstra's proposed FLSM this asset class makes up between **[Telstra CiC]** of the total cost allocated to ULLS (for bands 1–3) and **[Telstra CiC]** (in band 4) in 2013/14. It also makes up **[Telstra CiC]** of the total cost allocated to WLR. Therefore it is important to allocate this asset class correctly, as these services will be significantly affected by this allocation.

We have verified that the RAB for this asset class decreases over time which appears to be consistent with copper being decommissioned or transferred as a result of arrangements with the NBN accounted for through the assets disposal mechanism. Therefore the allocation factors for CA02 do not need to take further account of this.

The full asset class is allocated between PSTN Retail Access, WLR, ISDN-BRI, ISDN-PRI, ULLS and Other DSL on the basis of demand (SIOs) by band.

The distribution by band, which allows for a distinction to be made between bands 1–3 and band 4, is based on installed copper-pair km as recorded in Telstra's NPAMS[65] database. The data extract used is from April 2014 and the calculated distribution by band (assumed not to change over time) is input into the CAF on the *Allocations sheet*, on rows 353–361. The distribution by band is illustrated below in Figure 4.3.

[**Telstra CiC]**

Figure 4.3: Distribution of copper by band FY14–19 [Source: Analysys Mason, 2015]

4.2.2 Assessment

The allocation of the cost of this asset class between services on the basis of SIOs is logical and in line with principles of cost causation. It results in an equal allocation of CA02 across all active CAN subscribers.

The distribution by band as well as service is also logical, since local loop lengths do vary geographically. It is not immediately obvious that the selection of copper-pair km, as opposed to sheath km, is the most appropriate metric to use. The capital cost of copper cabling is driven by both:

- material costs (partly driven by pair km, due to the cost of copper) and

65 Network Plant Assignment Management System.

- installation costs (more closely related to sheath km, due to the costs of handling and hauling copper cables into ducts[66]).

Telstra argued that the operating costs are driven primarily by pair km. This seems reasonable, since reported fault rates increase as loop lengths increase and as more loops come in operation. In addition, Telstra argued that, since the copper cable asset class (CA02) is heavily depreciated, the opex component of cost should be weighted more heavily in the assessment of the most reasonable cost driver than it otherwise would be.

A better approach would be to separate the overall cost into its component drivers (material, installation, fault repair, proactive maintenance, etc.) and use the most appropriate metric for each. However, in these circumstances the use of pair km seems to be a reasonable simplification.

We also make the following observations:

- Telstra provided a copy of the input data used to calculate the distribution of copper between bands (*Copper Pair Route Kilometres by ESA and Band*, extracted from its NPAMS system in April 2014). We have been able to verify that the inputs in the CAF match this source.
  - In response to our queries, Telstra confirmed that lead-in cables and conduits will in some cases be captured within the NPAMS system. Given the chosen methodology this should not have an effect on the allocation factors calculated since we would not expect the distribution between bands to be significantly affected (i.e. lead-ins are not expected to be systematically shorter or longer in bands 1–3 than band 4).

- Telstra has confirmed that there is no NBN presence on the CAN side of the MDF. Therefore the allocation factors for CA02 do not need to reflect migration to the NBN. However, the RAB does need to reflect assets decommissioned or transferred to the NBN. This is what the ACCC proposed to do in its draft decision.

- Telstra's proposed CAF assumes that the distribution of copper between bands will not change over the course of the regulatory period. This is in line with the aim of NBN Co to pursue a geographically neutral roll-out, rather than aiming to maximise premises passed as a strictly commercial deployment would do. It is unclear whether NBN Co has been able to achieve a geographically neutral roll-out, and the recent announcement of a move to the multi-technology mix (MTM) architecture adds further uncertainty to this area. It is unclear whether there is a systematic impact of the decision to adopt the MTM on the distribution of copper between bands. Given the uncertainty over the impact of the MTM architecture on the NBN deployment it would not be reasonable for this to be incorporated into the forecast distribution of copper pair km by band at this stage.

66 We understand that all copper cabling is ducted and there is no direct burial of cabling in the CAN. Therefore the cost of digging trench and reinstating the surface is included in asset class CA01 (ducts and pipes) rather than in this asset class.

- We note that in areas where the NBN's preferred deployment type is wireless or satellite, the CAN is not to be decommissioned. Therefore, notwithstanding other potential trends, we expected that the relative weight for band 4 copper pair km to grow compared to the relative weights for the other bands. In response to our queries, Telstra provided evidence to explain that wireless and satellite deployment is expected in both band 3 and band 4 areas.[67] Given that the distribution by band is used in the CAF to distinguish between ULLS in bands 1–3 against ULLS in band 4, the relative weightings are unlikely to have an impact on the results of the model.

Based on the data and explanations provided by Telstra, our overall assessment is that the approach taken with respect to asset class CA02 seems reasonable for informing the CAF in this regulatory period provided that the RAB is already modified appropriately to account for copper cabling that has been decommissioned through the asset disposal mechanism.

4.3 Other cables (CA03)

This asset class includes CAN fibre-optic cables, joints and associated equipment used to provide FTTP-based fixed-line services, excluding those used to connect remote broadband and voice devices to the local exchange (see section 5.1.3 of the *CAF user guide*). This asset class accounts for just **[Telstra CiC]** of the total access and core revenue requirements over the ten years of the model period (according to data in rows 281–330 of the *6.Revenue Requirements* sheet of the current version of the FLSM). According to Telstra's proposed FLSM this asset class makes up **[Telstra CiC]** of the total cost allocated to WLR in 2013/14 and no costs are allocated to any of the other regulated fixed-line services in the FLSM. Therefore it has only a small impact on the final cost calculated for this regulated fixed-line service.

The cost of this asset class is allocated between the PSTN Retail Access service and the WLR service in proportion to the demand for each service in each modelled year. Therefore, it is our understanding that the declared service definitions allow for these services to be delivered over FTTP in areas where this has been deployed by Telstra (known as Velocity areas) and that these lines are not suitable for unbundling. Hence ULLS cannot be provided over these lines. Telstra has also confirmed that no other services are provided using this asset class.

We also note that Telstra's FTTP assets are not subject to any sale or leasing agreements with NBN Co. Therefore the deployment of the NBN has no direct impact on this asset class.

The demand that the CAF distributes between PSTN Retail Access and WLR is that for the entire network rather than just for FTTP areas. This results in a per-subscriber allocation which is the same for both services. Since both services are in effect the same product at the wholesale level (WLR is the wholesale equivalent of PSTN Retail Access) this is a logical allocation.

67 *Telstra response to Analysys Mason queries (June)*, Q2.

4.4 Pair gain systems (CA04) and CAN radio bearer equipment (CA05)

4.4.1 Description

Pair gain systems

Asset class CA04 includes the remote housing, devices and associated equipment used for supplying fixed-line voice and access services to subscribers in certain areas. These are generally CMUX units. This asset class accounts for just over **[Telstra CiC]** of the total access and core revenue requirements over the ten years of the model period (according to data in rows 281–330 of the *6.Revenue Requirements* sheet of the current version of the FLSM).

The cost of this asset class is allocated between the PSTN Retail Access service, ISDN-BRI and the WLR service in proportion to the demand (SIOs) for each service in each modelled year. According to Telstra's proposed FLSM this asset class makes up **[Telstra CiC]** of the total cost allocated to WLR in 2013/14 and no costs are allocated to any of the other regulated fixed-line services in the FLSM. Therefore it has only a small impact on the final cost calculated for this regulated fixed-line service.

CAN radio bearer equipment

This asset class includes the High Capacity Radio Concentrator (HCRC) equipment used for the provision of fixed-wireless PSTN voice services in rural and remote areas, and this asset class accounts for **[Telstra CiC]** of the total access and core revenue requirements over the ten years of the model period (according to data in rows 281–330 of the *6.Revenue Requirements* sheet of the current version of the FLSM).

The cost of this asset class is allocated between the PSTN Retail Access service and the WLR service in proportion to the demand for each service in each modelled year.

According to Telstra's proposed FLSM this asset class makes up **[Telstra CiC]** of the total cost allocated to WLR in 2013/14 and no costs are allocated to any of the other regulated fixed-line services in the FLSM. Therefore it has only a small impact on the final cost calculated for this regulated fixed-line service.

4.4.2 Assessment

We understand that the ACCC considers that asset classes CA04 and CA05 will become redundant in NBN areas as subscribers are disconnected. This is logical, since once subscribers connected to a particular pair-gain system or HCRC system are disconnected this equipment cannot serve any other subscribers.

The assignment of costs between the PSTN Retail Access service, ISDN-BRI service and the WLR service appears reasonable for asset class CA04 (pair gain systems), since this asset is used to provide only these services. The assignment of asset class CA05 (CAN radio bearer equipment) between the PSTN Retail Access service and the WLR service appears reasonable for the same reason.

However, the allocation of each asset class among the respective set of services is in proportion to the overall demand for these services, when in fact only a subset of PSTN, ISDN and WLR subscribers will be connected via CMUX-type equipment (CA04) or CAN radio bearer equipment (CA05). This results in a potential disconnect in cost causation if the distribution between PSTN/ISDN/WLR is significantly different in areas served by CMUX or HCRC from those in the remainder of Australia.

Ideally, the allocation between services would be weighted based on subscribers connected via pair gain systems or CAN radio bearer equipment. Telstra has stated that it does not forecast to a sufficient degree of granularity to reflect the number of subscribers of each service served by pair gain systems or the HCRC concentrators that make up asset class CA05.

In addition, we are not aware of any systematic reason that the service taken by a subscriber would be affected by whether or not their line is served by a pair gain system, since this is an internal network characteristic of which subscribers are unaware. The use of an HCRC concentrator may be visible to subscribers, but we are also not aware of a systematic reason for the service taken to be distributed among bands differently from how it is for the general population.

Therefore, we accept as reasonable the assumption that subscribers served by pair gain systems and CAN radio bearer equipment are distributed between services in the same way as the total of national subscribers. In turn, this leads us to conclude that the allocation mechanism proposed in the CAF for asset classes CA04 and CA05 appears reasonable given practicality constraints.

4.5 Other CAN assets (CA06)

4.5.1 Description

Telstra's *CAF user guide* explains that this asset is primarily made up of network termination units (NTUs) on customer premises. This asset accounts for **[Telstra CiC]** of the total access and core revenue requirements over the ten years of the model period (according to data in rows 281–330 of the *6.Revenue Requirements* sheet of the current version of the FLSM). Our inspection of the 2013 asset register provided to the ACCC verifies that only NTUs are included in this asset class.

This asset class makes up **[Telstra CiC]** of the total revenue requirements allocated to ULLS (bands 1–3), **[Telstra CiC]** of ULLS (band 4) and **[Telstra CiC]** of WLR in 2013/14, according to Telstra's proposed CAF and FLSM. Therefore it has only a very small impact on the final cost calculated for these regulated fixed-line services.

We assume that NTUs for subscribers transferred to the NBN are removed from the RAB through the asset disposal mechanism. Therefore, we do not consider this here. The cost of this asset class is allocated between the PSTN Retail Access service, ISDN-BRI, ULLS WLR service and Other DSL service in proportion to the demand for each service in each modelled year in each band. This seems to be logical, as it represents a count of one line per subscriber connected to the network: subscribers taking two services are not double counted. We note that if naked DSL products were to be offered these would need to be classified under "Other DSL" in order for this cost allocation to remain accurate.

Our assessment is that the allocation methodology for this asset class appears reasonable.

4.6 Other communications plant and equipment (CA07)

4.6.1 Description

This asset class includes radio communication equipment used in conjunction with asset class CA05 (CAN radio bearer equipment) for the provision of voice services. We also understand that this asset class contains assets such as racks, ironwork and cabling that are used more broadly by other CAN services. This asset only accounts for **[Telstra CiC]** of the total access and core revenue requirements over the ten years of the model period (according to data in rows 281–330 of the *6.Revenue Requirements* sheet of the current version of the FLSM).

According to Telstra's proposed model this asset class makes up **[Telstra CiC]** of the total revenue requirements allocated to ULLS (bands 1–3), **[Telstra CiC]** of that for ULLS (band 4) and **[Telstra CiC]** of WLR in 2013/14. Therefore it has only a very small impact on the final cost calculated for these regulated fixed-line services.

4.6.2 Assessment

It can be seen from the implementation in the FLSM that the cost of this asset class is recovered across PSTN Retail, ISDN-BRI, ISDN-PRI, ULLS, WLR and DSL services by band, in proportion to the demand (SIOs) for each service in each band.

We note that the *CAF user guide* indicates that this asset class is used to provide services to PSTN retail basic access and WLR.[68] Telstra has explained that this is incorrect, as the asset class also supports other services (ISDN-BRI, ISDN-PRI, ULLS) as well as Other DSL. Therefore every subscriber on the CAN is allocated a proportion of the cost of some assets that support radio bearer equipment.

Ideally this asset class would be split into a category that represents assets used in conjunction with asset class CA05 (CAN radio bearer equipment) and a category that supports CAN services more broadly (e.g. racks, ironwork, cabling). Each could then be recovered across the relevant services for each category. However, in its response to our queries[69] Telstra did demonstrate that

68 Table 2 and page 26.

69 Telstra's Response to Analysys Mason queries dated 20 April 2015 (as revised on 22 April 2015).

the value of assets supporting only radio services was less than **[Telstra CiC]**[70] of the total for this asset class.

Allocating an equal proportion to each subscriber connected to the CAN is not strictly correct, but appears reasonable given practicality constraints. Given the small relative value of this asset class it would probably not be proportionate to sub-divide the assets class further to reflect any differences between the assets within it.

During this regulatory period it is unlikely that an efficient operator would decommission the assets in this asset class. Given the very low materiality of this asset class it does not seem necessary to estimate a decommissioning forecast. We would recommend instead that the ACCC reassess this asset class closer to the end of the NBN deployment period for future regulatory periods.

4.7 Network land (CA08) and Network buildings/support (CA09)

4.7.1 Description

In the *CAF user guide* Telstra explains that these two asset classes are not distinguished in the Telstra asset register. The asset register also does not distinguish between the land and buildings used to support CAN and core services. Therefore a split is required between asset classes CA08, CA09, CO08 and CO09 to distinguish between the assets supporting the customer side of the MDF and the assets supporting the core side of the MDF.

The ACCC originally carried out this split by estimating the undepreciated value of land and building assets within Telstra's TEA (Telstra Efficient Access) model.[71] This model was developed by Telstra to calculate the price of ULLS before the FLSM was developed.

Our understanding is that the approach has not changed by Telstra when preparing the latest version of the FLSM. Telstra has also stated in their response to our queries that there is no NBN presence on the CAN side of the MDF (NBN ODFs are included in the racks that NBN Co occupies on the core side of the MDF, which are accounted for in asset classes CO08 and CO09).[72]

Asset class CA08 accounts for **[Telstra CiC]**of the total access and core revenue requirements over the ten years of the model period, and asset class CA09 accounts for **[Telstra CiC]** (according to data in rows 281–330 of the *6.Revenue Requirements* sheet of the current version of the FLSM).

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70 [**Telstra CiC]**of [**Telstra CiC]**.

71 *ACCC April 2011 FAD Discussion paper*, page 51.

72 [**Telstra CiC]**

According to the model proposed by Telstra these two asset classes together make up **[Telstra CiC]** of the total costs allocated to ULLS (bands 1–3); **[Telstra CiC]** of the total costs allocated to ULLS (band 4) and **[Telstra CiC]** of the total costs of WLR in 2013/14. Therefore these asset classes have a relatively small impact on the final cost calculated for these regulated fixed-line services.

4.7.2 Assessment

It can be seen from the implementation in the FLSM model that asset classes CA08 and CA09 are recovered across PSTN Retail, ISDN-BRI, ISDN-PRI, ULLS, WLR and Other DSL services by band, in proportion to the demand for each service in each band.

Since the number of subscribers drives the size of the MDF, the choice of SIO as the cost driver is reasonable in terms of cost causation and distribution of benefits. The allocation as proposed allocates an equal share of CA08 and CA09 to each subscriber in the CAN.

In addition, the weighting by band is consistent with the treatment of CO08, CO09 and other access asset classes where geographical distribution is relevant and measurable.

However, we have the following observations:

- We understand that NBN subscribers will be connected to ODFs which occupy NBN racks whose cost is accounted for in CO08 and CO09. Therefore there should be no transfer of the cost of asset classes CA08 and CA09 from fixed-line services to NBN services.
- Telstra noted that there have been some ongoing commercial negotiations with NBN Co regarding potential future use of some MDFs by the NBN to serve some CAN subscribers who are directly fed from the exchange as part of the multi-technology mix (MTM) deployment strategy. Since this is only a possible future scenario this should not be taken into account in the CAF at this stage. However, we recommend that the ACCC monitor this situation, since some MDF cost should be allocated to the NBN (or disposed of from the RAB if the agreement involves the sale of the MDF) if this was to occur.
- We note that Telstra applies a land value modification to asset classes CO07, CO08 and CO09 (as discussed in Section 5.6 above). This reflects the higher value of exchange space in urban areas than in outlying areas, based on **[Telstra CiC]**. We agree that this approach is logical, and for reasons of consistency recommend that the land value modification is also applied to asset classes CA08 and CA09.
- Given the significant disconnection of subscribers from the CAN we have considered whether there is scope for rationalisation of MDFs.[73] As a provider of regulated fixed-line services, it is incumbent on Telstra to behave efficiently with respect to expenditure involved in providing these services.

[73] In particular, there may be scope for rationalising the size of the frame itself and the accommodation occupied. The scope for rationalising the number and location of buildings is less clear, at least in this regulatory period.

– Telstra has argued that there is no scope for rationalising the usage of an MDF (frame and floorspace) until all CAN subscribers have been disconnected. Our view is that it should be possible for some rationalisation to occur once sections of exchange service areas (ESAs) are cutover to the NBN. We acknowledge that immediate full rationalisation is unlikely to be practical, since the pattern of deployment is piecemeal in nature.[74] Therefore rationalisation of the MDFs seems unlikely to occur until much later in the NBN deployment period, and potentially at the end of that period. This implies that rationalisation of the exchanges and MDFs at any meaningful level is unlikely to be efficient in this regulatory period (up until 2018/19), and asset classes CA08 and CA09 should be considered non-scalable in this period. We recommend that the ACCC review this before the next regulatory period, at which point the NBN deployment will be much further advanced and more evidence is likely to be available.

– We note that a potential issue hampering rationalisation would be the continued supply of certain special services that cannot be easily provided over the NBN ('special services'). Should those services cause an unreasonable delay in rationalisation we would recommend that the ACCC considers one of the additional remedies described in Section 2.4.2.

– The discussion above implies that there will be overcapacity emerging in these asset classes in this regulatory period as subscribers are disconnected but the assets do not scale down in proportion. As discussed in Section 2.3.2, this overcapacity could be allocated to the 'NBN-Telstra agreement' cost centre or across all relevant services as an EPMU. Should the EPMU approach be deemed more appropriate, there would be no need to modify Telstra's proposed CAF as it implicitly recovers this overcapacity over all fixed services as an EPMU. However such an EPMU approach would need to be reviewed closer to the end of the deployment of the NBN at which point rationalisation would be expected from an efficient operator.

Our assessment is that the allocation factors proposed for asset classes CA08 and CA09 will be reasonable for this regulatory period once the land value modification has been applied to this asset class, in the same way as it has been applied to CO07, CO08 and CO09. However, this approach is unlikely to continue to be appropriate for the next regulatory period.

4.8 Indirect capital assets (CA10)

4.8.1 Description

The CA10 asset class includes primarily IT equipment (software and hardware) as well as equipment related to motor vehicles and mechanical aids used in the access network. It accounts

[74] We understand that regions of migration will in many areas cover entire distribution point coverage areas or pillar coverage areas. We would expect that a copper feeder cable entering the exchange is likely to serve a subset of nearby distribution points and one or more pillars. Therefore it would become possible to decommission the blocks on the MDF on to which a particular feeder cable terminates once that region of migration is cutover to the NBN. There may be some exceptions but it is not credible to argue that all subscribers must be migrated before an MDF can be decommissioned as it can be decommissioned a few blocks at a time.

for nearly **[Telstra CiC]** of the total access and core revenue requirements over the ten years of the model period (according to data in rows 281–330 of the *6.Revenue Requirements* sheet of the current version of the FLSM).

According to the model proposed by Telstra, this asset class accounts for **[Telstra CiC]** of the costs allocated to ULLS (bands 1–3), **[Telstra CiC]** of the total costs allocated to ULLS (band 4) and **[Telstra CiC]** of the total costs of WLR in 2013/14. Therefore it has a reasonably significant impact on the final cost calculated for these regulated fixed-line services.

CA10 is allocated across services using a General Allocator based on the 'revenue share approach' previously developed by the ACCC and described by Telstra in the *CAF user guide* (section 5.1.5). This approach aims to allocate costs in proportion to the overall allocation of costs (or 'revenue requirements') in the remaining asset classes for which a cost driver is used (i.e. CA01–CA09, for which the distribution of cost is 'known'). The General Allocator therefore allocates costs across ULLS, WLR and Other fixed line services only, since no revenues are attributed to PSTN, LCS, Line Sharing Service (LSS), Wholesale ADSL (WADSL) and Telstra Exchange Building Access (TEBA) for the access network.

4.8.2 Assessment

We have inspected the 2013 asset register to confirm the composition of this asset class, and note that it contains assets related to general business support (e.g. office equipment, vehicles) as well as a number of high-value IT systems.

A significant portion of the asset class relates to general business support assets. We agree that the revenue share approach is a reasonable methodology to apply to this portion of asset class CA10. This is a long-standing methodology which the ACCC has used since the 2011 FADs.[75] We note that the documentation for the model does not explain how the split between CA10 and CO10 is made in the RAB. Our assessment assumes that this split reflects the relative RAB values of access and core oriented assets accurately.

According to the *ACCC April 2011 FAD Discussion paper* (page 132), the Indirect Capital Asset value was split based on the CAN and Core asset values in Schedule 2 of Telstra's November 2010 submission.[76] Our assessment assumes that this split reflects the relative RAB values of access and core oriented assets accurately.

IT systems make up the remainder of this asset class. In line with the principle of cost causation, the IT systems should ideally only be allocated to the services that they support. In some cases the IT systems will support all CAN subscribers, but we would expect a significant portion of the IT systems to only support a subset of Telstra's services. These IT systems should therefore be

75 *ACCC April 2011 FAD Discussion paper*, section 10.3.8.

76 Telstra, Pricing Principles for Fixed Line Services: Supplementary response to the ACCC's Draft Report, November 2010.

allocated only to the IT services that they support. It is likely that a number of IT systems will support multiple services, and there is not necessarily a direct causal link between an IT system and the number of subscribers or number of systems that it serves which could be used to inform an allocation.

In light of issues related to practicality (data requirements and pressure of time), we view the current allocation methodology as reasonable overall. However, future updates of the CAF should incorporate a more-detailed consideration of IT systems as described above.

It is possible that there may be some emerging diseconomies of scale in this asset class as a result of migration of subscribers from the CAN to the NBN. The majority of items in this asset class are invariant, or largely invariant, to the number of subscribers in the network. Provided that the methodology used to calculate the allocation factors in the remaining CAN asset classes is appropriate and reflects the correct allocation of overcapacity or diseconomies of scale, the General Allocator approach will be reasonable. This is because the General Allocator approach reflects the overall allocation to all other asset classes and applies it to CA10. Therefore, if the General Allocator approach is used, no particular change needs to be made to the methodology to reflect any emerging overcapacity in the network.

Our overall conclusion is that, given the context in which the allocation is being made, the revenue share approach as implemented in the version of the CAF that we have reviewed appears to be reasonable.

5 Core network and transmission platforms

This section discussed the inputs primarily related to the core network and transmission platforms. In each sub-section we briefly discuss the key characteristics of the proposed allocation methodology and provide our comments on its suitability for the CAF. More detailed descriptions of the proposed methodology are available in Telstra's model documentation.

5.1 Switching equipment – local (CO01)

5.1.1 Description

The CO01 asset class includes local access switches (LAS), remote subscriber stages (RSS) and associated software and control infrastructure used to provide PSTN and ISDN calls. This asset class does not include the accommodation or supporting assets (e.g. power and air conditioning) that support these. It accounts for nearly **[Telstra CiC]** of the total access and core revenue requirements over the ten years of the model period (according to data in rows 281–330 of the *6.Revenue Requirements* sheet of the current version of the FLSM).

This asset class is recovered across the following services:

- PSTN retail access
- WLR
- PSTN local calls
- PSTN national STD
- PSTN international
- PSTN fixed to mobile
- PSTN OTA
- LCS
- ISDN-BRI
- ISDN-PRI
- ISDN voice.

The costs are split between two cost drivers: ports or SIOs (**[Telstra CiC]**) and call volumes in minutes (**[Telstra CiC]**) and use the routeing factors calculated in the *routeing factor model* (described in Appendix B of the *CAF user guide*). This asset class accounts for **[Telstra CiC]** of the total costs allocated to WLR according to Telstra's proposed model for 2013/14, but is a very significant component of the total costs of PSTN FOAS/FTAS (**[Telstra CiC]**) and LCS (**[Telstra CiC]**) and so it is important for the allocations to be correct.

We understand that the position the ACCC is consulting on is that the port component of local switching assets is scalable and the remaining traffic-driven component is not scalable (see Section 2.3.1 on asset disposals). Therefore, as subscribers are migrated from the CAN the port component of this asset class becomes redundant and should be removed from the RAB through the asset disposal mechanism. The remaining (traffic-driven) component must reflect any resulting diseconomies of scale through the CAF. This is not the approach taken in the FLSM as proposed by Telstra, as the distinction between scalable and non-scalable components was not previously made.

In our assessment below, we presume that the value of the RAB for this asset class will be modified such that the port-driven component (**[Telstra CiC]**) will be progressively removed from the RAB and only a proportion corresponding to the subscribers who remain on the CAN will need to be allocated by the CAF. The CAF will also need to reflect the correct allocation for the traffic-driven component (**[Telstra CiC]**).

5.1.2 Assessment

Each component (driven either by ports or by traffic) is allocated on the basis of the appropriate demand metric (SIOs and MOU respectively), weighted by the routeing factors for each service. The routeing factors reflect the relative usage of the asset class by each service and are an important input since they may alter the distribution of cost significantly.[77] Allocating port-driven assets on the basis of SIOs and traffic-driven assets on the basis of call volumes (minutes) is logical and cost based. We assessed the suitability of the routeing factors in Section 3 earlier. The overall approach appears reasonable and in line with standard fixed-line regulatory modelling practice.

The distribution between port- and traffic-driven components of the asset class is based on the value of port- and traffic-driven assets in this asset class as recorded in the 2014 asset register. We have reviewed the categorisations in the supporting calculations provided by Telstra and have not identified any categorisations that we disagree with. However, there is one large category in the asset register which is allocated to the traffic-driven category ("LOCAL SWITCH – CREDIT" valued at AUD **[Telstra CiC]**) but which not defined in sufficient detail to enable us to verify whether it is allocated appropriately. If it is not possible to allocate this category to either the port- or traffic-driven category with certainty, we suggest that it is not allocated to either and is ignored when calculating the distribution between value of port- and traffic-driven assets. This would lead to a distribution of **[Telstra CiC]** of asset value as port driven and **[Telstra CiC]** as throughput driven.

Therefore the asset disposal mechanism should progressively remove **[Telstra CiC]** of the value of this asset class in line with the migration of subscribers from the CAN to the NBN. The remaining **[Telstra CiC]** should be allocated by the CAF.

Leased assets and depreciated capex as a driver

We also note that the asset register extract contains reference to assets described as leased (and with no written-down value (WDV)). Since leased assets have no value in the asset register they

77 See also the discussion of routeing factors in Section 3 and Annex B.

cannot influence the allocation of cost between port- and traffic-driven components, even though they incur costs.

Furthermore, Telstra’s methodology applies a distribution of (largely depreciated) capex to allocate capex and opex between categories. The more that capex is depreciated the less appropriate this methodology becomes in terms of cost causation.

Telstra acknowledged that this approach is imperfect, but argued that this was preferable to the allocation of costs on the basis of only minutes of use or only ports. Inspection of the revenue requirements in *6. Revenue Disaggregate* in the FLSM suggests that capex is still the largest contributor to costs and therefore this may not yet cause a large distortion to the CAF. However, in future regulatory periods this method will need to be refined to take account of the concerns outlined above.

Conclusion

We have verified the calculations and believe these to be reasonable for the next regulatory period only, with the exception of the issues discussed here:

- Since the port-driven component is considered scalable, **[Telstra CiC]** of the asset class value should be removed through the asset disposal mechanism. The port-traffic distinction should therefore be removed from the CAF and the calculation that allocates port-driven costs should be removed since it is not relevant. This should leave the calculation that allocates the traffic-driven component on the basis of SIOs.

- The routeing factors calculated by Telstra in the CAF remain static throughout the regulatory period. This implies that the relative value of port- and traffic-driven subscriber assets does not change during the regulatory period. This further implies that there is no planned programme of asset replacement or upgrades that may distort this distribution. In light of the significant migration of subscribers to the NBN this seems to be an efficient strategy for Telstra to employ. Since promoting efficiency is a key regulatory objective,[78] and in the absence of evidence of any particular bias that might result from future alterations to the composition of this asset class, we consider it reasonable to use a static distribution between port- and traffic-driven components for this allocation factor.

- In the discussion above, the traffic-driven component of this asset class is considered unscalable. Therefore, as the number of CAN subscribers decreases, there is a resulting diseconomy of scale. As discussed in Section 2.3.2, this overcapacity could be allocated to the ‘NBN-Telstra agreement’ cost centre or across all relevant services as an EPMU. The latter approach is implicit in Telstra’s implementation of its proposed CAF. If the allocation to the ‘NBN-Telstra agreement’ cost centre is selected, then overcapacity would need to be measured using a suitable proxy. Given that this component of local switching is mostly driven by SIOs,

78 As set out in the Competition and Consumer Act 2010; see http://www.comlaw.gov.au/Details/C2011C00003.

the proportion of SIOs migrated to the NBN could be deemed to be equivalent to the proportion of the cost that should be allocated to the 'NBN-Telstra agreement' cost centre.

5.2 Switching equipment – trunk (CO02) and Switching equipment – other (CO03)

5.2.1 Description

According to the *CAF user guide* the CO02 asset class includes switching equipment and control software used to provide fixed-line voice services. It comprises higher-order transit switches used for calls between local switches and for interconnection with other networks. Asset class CO03 contains miscellaneous equipment which is used to support the provision of fixed-line services.

CO02 accounts for only **[Telstra CiC]** of the total access and core revenue requirements over the ten years of the model period and CO03 accounts for **[Telstra CiC]** (according to data in rows 281–330 of the *6.Revenue Requirements* sheet of the current version of the FLSM). These asset classes do not have a significant impact on the total costs allocated to PSTN FOAS/FTAS or LCS. They account for **[Telstra CiC]** (CO02) and **[Telstra CiC]** (CO03) of PSTN FOAS/FTAS and **[Telstra CiC]** (CO02) and **[Telstra CiC]** (CO03) of LCS in 2013/14, according to Telstra's proposed FLSM.

5.2.2 Assessment

In the CAF the costs of asset classes CO02 and CO03 are allocated based on their usage of switching assets as calculated in the *routeing factor model*, weighted by the demand for each service (in MOU – minutes of use). The approach is the same as for asset class CO01, with the exception that there is no split between subscriber- and traffic-weighted components.

This is logical, since at this point in the network traffic is aggregated such that traffic is a direct driver of cost and there is no direct link to subscribers. We examined the 2013 asset register held by the ACCC to verify that this was the case, and found that no assets listed under either of these asset classes were identified as driven by ports/SIOs rather than traffic.

We also understand that the RAB for this asset class was originally set so as to include only the asset value for switches used for PSTN switching. Any pre-NBN IP switching capacity is therefore excluded from the value being allocated. Given this definition, it is appropriate to allocate the pre-NBN costs on the basis of PSTN FOAS/FTAS traffic and LCS traffic.

Since the deployment of the NBN began there are four groups of users that could make use of the switching assets in CO02 and CO03:

- users left on the CAN (or any users calling them)
- users still using ISDN (or any users calling them)
- users of special services (or any users calling them), and

- users of NBN (if there is an access or trunk gateway transferring traffic back into the legacy core network and provided that subscribers are not migrated to the core networks operated by access seekers).

Our understanding is that Telstra connects its NBN-based voice subscribers to an IMS core. Traffic to or from those subscribers only uses trunk gateways and legacy TDM switches if the other (calling or called) party is still on the CAN or is served by another retail operator. This architecture is reflected in Telstra's proposed CAF which shows a rapid decrease in PSTN traffic. This would have the effect of increasing the cost of CAN-based voice services (PSTN FOAS/FTAS and Local Carriage Service).

Similarly, we would expect the rapid increase in the equivalent NBN-based voice services to lead to a decrease in the cost of NBN-based voice services. If the voice services were defined in a technology neutral way, this would likely mean a broadly stable total voice traffic and stable or decreasing service costs (decreasing if the cost of IMS-based services is lower due to higher efficiency).

This is not currently the case in Telstra's CAF due to the fact it only reflects the decrease in utilisation of TDM assets rather than the broader stable utilisation of voice assets in general. This leads to the development of diseconomies of scale (if focusing only on TDM assets) that according to Section 2.3.2 should be allocated either as an EPMU or to the 'NBN-Telstra agreement' cost centre. Allocation as an EPMU is not appropriate for TDM voice assets as they are not shared at all between CAN and NBN voice services. This leaves allocation to 'NBN-Telstra agreement' cost centre as the more realistic option.

Alternatively we would recommend to use a more stable forecast for PSTN traffic (e.g. the pre-NBN forecast). This would be the equivalent from looking at all voice services (independently of which access technology is used to connect to the subscriber) and would also be consistent with Telstra's assumptions regarding rack forecasts (discussed in Section 5.6).

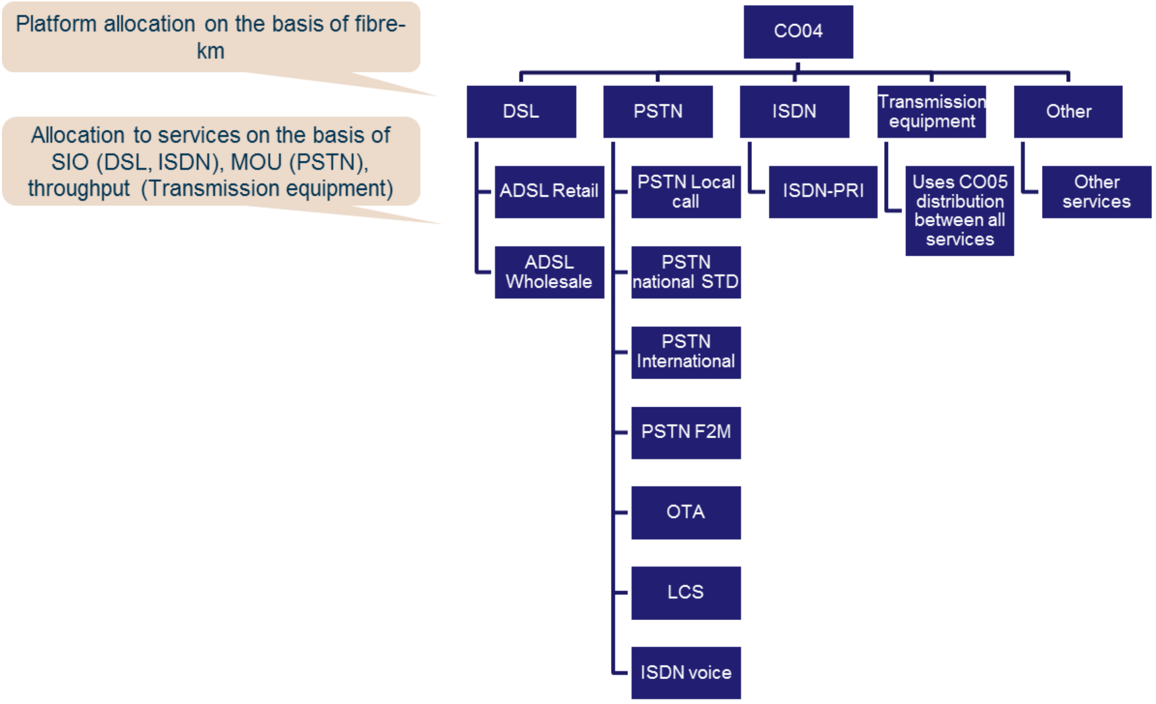
5.3 Inter-exchange cable (CO04)

5.3.1 Description

This asset class includes the fibre-optic cables that connect Telstra's exchange buildings and also remote voice and broadband equipment to its local exchanges (such as DSLAMs). In *Telstra's response to Analysys Mason queries (June)*, Telstra also explains that this asset class includes fibre optic tails serving ISDN-PRI subscribers. It accounts for **[Telstra CiC]** of the total access and core revenue requirements over the ten years of the model period (according to data in rows 281–330 of the *6.Revenue Requirements* sheet of the current version of the FLSM). According to Telstra's proposed model this asset class accounts for **[Telstra CiC]** of the total costs allocated to PSTN FOAS/FTAS, **[Telstra CiC]** of that for LCS and **[Telstra CiC]** for WADSL in 2013/14. Therefore it has a small but significant impact on the total costs of PSTN FOAS/FTAS, LCS and WADSL.

This category is allocated first between platforms (PSTN, DSL, ISDN transmission equipment and other) on the basis of fibre km attributable to each platform in Telstra's Network Decision Support Database (NDSD). The second step is to allocate cost within each of the platforms to services on the basis of demand. This is summarised in Figure 5.1 below.

Figure 5.1: Allocation of asset class CO04 to services in Telstra's CAF[79] *[Source: Analysys Mason, 2015]*



The allocation across platforms results in the following distribution over the course of the regulatory period:

79 Note that this diagram reflects the update made by Telstra to account for ISDN-PRI local fibre tails, explained in *Telstra response to Analysys Mason queries (June)*.

[Telstra CiC]

Figure 5.2: Allocation of costs between platforms [Source: Telstra,[80] 2015]

The allocation of costs within each transmission technology to individual services is performed on the basis of demand:

- Allocation between the PSTN services is on the basis of MOU, which is logical
- Allocation between the DSL services is on the basis of SIOs, which is logical as a proxy for bandwidth (since there is no need to segment by users with different usages for this calculation)
- ISDN services appear to only be allocated to ISDN-PRI which is logical as this is the only ISDN service to make use of fibre optic access tails. We have not been supplied with the full amended model so cannot verify that this is what is implemented but the documentation of changes appears to confirm this
- Transmission equipment is allocated on the basis of the distribution between services calculated for asset class CO05. This is logical, since CO05 represents the active electronics that make use of this component of the inter-exchange cable asset class
- Other services are not segmented, since the entire category is allocated to non-fixed-line services.

5.3.2 Assessment

Platform allocation between PSTN, DSL, ISDN, transmission equipment and other

Telstra first allocates the costs of asset class CO04 between platforms on the basis of fibre km identified as being used by each platform. This metric counts individual fibres by length (rather than fibre pairs, or fibre sheath).

80 Based on data from *CO04 - Interexchange cables (Version 1_1).xlsx* provided by Telstra.

► *Choice of fibre-km metric*

In a bottom-up model where cable sizes are dimensioned based on transmission requirements it makes sense to use fibre sheath km as the driver of cost, since this reflects the principle of cost causation most accurately. Installation is the main driver of cost and therefore sheath km is the metric which most closely aligns with cost causation in this case.

However, since a FAC approach is being used here this is less relevant, since the RAB is not dimensioned in this way. The ability to attribute cost to the users who benefit from the asset class is in line with the principle of distribution of benefits. Therefore in this situation fibre km is more appropriate than fibre sheath km as a metric for distributing costs.

We also note from the *CAF user guide*[81] that Telstra's methodology takes account of the fact that some equipment makes use of single fibres while other equipment uses fibre pairs: in the latter case two fibres are counted in the data used.

► *Verification of inputs and calculation*

Telstra provided us with a copy of the extracts from its NDSD system and the calculations and forecasts underlying the distributions it applies in the CAF. These are based on extracts from March 2014 and September 2014. For the most part we have been able to verify the calculations explained in the *CAF user guide*,[82] and agree that the approach appears reasonable except for the following concerns:

- We asked Telstra to clarify how unlit or unused fibres are treated in the data it used. Telstra confirmed that unutilised fibres were not included in the NDSD data. It also confirmed that where a service could not be identified for a fibre it was excluded from the data. Therefore, it is implicit that the costs of unlit fibres are borne by all services in proportion to their use of fibres that are utilised, like an equi-proportional mark-up (EPMU). This seems reasonable, given that an efficient operator would always provision a certain number of spare fibres in case of damage and to allow for future expansion. This approach would only be unreasonable if these fibres were reserved for a particular service or if the fibre cables had been grossly over-dimensioned.
- Telstra's forecast for future platform allocations is based on a linear extrapolation of the change recorded in the six-month period from March 2014 to September 2014, over the five-year regulatory period. This is not robust. Telstra has indicated that further historical data is unavailable (because the required queries have changed over time) and it does not hold data that could verify its forecast. In our view it would be preferable for Telstra to identify the factors driving the observed trends and assess how those would apply in the future.

81 Section 5.2.3, page 36.

82 *CAF user guide*, section 5.2.3.

– The forecast trend indicates that the share of cost attributed to DSL will reduce from **[Telstra CiC]** to **[Telstra CiC]** over the regulatory period. The equivalent change for PSTN is from **[Telstra CiC]** to **[Telstra CiC]** and for ISDN from **[Telstra CiC]** to **[Telstra CiC]**. The allocation to Transmission will increase slightly over this period from **[Telstra CiC]** to **[Telstra CiC]**, and the allocation to Other will rise from **[Telstra CiC]** to **[Telstra CiC]**. This was shown in Figure 5.2 earlier.

– Assuming that Telstra's core network topology does not change in this regulatory period, it seems reasonable to assume that the number of fibres required by DSL and PSTN will not change significantly.[83] This is what the gentle decline in the allocation to DSL and PSTN in Telstra's forecast suggests. For similar reasons, a small increase in the allocation to Transmission also seems logical, given the increase in access-seeker and leased-line transmission requirements without a change in the network topology.

– Telstra's forecasting methodology extrapolates the trends for the Transmission and Other categories. The remaining proportion is then allocated between DSL and PSTN, keeping the ratio between the two the same throughout the forecast period. It seems likely that in practice data traffic will become a larger proportion, as indicated by Telstra's pre-NBN demand forecasts. However, there is no demand forecast for DSL traffic in particular. Therefore the more conservative approach of assuming that the ratio between DSL and PSTN remains the same is reasonable.

– In light of the above we consider the forecast not to be unreasonable. However, in order to improve the robustness of the forecast and in light of the fact that this asset class accounts for over **[Telstra CiC]** of the RAB we recommend that additional NDSD data (which should now be available[84]) should be incorporated into the data used to extrapolate future trends.

– In the next regulatory period, as the NBN nears completion, we expect that there will be more scope for Telstra to rationalise its core network. As a result, a more nuanced forecast is likely to be needed at that point, since the topology of the network may not remain as static.

► *Additional observations*

We understand that NBN Co's use of dark fibre is accounted for in the non-ADSL component of the Dedicated Data service platform recorded in the NDSD. This is allocated to the Other category of the platform allocation that is used as an input to the CAF, as explained in the CAF user guide.[85]

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83 Migration to the NBN is likely to provide an opportunity to decommission local switches in the future, though not necessarily within this regulatory period. This could result in significant changes in the allocation of CO04 to services. Our understanding is that current NBN deployment plans are fairly uncertain, so it is difficult to assess the scope for decommissioning in this regulatory period. The likelihood of this becoming possible will increase as the NBN deployment progresses.

84 Telstra indicated that NDSD data is extracted at six-monthly intervals, which means that March 2015 data should now be available.

85 *CAF user guide*, page 36. This is explained further in Telstra's response to our queries.

This is a reasonable approach, and does not result in the cost of NBN use of inter-exchange cable being allocated inappropriately to fixed-line services.

Allocation between services

Once allocated between platforms, costs are then allocated to services on the basis of MOU , SIOs or throughput (as shown in Figure 5.1). This is a logical approach and is in line with cost causation.

Conclusion

In general, the approach to allocation of CO04 appears reasonable, but we recommend that the robustness of the forecast platform allocation should be improved through the incorporation of March 2015 NDSD platform allocation data. In addition, we recommend that data is measured regularly (for example, every six months), to build a record that can be used in future FLSM updates.

We did not identify any diseconomies of scale in this asset class brought about by the migration of subscribers to the NBN in this regulatory period. As subscribers migrate to the NBN, the core traffic that is attributable to them moves from the DSL and PSTN categories seen in Figure 5.2 to the Other category (which contains NBN leased lines and other data services), thereby ensuring that no costs of overcapacity are allocated to fixed-line service subscribers.

We also note that values quoted in tables in section 5.2.3 of the *CAF user guide* do not exactly match the values in the calculations provided to us by Telstra (although the output values in the CAF model do match those provided in the supporting calculations). Therefore we recommend that Telstra should correct the tables in the *CAF user guide*.

5.4 Transmission equipment (CO05)

5.4.1 Description

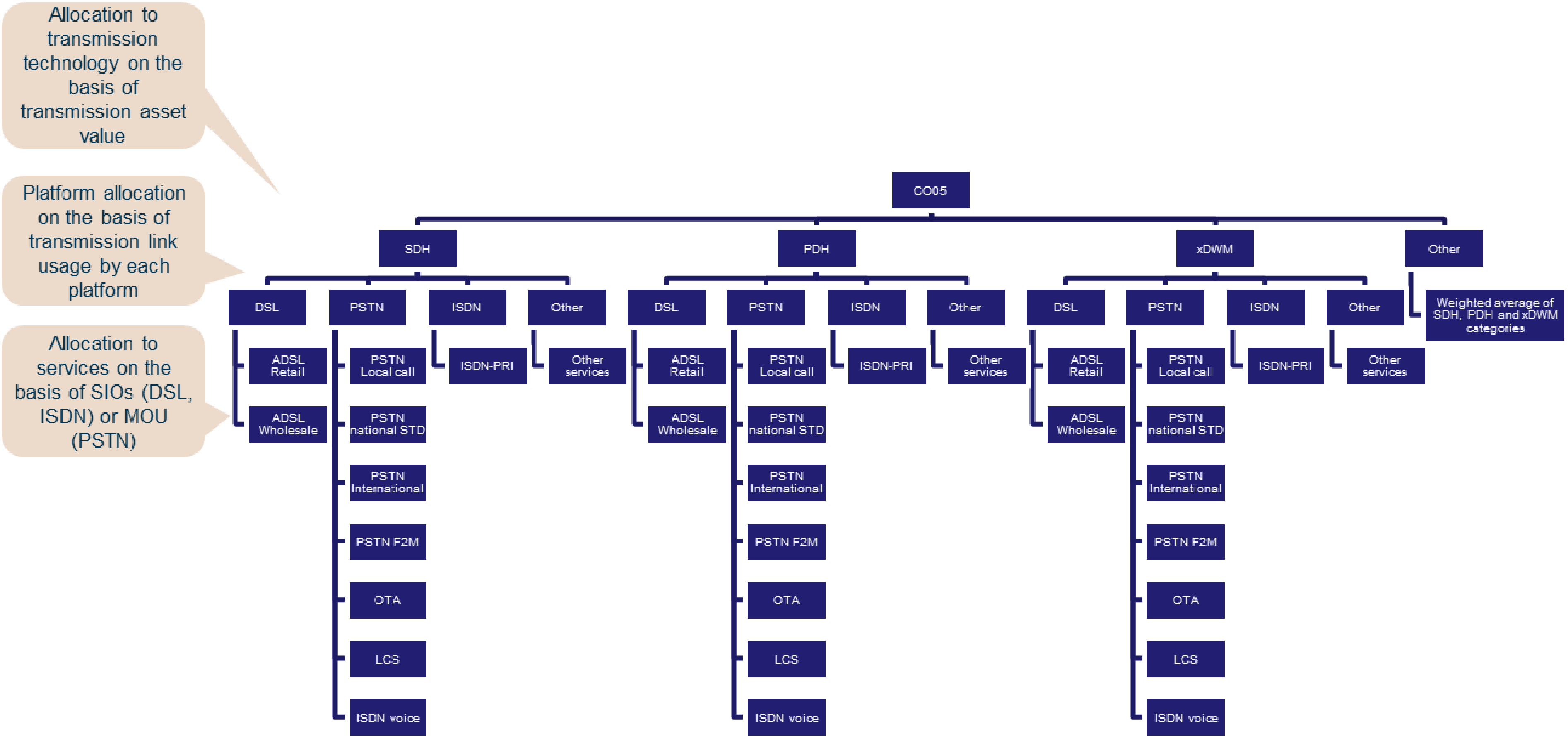
This asset class includes SDH, PDH, xWDM and other transmission equipment (including synching clocks and control devices) used in Telstra's core network. It effectively represents the electronics required to make use of the fibre-optic network that falls under asset class CO04. Therefore this asset class is treated in a similar manner to CO04, although with an additional sub-division by transmission technology (i.e. SDH, PDH and xWDM).

CO05 accounts for nearly **[Telstra CiC]** of the total access and core revenue requirements over the ten years of the model period (according to data in rows 281–330 of the *6.Revenue Requirements* sheet of the current version of the FLSM). This asset class has a significant impact on the total cost of PSTN FOAS/FTAS, LCS and WADSL, since it accounts for **[Telstra CiC]** of the total costs allocated to PSTN FOAS/FTAS, **[Telstra CiC]** of the costs for LCS and **[Telstra CiC]** for WADSL in 2013/14 (according to Telstra's proposed model).

We note that the approach to this asset class was modified in February 2015, and so it is also described in the *User guide for amendments to CAF*.[86] We illustrate the approach in Figure 5.3 below.

86 See section 7 (page 22) and also page 42 of the main *CAF user guide*.

Figure 5.3: Allocation of asset class CO05 to services in Telstra's CAF [Source: Analysys Mason, 2015]



The first step is to allocate costs among transmission technologies. Telstra's proposed approach allocates costs between SDH, PDH, xWDM and Other transmission equipment on the basis of their asset value in the asset register.[87] This allocation changes over time based on the trend in asset values in the asset register between June 2012, June 2013 and June 2014.

The second step is to allocate costs within each transmission technology to a platform (DSL, PSTN, Other). This platform allocation is based on the number of E1 (2Mbit/s) equivalent transmission links allocated to each service. This is obtained from biannual extracts taken from Telstra's NDSD system.

The final step is to allocate these services to services in proportion to the demand – using SIOs (for DSL and ISDN) services and MOU (for PSTN services).

5.4.2 Assessment

The approach used by Telstra for allocating asset class CO05 is consistent with the approach taken for CO04 (division between platforms before allocation to services) and CO01 (allocation between equipment types, in this case transmission technologies, based on asset value).

Allocation between transmission technologies

As explained above, the first step in allocating the cost of asset class CO05 is based on the WDV of SDH, PDH, xWDM and other transmission assets in the asset register. This is a reasonable approach that is consistent with that used in other asset classes, such as CO01 (Local switching equipment).

We have inspected the asset register data supplied by Telstra to support its classification of assets and distribution of costs, and have verified that these are accurate. Telstra's forecast (shown in Figure 5.4) is based on an extrapolation from three years of the asset register (2012–2014); that is, two periods with a trend calculated on the trailing two periods. The extrapolation for PDH reaches **[Telstra CiC]** in **[Telstra CiC]**. Telstra has stated that no older, comparable, historical data is available (for example, prior to 2012 xWDM was not recorded separately from SDH).

87 We note that this suffers from the flaw raised in respect of asset class CA01 (local switching equipment), in that all costs (capex, opex, return on capital) are allocated purely on the basis of (depreciated) capex.

[Telstra CiC]

Figure 5.4: Telstra's forecast distribution of transmission technologies by value [Source: Telstra,[88] 2015]

It is not best practice to perform extrapolation from a very short period. However, the trend shown by the forecast seems reasonable (as explained below), and despite the large change in distribution among transmission technologies, the distribution between platforms and later services dampens the possible distortion that this may cause:

- The distribution between platforms within a transmission technology is forecast to be relatively stable (with a change in magnitude of less than 1 percentage point over the regulatory period being typical)
- The xWDM distribution between platforms is based on the SDH distribution (since both are part of the same asset register category and both are modern technologies)
- The PDH transmission technology is of minimal importance (falling from **[Telstra CiC]** of transmission asset value in **[Telstra CiC]** to **[Telstra CiC]** in **[Telstra CiC]** onwards)
- Therefore, the majority of cost is allocated based on the SDH distribution between platforms (since xWDM is directly based on SDH and Other is based on a weighted average of all categories).

This forecast reflects the decommissioning of legacy PDH assets and SDH assets as well as growth in xWDM. This seems logical, since xWDM is the newest technology but generally used for only the largest-capacity links, whilst PDH is a legacy technology which is being phased out of Telstra's network. The Other category contains assets that are common to different transmission technologies and are allocated to services based on the weighted average for the PDH, xWDM and SDH proportions. It seems counter-intuitive that the Other category is growing, as this implies that the value of the supporting assets that make up this category is increasing relative to the value of PDH, SDH and xWDM equipment. We therefore suggest that it would be more reasonable for the

88 Based on the transmission equipment forecast in *CO05 - Transmission Equipment service platform allocation.xlsx*.

forecast to be re-based to keep the proportion of Other constant in the absence of any data from Telstra supporting the growth of Other.

Allocation between platforms: SDH and PDH

The allocation between platforms within the SDH and PDH categories relies on the link capacity allocated to each platform (DSL, PSTN, ISDN and Other). This is in line with cost causation, since link capacity assigned represents a common measure across all the different types of service that use transmission.

Figure 5.5 below shows in schematic form how Telstra uses data on its transmission links to calculate a platform distribution across different service types, which can then be used to allocate the costs of SDH and PDH. Two equivalent calculations are carried out separately based on SDH and PDH data, to produce a platform distribution that can be applied to SDH and PDH respectively.

Figure 5.5: Calculation of the platform distribution for SDH and PDH transmission equipment [Source: Analysys Mason based on Telstra,[89] 2015]

[Telstra CiC]

The allocation relies on links being converted into a common multiple of 2Mbit/s (E1). Telstra does this on the basis of industry standards[90] (rather than a simple division by 2Mbit/s), to take

[89] Based on calculations provided in *'CO05 - Transmission Equipment service platform allocation (version1_1).xlsx'*.

[90] Telstra used the following sources: *ITU-T Recommendation G.702 – DIGITAL HIERARCHY BIT RATES* and *ITU-T Recommendation G.707 – Network node interface for the synchronous digital hierarchy (SDH)*.

account of signalling overheads. The Infrastructure category is allocated in proportion to the PSTN, Mobile, Data and Leased categories of transmission links since it is deemed to be the aggregation of those categories. The *CO05 - Transmission Equipment service platform allocation.xlsx* file shows that over **[Telstra CiC]** of transmission costs for both PDH and SDH are under the infrastructure category. So this approach relies on the assumption that the distribution of infrastructure mirrors the one for PSTN, Mobile, Data and Leased categories.

The allocation of Dedicated data and Shared data between the DSL and Other categories is based on the share of data equipment ('DX allocators') that is used for ADSL according to Telstra's internal financial model (NECTAR). This seems reasonable.

The forecast of the distribution within SDH and PDH (i.e. that calculated above) relies on a trend extrapolated from a trailing two-year period for the Other category. The forecast for SDH is a small rise in Other and for PDH a small decline in Other. The DSL and PSTN components are then distributed between the remainder (i.e. 100% minus the proportion forecast for Other), keeping the ratio between DSL and PSTN the same over time.

Whilst there are flaws in this methodology, in this context it appears reasonably conservative. The result of the forecast is a change in both the SDH distribution and the PDH distribution of less than one percentage point over five years for each platform. Given the lack of alternative data the only other reasonable approach that is available would be not to use a forecast but to retain the distribution as a static value. The choice between the two approaches is largely arbitrary and will have little impact on the allocation factors calculated by the CAF. Therefore we would recommend accepting Telstra's methodology.

If there were to be a significant change in the transmission network topology (which is not expected in this regulatory period) then the configuration of links would be likely to change, with a much larger proportion of links allocated to 'Other', representing the likely greater requirements of the NBN and a reduction in the coverage and traffic associated with the CAN. However, in the current regulatory period it does not appear necessary to reflect these considerations in the equipment and platform allocations. However, this does imply that there is emerging under-utilisation of the links provisioned for DSL and PSTN purposes due to a reduction in fixed-line service subscribers due to their migration to the NBN. As discussed in Section 2.3.2, this overcapacity could be allocated to the 'NBN-Telstra agreement' cost centre or across all relevant services as an EPMU. The latter approach is implicit in Telstra's implementation of its proposed CAF. If the 'NBN-Telstra agreement' is selected then overcapacity would need to be measured using a suitable proxy such as SIOs migrated to the NBN (or transmission capacity required by subscribers migrated to the NBN).

Allocation between platforms: xWDM

The xWDM distribution between platforms is based on a single data point (DWDM fraction report from 2014). Our initial view is that this appears reasonable, as it seems unlikely that it will change significantly. However, given the rapidly increasing significance of xWDM in the transmission mix it should ideally be verified. Telstra claims that measurement of this product only began last year, and therefore no earlier data is available.

Telstra has extrapolated the xWDM forecast distribution between platforms into the future, based on SDH trends. This seems reasonable, as the two are part of the same category in the asset register and both are modern technologies. We have not identified an *a priori* reason for the two to diverge.

The same flaw in the extrapolation methodology exists as for SDH and PDH. The conclusion is likely to be similar, however – that is, the impact is small and most easy to do alternatives have other flaws.

Allocation to services

The final step is to allocate the asset costs to services on the basis of demand. As shown in Figure 5.3 earlier, this calculation uses MOU to allocate between voice services, and SIOs to allocate between DSL and ISDN services. The remainder of the cost of asset class CO05 is allocated to non-fixed-line services and therefore no further distribution is required. This is a reasonable approach, and consistent with that taken for a number of other asset classes.

We note that the allocation to services remains fairly stable despite migration to the NBN. This assumes that there is very little (or no) scope for changes to the transmission network topology in the present regulatory period. This seems to be a reasonable assumption, given the evidence provided by Telstra (e.g. statement from **[Telstra CiC]**[91]), but this will need to be reassessed for the next regulatory period. However, this does result in overcapacity being allocated in part to fixed-line service subscribers.

As discussed above in relation to the allocation of SDH and PDH costs to platforms (PSTN, DSL, ISDN and Other) and in Section 2.3.2 this overcapacity could be allocated to the 'NBN-Telstra agreement' cost centre or across all relevant services as an EPMU. The latter is implicit in Telstra's approach to this asset.

Conclusion

Our conclusion regarding this asset class is that whilst there are some flaws in the allocation it is reasonable overall given practicality concerns relating to potential improvements. Our only proposed change relates to the distribution between transmission technologies: that is, the proportion of 'Other' should be held constant whilst allowing the proportions allocated to SDH, PDH and xWDM to vary over time as explained above. This would prevent the proportion of supporting equipment from increasing over time (as it does in Figure 5.4), which is unrealistic.

91 *Telstra submission*, Appendix 15.

We note that if the ACCC decides to allocate the costs of emerging overcapacity to an 'NBN-Telstra agreement' cost centre, then this should be reflected in relation to this asset class.

5.5 Core radio bearer equipment (CO06)

5.5.1 Description

The Core radio bearer equipment asset class contains assets used to provide radio-based SDH and PDH transmission in rural and remote areas, instead of fibre-optic cables. In the *CAF user guide*[92] Telstra states:

> *"Given that these assets are primarily used to support the transmission systems, and the relatively small contribution CO06 makes to the value of the RAB, the allocators calculated for CO05 Transmission Equipment are used to allocate the annual costs attributable to CO06 to the relevant services."*

CO06 accounts for just over **[Telstra CiC]** of the total access and core revenue requirements over the ten years of the model period (according to data in rows 281–330 of the *6.Revenue Requirements* sheet of the current version of the FLSM). According to Telstra's proposed model this asset class accounts for **[Telstra CiC]** of the total costs allocated to PSTN FOAS/FTAS, **[Telstra CiC]** for LCS and **[Telstra CiC]** for WADSL in 2013/14. Therefore, it has only a small impact on these asset classes.

5.5.2 Assessment

The allocation method for CO06 is effectively the same method as for CO05, apart from a difference in routeing factors as a result of a different output from the *routeing factor model*.[93] This reflects the different topology of the microwave and fibre parts of the core network. In particular, radio bearers are only used for LE–PoC links, and so are used less often in transmission.

We note that the demand weighting used in this allocator is that of total MOU, rather than traffic specifically carried by core radio bearer equipment. This might be traffic originating or terminating at the remote exchanges that are served by this equipment. Traffic in the core is aggregated and so it is not possible to identify which services use each core radio bearer link. At this level of the network we would also expect a mesh structure (for redundancy), and so it would be difficult, if not impossible, to identify exactly which exchanges are responsible for traffic carried on the radio bearer equipment. Therefore, our assessment is that the use of total demand for weighting the allocation between services is an appropriate methodology to use.

In addition, we note that the same platform allocation (between SDH, PDH, xWDM and Other) is used for this asset class as for CO05. This is erroneous since the distribution of SDH, PDH and

92 Section 5.2.5, on page 44.

93 This is discussed in Section 3.

xWDM transmission equipment cannot by definition be the same in the fibre core network as the microwave link part of the core, simply because xWDM is a fibre-only technology. However, given that this asset class makes a low contribution to the RAB our assessment is that this methodology is not unreasonable given the small significance of this asset class.

Our overall assessment is that the proposed allocation calculation for this asset class is reasonable given practicality concerns. However, this should be reviewed for future CAF updates, given likely changes in traffic mix (e.g. more NBN leased transmission capacity). Our comments regarding the identification and allocation of the costs of under-utilised assets in asset class CO05 apply here as well.

5.6 Other communications plant and equipment (CO07), Network land (CO08) and Network buildings/support (CO09)

5.6.1 Description

Asset class CO07 accounts for **[Telstra CiC]** of the total access and core revenue requirements over the ten years of the model period (according to data in rows 281–330 of the *6.Revenue Requirements* sheet of the current version of the FLSM). Asset classes CO08 and CO09 account for a further **[Telstra CiC]** and **[Telstra CiC]** respectively. Taken together these have a large impact on the costs of WLR, PSTN FOAS/FTAS; LCS and WADSL. These asset classes together account for **[Telstra CiC]** of the total costs allocated to WLR, **[Telstra CiC]** of the total costs allocated to PSTN FOAS/FTAS, **[Telstra CiC]** of the total costs of LCS and **[Telstra CiC]** of the total costs of WADSL in 2013/14 (according to Telstra's proposed model).

Together the three asset classes account for the fixed-line network exchange buildings and land as well as exchange building equipment (including power infrastructure, air-conditioning, equipment racks and cable infrastructure).

These asset classes are allocated across services using the General Allocator method, based on the 'revenue share approach'[94] previously developed by the ACCC and described by Telstra in the *CAF user guide* (section 5.3.1). However, before the General Allocator is applied, a proportion of costs equivalent to the third-party usage of Telstra exchange space is allocated away on the basis of the number of racks used and forecast to be used by third parties; this is referred to as the 'Third Party Access Allocator'. Because spare space is not explicitly accounted for, it is partly allocated to fixed-line services and the remainder is 'removed' by the Third Party Access Allocator. In the *CAF user guide* Telstra explains that the General Allocator is modified using the results of a **[Telstra CiC]** valuation **[Telstra CiC]** to weight the costs of racks in more or less expensive bands. However, it is unclear how this weighting is implemented in the model.

The General Allocator is then applied. This is intended to allocate costs in proportion to the overall allocation of costs in the remaining asset classes for which a cost driver was used (i.e. C001–CO06

94 This version of the general allocator is based on asset classes CO01–CO06 and CO12.

and CO12, for which the distribution of cost is 'known'). The General Allocator therefore allocates costs across WLR, PSTN FOAS/FTAS, LCS, WADSL, Other fixed line services and Other services.

5.6.2 Assessment

We note that the equivalent asset classes in the access network (CA07, CA08 and CA09) are allocated using a common methodology (weighting by SIOs only), and so it seems to make sense for asset classes CO07, CO08 and CO09 to share a common methodology as well. CO08 and CO09 logically support each other and it seems proportionate to include CO07, which accounts for only **[Telstra CiC]** of the revenue requirements across the modelled period.

The rack metric

The proposed CAF allocates costs between fixed-line services, TEBA[95] and other third-party users on the basis of the rack metric. The rack metric is commonly used in regulatory models as a proxy for floorspace, and hence the cost of accommodation in an exchange building. Using racks as a common denominator accounts for the amount of space that is usable in an exchange (since common space such as stairwells and corridors occupies floorspace but is consumed equally by all racks) and acts as a proxy for costs such as security, cable guides and fire suppression systems.

However, electricity consumption (and hence heat production and cooling requirements) can vary significantly between racks, as it depends on the type of equipment installed in those racks and the level of utilisation.[96] In addition, the profile of revenue requirements in the FLSM suggests that the opex requirement for asset class CO09, in particular, is a very significant component of the total revenue requirement.

Therefore, best practice would suggest that the metric used to allocate costs in the CAF should be some combination of the number of racks and power consumption, or alternatively that floorspace and power costs should be treated as separate asset classes. However, we recognise that the information required to allocate power consumption between fixed-line services, TEBA, third-party users and common requirements in historical years would be difficult to collect. In addition, forecasting the evolution of power consumption may be difficult to perform reliably, given the uncertainty introduced by migration to the NBN.

Given considerations of practicality, a reasonable approach is therefore to use the rack metric as Telstra has done. This is equivalent implicitly to assuming that a wholesale floorspace service (used both internally and externally) includes both floorspace and any power requested by the user.

95 Telstra Exchange Building Access.

96 That is, utilisation both in terms of rack units occupied and also power consumption of the equipment. We understand that Telstra leases accommodation to access seekers on a per-rack (or part thereof) basis; there is no sharing between users. We note that this allows Telstra's usage of rack space to be more efficient than that of access seekers, since it is the dominant user of its exchanges.

Third Party Access Allocator and General Allocator

We agree with the principle of the Third Party Access Allocator; that is, assigning costs between fixed-line services, TEBA and other third-party users on the basis of the rack metric.

Ideally this allocation should be extended to allocate costs between fixed-line services instead of just allocating third-party costs (i.e. rack usage for each service should be identified and costs allocated directly on this basis). After the Third Party Access Allocator has been applied the remaining costs are allocated using the General Allocator method.[97] This does not seem to be cost based. Ideally the floorspace (in square metres) or rack usage occupied or reserved by each service should drive the allocation.[98]

Telstra has provided evidence to verify the reasonableness of the allocation method, in 7.1.1 and Appendix 9 of the Telstra submission in response to the ACCC's draft decision. The discussion in 7.1.1 which verifies the FLS/non-FLS split of **[Telstra CiC]** seems reasonable. The allocation of equipment to categories in Table 112 which is the basis for this verification appears to be reasonable as well.

Given the verification provided by Telstra in its submission we are satisfied that the resulting allocation between FLS and Other services is not unreasonable, despite the principled shortcomings of the approach.

Land value modification

In the CAF Telstra weights the Third Party Access Allocator on the basis of the relative value of the land and buildings in each band. This is intended to reflect the greater value of, for example, band 1 buildings compared to band 4 buildings in more rural areas. The contention that land is more costly to acquire and operate in bands representing more urban areas and cheaper to acquire and operate in more rural areas is reasonable. The use of the proxy of the value of land is also reasonable for this purpose.

The use of land valuation data from **[Telstra CiC]** would almost certainly be unsuitable for an accurate analysis. However, in practice the weighting of land value is distributing costs between bands 1–3 on the one hand and band 4 on the other, for the purposes of distinguishing the costs of ULLS in these geotypes.

Telstra has confirmed that there has been no significant building, sale or relocation of buildings since **[Telstra CiC]** (except for a notable relocation of the South Brisbane local exchange), so we

97 The General Allocator approach allocates costs across services based on the 'revenue share approach' previously developed by the ACCC and described by Telstra in the *CAF user guide* (section 5.3.1). We also note that there are flaws in the General Allocator approach as implemented with respect to core asset classes in the CAF (as discussed in Section 0 below).

98 A further improvement would be to identify the rackspace or floorspace used by common supporting assets such as power equipment and batteries and to allocate the associated costs separately to services based on their consumption by each service.

see no reason for the distribution of value by band to have significantly changed since then. Telstra also explained that **[Telstra CiC]………………………………………………… ………………………………..** [**CiC ends]**. We understand that Telstra has not carried out another valuation exercise since then, or made any significant changes in its exchange portfolio, so this is the most up-to-date data available and it should be representative of Telstra's current estate. Given the purpose of the valuation we deem this land valuation report to be a reasonable source to rely on for this purpose in the next regulatory period. A new valuation may be useful by the time of the end of the deployment of the NBN.

Rack usage forecast

The rack usage forecast underpins the values used for the Third Party Access Allocator. We have verified the base-year inputs against the extracts from Telstra's inventory system (MITS) as provided. Below we discuss the usage forecast for each party in turn. Figure 5.6 shows the rack forecast proposed by Telstra.

[Telstra CiC]

Figure 5.6: Telstra's proposed rack forecast [Source: Telstra's CAF, 2015]

► *Telstra*

Telstra forecasts that its rack usage will remain static at 2013/14 levels. Telstra has argued that most racks are required for transmission and similar assets which cannot be rationalised until deployment of the NBN is complete. Telstra provided evidence for this in its *submission*[99] and in its response to our queries (question 47).

In view of the evidence provided by Telstra it seems reasonable to accept this level of rack usage for this regulatory period. However, as the NBN deployment moves closer to completion we

99 *Telstra submission*, section 3.4.1 and Appendix 15 in particular. See also Table 112, which provides a breakdown of racks occupied by different categories of equipment.

would expect opportunities for rationalisation to become more likely during the next regulatory period. The ACCC should review the rack usage forecast for the next update of the CAF.

► *TEBA*

Telstra's TEBA rack usage forecast assumes that the number of TEBA racks will grow by approximately **[Telstra CiC]** per annum before the impact of the NBN is applied. This is based on a 12-month moving average. Telstra has explained that it expects the number of TEBA racks to remain stable despite the forecast (pre-NBN) growth in ULLS of about **[Telstra CiC]** per annum in each year of this regulatory period, based on historical experience that the number of TEBA racks has grown much more slowly than ULLS subscribers. This is due to an declining trend in LSS subscribers (which also drives access seekers' requirements for TEBA) which requires more ports than ULLS. Telstra has also claimed that access seekers historically overprovisioned equipment in an effort to deploy enough equipment to service their market share targets, rather than their actual market shares. This argument suggests that access seekers continue to operate with relatively lower levels of utilisation of their equipment, despite the incentive to minimise TEBA charges. Overall this argument appears plausible.

Telstra's TEBA rack usage forecast is modified to model a decline to a post-NBN scenario of just **[Telstra CiC]** TEBA racks. This assumes that:

- TEBA is only required in **[Telstra CiC]** NBN points of interconnection (PoIs). This seems to be a reasonable end point to assume, as access seekers would be able to reach all subscribers without having a presence in each local exchange and could only connect to the NBN at these PoIs.
- There are five access seekers active in each PoI. This is the same number of access seekers as at present and seems a conservative assumption to make
- Each access seeker requires only one rack.

The above assumptions are based on the view of likely requirements expressed by Telstra's TEBA Wholesale Product Manager.

In its response to the draft decision, Optus submitted that its rack requirements would not be decreasing:

- Its use of TEBA related to all declared services and not just those experiencing a reduction in subscribers as a result of the NBN
- **[Optus CiC]……………………………………………….………………….[CiC ends]**[100]

The conclusion we draw from Optus' points is that it would be too aggressive to forecast a reduction in TEBA requirements to the very small final footprint assumed by Telstra. Given that Telstra forecasts that it will not be able to rationalise its own rack requirements during the current regulatory period it would seem unreasonable to apply a higher efficiency standard to access

100 Para 3.94.

seekers that use TEBA services. It is therefore more reasonable to assume that rack usage remains static at 2013/14 levels during the next regulatory period.

► *NBN Co*

The NBN Co forecast assumes that at the end of the current regulatory period NBN Co will require **[Telstra CiC]** racks nationally, and that this is **[Telstra CiC]** of the total requirement of the NBN once it is completed. The forecast calculates a roll-out rate for the intervening years, based on the percentage cutover assumptions in the *NBN Co Strategic Review*.

Telstra has stated that the rack forecast is based on The Infrastructure Services Agreement between NBN Co and Telstra. This has recently been renegotiated, and the NBN rack requirement has increased from **[Telstra CiC]** in August 2020 to **[Telstra CiC]** by November 2020.

It seems reasonable to accept that the Agreed Rollout plan between Telstra and NBN Co is the most reasonable source to rely on for the Telstra rack forecast, despite the fact that this is subject to revisions as the NBN deployment proceeds. We note that the upwards revision described above is partly mitigated by the slippage in deployment timetable, and so we do not propose that amendments should be made to the NBN rack forecast at this stage. However, the ACCC should review the latest rack usage actuals and forecasts whenever the CAF is updated.

Overcapacity

In its submission to the draft decision, Telstra presented arguments to support the view that asset classes CO07, CO08 and CO09 are not scalable in the present regulatory period, because during the deployment period of the NBN the opportunities for rationalisation will be limited.[101] This supports the view that increasing overcapacity will emerge in these asset classes during this regulatory period.

At this stage it is not possible to identify how much or when overcapacity will emerge, since Telstra has not provided any plan to decommission equipment that currently occupies racks. Indeed it can be argued that decommissioning may not be economical until the NBN is nearing completion or completed. According to the discussion in Section 2.3.2 earlier, this overcapacity could be allocated to the 'NBN-Telstra agreement' cost centre or to all relevant services as an EMPU, which is implicit in Telstra's approach to this asset.

Should the EPMU allocation be adopted for the next regulatory period, we note that as the NBN deployment approaches completion in the next regulatory period, opportunities to rationalise exchange buildings and racks should become more cost effective. Therefore the ACCC should review this allocation of overcapacity in preparation for the next regulatory period, since it may be possible to reclassify at least part of these asset classes as scalable.

101 *Telstra submission*, section 3.4.1 and Appendix 15 in particular.

Calculation error

We have noticed that the implementation of the Third Party Access Allocator in the CAF component of the FLSM seems wrong, since the calculations in the *Allocations* sheet allocate TEBA racks to the TEBA service but then allocate the remaining space to fixed-line services. The proportion of third-party access racks should be excluded from the allocation to fixed-line services (i.e. the calculations should be of the form: *General Allocator * (1-TEBA%-TPA%)*). Telstra acknowledged that this was a mistake when responding to our queries, and has corrected this in an updated version of the CAF. Telstra stated that the effect was "[…] a slight decrease in the total usage allocated to Fixed Line Services and a slight increase in usage allocated to Other Services for each year."[102]

Conclusion

We have noted above a number of limitations to the approach proposed by Telstra for these asset classes. However, we only make the following recommendations:

- The ACCC should review the rack usage forecasts when the CAF is updated, to ensure that it takes account of the latest available information
- The TEBA rack forecast should remain static at 2013/14 levels.

The remainder of the forecast seems to be reasonable. Overcapacity is likely to emerge in these asset classes in the present regulatory period given the likely practical issues with rationalising and disposing of while the NBN is being deployed. In Telstra's proposed approach the overcapacity is implicitly allocated as an EPMU, with the majority implicitly allocated to Other services and Other fixed line services. The other approach that could be adopted by the ACCC would be to an allocation of the costs of NBN-induced diseconomies of scale to the 'NBN-Telstra agreement' cost centre.

5.7 Indirect capital assets (CO10)

5.7.1 Description

The CO10 asset class includes primarily IT equipment (software and hardware) as well as equipment related to motor vehicles and mechanical aids used in the core network. In the ACCC's *April 2011 FAD discussion paper*,[103] it is noted that Telstra advised that indirect capital assets were used to provide administration, human relations, accounting, IT and other indirect functions. CO10 accounts for nearly **[Telstra CiC]** of the total access and core revenue requirements over the ten years of the model period (according to data in rows 281–330 of the *6.Revenue Requirements* sheet of the current version of the FLSM). This asset class has a small impact on WLR, PSTN FOAS/FTAS, LCS and WADSL as it accounts for **[Telstra CiC]** of the total costs allocated to WLR, **[Telstra CiC]** of those

102 *Telstra response to Analysys Mason queries (April)*, Q33.

103 ACCC *April 2011 FAD Discussion paper*, page 51.

allocated to PSTN FOAS/FTAS, **[Telstra CiC]** of those allocated to LCS and **[Telstra CiC]** of those allocated to WADSL in 2013/14 (according to Telstra's proposed model).

CO10 is allocated across services using a 'Secondary General Allocator' based on the 'revenue share approach' previously developed by the ACCC and described by Telstra in the *CAF user guide* (section 5.1.5). This approach aims to allocate costs in proportion to the overall allocation of costs in the remaining asset classes for which a cost driver is used. Accordingly, the revenue allocator is based on all core asset classes except CO10 and CO11. This is consistent with the approach used for asset class CA10.

5.7.2 Assessment

We have inspected the 2013 asset register to confirm the composition of this asset class, and note that it contains assets related to general business support (e.g. office equipment, vehicles) as well as a number of high-value IT systems.

A significant portion of the asset class relates to general business support assets. We agree that the revenue share approach is a reasonable methodology to apply to this portion of asset class CO10. This is a long-standing methodology which the ACCC has used since the 2011 FADs.[104]]

According to the *ACCC April 2011 FAD Discussion paper* (page 52) the Indirect Capital Asset value was split based on the CAN and Core asset values in Schedule 2 of Telstra's November 2010 submission.[105] Our assessment assumes that this split reflects the relative RAB values of access and core oriented assets accurately.

IT systems make up the remainder of this asset class. In line with the principle of cost causation, the IT systems should ideally only be allocated to the services they support. In some cases the IT systems will support all subscribers, but we would expect a significant portion of the IT systems to only enable support a subset of Telstra's services. These IT systems should therefore be allocated only to the IT services that they support. It is likely that a number of IT systems will support multiple services, and there is not necessarily a direct causal between an IT system and the number of subscribers or number of systems that it serves which could be used to inform an allocation. This does not necessarily mean that the allocation methodology is unreasonable, but it would be made more robust by incorporating our suggested approach.

In light of issues related to practicality (data requirements and pressure of time), we view the current allocation methodology as reasonable overall. However, future updates of the CAF should ideally incorporate a more-detailed consideration of IT systems as described above.

It is possible that there may be some emerging diseconomies of scale in this asset class as a result of migration of subscribers from the CAN to the NBN. The majority of items in this asset class are

104 ACCC *April 2011 FAD Discussion paper*, section 10.3.8.

105 Telstra, Pricing Principles for Fixed Line Services: Supplementary response to the ACCC's Draft Report, November 2010.

invariant, or largely invariant, to the number of subscribers in the network. Provided that the methodology used to calculate the allocation factors in the remaining CAN asset classes is appropriate and reflects the correct allocation of overcapacity or diseconomies of scale, the General Allocator approach will be reasonable. This is because the General Allocator approach reflects the overall allocation to all other asset classes and applies it to CO10. Therefore if the General Allocator approach is used, no particular change needs to be made to the methodology needs to be made to reflect any emerging overcapacity in the network.

However, we note that the revenue share method as applied to CO10 does not take account of the revenues for all services that use exchange buildings. Routers and switches that are used for business services are excluded from the RAB (Asset class CO12 contains only DSL-related equipment), although they do take up exchange building space and consumer power. This is likely to result in an under-allocation of costs to the Other services category. We are not aware of data that would enable us to calculate the equivalent to the regulatory value for these assets. The General Allocator approach is an imperfect proxy, but this flaw seems unlikely to introduce a higher level of error than is already present with this proxy.

Our overall conclusion is that, given the context in which the allocation is being made and the relative materiality of the asset class to the price of regulated fixed-line services, the revenue share approach as implemented in the version of the CAF that we have reviewed appears to be reasonable.

5.8 LSS equipment (CO11)

In the *CAF user guide*[106] Telstra explains that the LSS equipment is used only to provide the line sharing service (LSS). Therefore this asset class is entirely allocated to the LSS and no other asset class contributes to the costs allocated to this service. We did not identify any LSS equipment in the 2013 asset register that was made available for our inspection to verify this. However, the asset class was previously defined in conjunction with the ACCC and therefore our working assumption is that no further verification is required of the composition of this asset class.

This asset class accounts for only **[Telstra CiC]** of the total access and core revenue requirements over the ten years of the model period (according to data in rows 281–330 of the *6.Revenue Requirements* sheet of the current version of the FLSM). According to Telstra's proposed FLSM this asset class makes up 100% of the total cost allocated to the LLS service in 2013/14. Therefore it has only a small impact on the final cost calculated for the LSS service.

We agree with the logic of assigning all costs in this asset class to the LSS, and are satisfied that this is a reasonable allocation for this asset class.

106 Section 5.2.6; see page 45.

5.9 Data equipment (CO12)

5.9.1 Description

This asset class contains equipment used to provide fixed-line DSL broadband services (but not ISDN or other data services). This includes IP routers, switches, DSLAMs and data network software. It accounts for **[Telstra CiC]** of the total access and core revenue requirements over the ten years of the model period (according to data in rows 281–330 of the *6.Revenue Requirements* sheet of the current version of the FLSM).

This asset class is allocated to the retail, wholesale and other DSL services in proportion to the number of subscribers to each service, without accounting for which band they are in. The result of this calculation for the regulated WADSL service is very significant, since according to Telstra's proposed CAF and FLSM this asset class accounts for **[Telstra CiC]** of the costs allocated to the WADSL service (in 2013/14).

5.9.2 Assessment

This is a significant category which accounts for a large revenue requirement. The type of assets listed in the asset register could be used to provide a variety of services. Telstra does note in its *CAF user guide* that no other services are supported by this asset class, and during the preparation of this report confirmed that this asset class, and its value, was defined in such a way in conjunction with the ACCC. This implies that active electronics supporting ISDN and leased-line services are excluded from the value to be allocated. Given this confirmation we agree that it is logical to allocate this asset class to the retail, wholesale and other DSL services.

We note that asset class CO12 includes a wide range of assets that, from a network engineering point of view, we would expect to be dimensioned on the basis of throughput (e.g. routers, switches, software licences) and others that we would expect to be dimensioned by SIOs (e.g. DSLAMS). It would be in line with the principles of cost causation to base the cost allocation on these metrics, rather than just subscribers. We asked Telstra to provide throughput data for Wholesale DSL, Retail DSL and Other DSL. According to Telstra's response,[107] **[Telstra CiC] ……………………………………………………………………………………………………… ………..[CiC ends]**. Data for Other DSL is not recorded since it is a mix of services. On the basis that data is not available for Other DSL and that wholesale and retail PSTN do not have systematically different throughputs, we concluded that the SIO only-based allocation is not unreasonable.

Average subscriber throughput provisioned is a characteristic which we would expect to change over time in response to changes in subscriber behaviour and commercial forces. This change may not necessarily be significant, however. Given the deployment of the NBN it may be difficult to accurately forecast the evolution of subscriber throughput during the deployment and migration

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107 *Telstra response to Analysys Mason queries (June)*, Q5.

period. Therefore for this regulatory period it may not be appropriate to calculate a dynamic allocation factor. Instead, an allocation factor that does not change over time may be more appropriate for this regulatory period.

We understand that the ACCC is consulting on the view that the portion of this asset class that represents DSLAMs is scalable; that is, DSLAMs can be decommissioned as subscribers are disconnected. If this is accepted, the impact of subscribers migrating to the NBN should be accounted for by the RAB and asset disposals mechanism for DSLAMs, and the CAF does not need to take further account of potential diseconomies of scale. We recommend that the ACCC should check that the RAB reflects this correctly, since the revenue requirements in the FLSM proposed by Telstra decline significantly over the course of the regulatory period (although not quite as steeply as the number of ADSL retail and ADSL wholesale subscribers).

The remainder of this asset class (mainly comprising core routers) could be considered as unscalable in response to declining CAN subscriber volumes. However they can be reused easily for NBN subscriber traffic. We would recommend to use a more stable forecast for CO12 traffic (e.g. the pre-NBN forecast). That would also be consistent with Telstra's assumptions regarding rack forecasts (discussed in Section 5.6).

6 Conclusion

The assessment presented in this report has primarily considered:

- whether the calculated allocation factors used reflect the ACCC's cost allocation factor fixed principles (set out in Annex B) and promote the LTIE, and
- whether the data used to calculate the allocation factors is reasonable and can be verified.

Our overall conclusion is that the CAF proposed by Telstra is generally fit for purpose, with the exception of the points summarised below.

Allocation of NBN-induced diseconomies of scale

In Section 2.3, we discuss alternatives that the ACCC could consider. These options include:

- allocating the costs of NBN-induced diseconomies of scale as an EPMU on all services. However, we acknowledge this could result in some of these costs being allocated to fixed-line service subscribers who neither caused diseconomies of scale nor are expected to derive benefits from the resulting over capacity
- allocating the costs of NBN-induced diseconomies of scale to an 'NBN-Telstra agreement' cost centre in the CAF

In Section 2.4, we also discuss assuming a hypothetical copper-only network without the existence of the NBN for the purposes of setting fixed-line service regulated prices.

The chosen approach should be applied in a consistent manner across all asset classes unless there is a clear rationale for using a different approach for a particular asset class.

We also made additional suggestions relating to greater disaggregation of services which could be considered in future regulatory periods should incentives for cost minimisation in the current regulatory period not prove sufficient.

Routeing factors

We have reviewed the routeing factors as presented in the supporting *routeing factor model*. Our assessment is that these are logical and reasonable to rely on for the purposes of this CAF, with the exception of a small number of errors which Telstra acknowledged and seems to have corrected during the course of this project. These are described in Section 3.

We also note our reservations about the age of the call dispersion data, which should certainly be updated for the next update of the FLSM.

Allocation of costs by asset class

Our conclusions and recommendations with respect to each asset class are summarised in Figure 6.1 below.

In general, those areas which do appear problematic relate to practical concerns such as data availability and to differences arising from the different starting point of the ACCC and Telstra on particular topics such as the treatment of the impact of the NBN (e.g. on local switching assets)

Figure 6.1: Summary of recommendations [Source: Analysys Mason, 2015]

Asset class	Assessment	Recommendations
CA01 – Ducts and pipes	Changes recommended	Make changes to the forecast, as described in Section 4.1.2
CA02 – Copper Cables	Reasonable	For future regulatory periods, monitor changes in the distribution of copper between bands brought about by the MTM approach to NBN roll-out. No changes for this regulatory period
CA03 – Other cables	Reasonable	None in this regulatory period
CA04 – Pair gain systems	Reasonable	None in this regulatory period
CA05 – CAN radio bearer equipment	Reasonable	None in this regulatory period
CA06 – Other CAN assets	Reasonable	None in this regulatory period
CA07 – Other communications plant and equipment	Reasonable	None in this regulatory period
CA08 – Network land	Changes recommended	For the next regulatory period, review opportunities for rationalising MDF and exchange buildings before next regulatory period
CA09 – Network buildings/support	Changes recommended	Update the current approach to apply the land value modification
CA10 – Indirect capital assets	Reasonable	Future updates to the CAF should allocate IT system costs directly to the services that they support, in order to improve the robustness of this allocation. The General Allocator method should be applied to remaining costs in this asset class. It would be reasonable to retain the current methodology for the current FAD
CO01 – Switching equipment – local	Changes recommended	Amend calculation to allocate costs in proportion to SIOs only (as a proxy for traffic). The RAB will be modified to dispose of the port-driven component of the cost for this asset class
CO02 – Switching equipment – trunk	Changes recommended	Maintain the use of MOU as the basis for the allocation, modify the forecast used to keep the volume of PSTN subscribers broadly constant (e.g. pre-NBN forecast).
CO03 – Switching equipment – other	Changes recommended	
CO04 – Inter-exchange cable	Changes recommended	Update platform allocation using March 2015 data, so as to extrapolate from a one-year period rather than a six-month period. Continue to record usage data to build up a record that can be used in future updates to the CAF

Asset class	Assessment	Recommendations
CO05 – Transmission equipment	Changes recommended	Rebase the transmission technology distribution in order to keep the 'Other' category constant, whilst the remaining categories vary as per the current approach
CO06 – Core radio bearer equipment	Reasonable	None in this regulatory period
CO07 – Other communications plant and equipment	Changes recommended	Review the rack usage forecasts when the CAF is updated to ensure that it takes account of the latest available information Keep the TEBA rack forecast static at 2013/14 levels
CO08 – Network land	Changes recommended	
CO09 – Network buildings/support	Changes recommended	
CO10 – Indirect capital assets	Reasonable	For future updates to the CAF, allocate IT system costs directly to the services that they support in order to improve the robustness of this allocation. The General Allocator method should be applied to remaining costs in this asset class. It would be reasonable to retain the existing methodology for the current FAD
CO11 – LSS equipment	Reasonable	None in this regulatory period
CO12 – Data equipment	Changes recommended	Maintain the use of MOU as the basis for the allocation of the remaining portion of the asset class after disposals (core routers), modify the forecast used to keep the volume of data subscribers broadly constant (e.g. pre-NBN forecast).

Annex A Asset classes and services

A.1 Definition of asset classes

Figure A.1: Description of FLSM asset classes – access [Source: Telstra CAF user guide, 2014]

FLSM Asset Class	Asset Description
CAN Asset Classes	
CA01 Ducts and Pipes	The Ducts and Pipes (CA01) Asset Class contains Telstra's duct network assets. These assets are used predominantly to contain copper cables in the main and distribution stages of the CAN. The duct network also contains fibre optic cable, some HFC as well as third party services. The duct network is present in CBD, metropolitan and most regional areas. CA01 comprised [redacted] of the initial Regulatory Asset Base (**RAB**) value (i.e. the RAB value as at 1 July 2011).
CA02 Copper Cables	The Copper Cables (CA02) Asset Class contains Telstra's copper cable assets, which are Telstra's primary means of connecting end-users to the PSTN through the CAN, enabling the provision of fixed line access services – including ULLS, LSS, WLR (and retail basic access) – and associated voice and broadband services. CA02 comprised [redacted] of the initial RAB value.
CA03 Other Cables	The Other Cables (CA03) Asset Class contains CAN-based optical fibre cables (and associated infrastructure) used to provide FTTP services in Telstra's Velocity estates, South Brisbane and similar deployments. These assets are used to provide services to end-users (either retail or wholesale basic access). CA03 comprised [redacted] of the initial RAB value. Note: optical fibre cables within this asset class do not include optical fibre cables used to connect remote (or CAN-based) voice and DSLAM equipment - i.e. Pair Gain Systems such as CMUX units. These cables are recorded against CO04 Inter-exchange Cables.
CA04 Pair Gain Systems	The Pair Gain Systems (CA04) Asset Class contains remote voice equipment (pair gain systems), which provides voice functionality to end-users. These devices – generally CMUX units – can also facilitate the provision of broadband services to end-users with the installation of a collocated DSLAM device. These devices are not part of the CA04 Asset Class and are contained (along with other, exchange-based DSLAM equipment) in CO12 Data Equipment. CA04 comprised [redacted] of the initial RAB value. The costs associated with assets are allocated to WLR, Retail Basic Access services and ISDN services.
CA05 CAN Radio Bearer Equipment	The CAN Radio Bearer Equipment (CA05) Asset Class includes antennas, terminals and related equipment. Note: these assets are not related to mobile wireless assets. These assets are used in the provision of Retail Basic Access and WLR services. CA05 comprised [redacted] of the initial RAB value.
CAO6 Other CAN Assets	The Other CAN Assets (CA06) Asset Class contains Network Termination Units which are used by the fixed line access services (ULLS, WLR, Retail Basic Access, ISDN and Other DSL). CA06 comprised [redacted] of the initial RAB value.
CA07 Other Communications Plant and Equipment	The Other Communications Plant and Equipment (CA07) Asset Class is predominantly made up of CAN radio towers, used in conjunction with CA05 to supply retail basic access and WLR fixed line access services. CA07 comprised [redacted] of the initial RAB value.
CA08 Network Land	The Network Land (CA08) Asset Class contains the share of network land assets (which include freehold network land, structural land improvements, mains power connections, fencing, roads, paths, parking, drainage and landscaping) to accommodate the customer side of the Main Distribution Frame (**MDF**) – which is contained in CA09. This asset is required for the provision of the fixed line access services (i.e. WLR and ULLS). CA08 comprised [redacted] of the initial RAB value.
CA09 Network Buildings/Support	The Network Buildings/Support (CA09) Asset Class contains the share of aggregate network buildings and support assets designed to reflect the values and associated costs of the Customer side of the MDF within Telstra exchange buildings. This asset is required for the provision of the fixed line access services (i.e. WLR and ULLS). CA09 comprised [redacted] of the initial RAB value.
CA10 Indirect Capital Assets	The Indirect Capital Assets (CA10) Asset Class contains equipment related to motor vehicles and mechanical aids, but is predominantly IT – both software and hardware. CA10 is required for the provision of all regulated fixed line services and other services. CA10 comprised [redacted] of the initial RAB value.
CO01 Switching Equipment - Local	The Switching Equipment – Local (CO01) Asset Class contains voice aggregation devices (Remote Switching Stages (**RSS**), Remote Aggregation Units (**RAU**)) – including voice line cards, as well as local access switch (**LAS**) devices. The costs associated with these assets are driven by both the number of end-user services connected and the volume of voice minutes that traverse the equipment. This equipment is used for the provision of fixed line voice services. CO01 comprised [redacted] of the initial RAB value.

Figure A.2: Description of FLSM asset classes – core [Source: Telstra CAF user guide, 2014]

FLSM Asset Class	Asset Description
Core Asset Classes	
CO02 Switching Equipment - Trunk	The Switching Equipment – Trunk (CO02) Asset Class contains higher level switching equipment – principally used in the provision of STD, international, fixed to mobile and interconnect voice calls. The costs associated with these assets are driven primarily by the volume of voice minutes that traverse the equipment. This equipment is used for the provision of fixed line voice services. CO01 comprised [redacted] of the initial RAB value.
CO03 Switching Equipment - Other	The Switching Equipment –Other (CO03) Asset Class contains a minimal amount of miscellaneous other voice switching equipment, used for the provision of the fixed line voice services. CO03 comprised [redacted] of the initial RAB value.
CO04 Inter-exchange Cables	The Inter-exchange Cables Asset Class (CO04) contains the fibre optic cables that connect Telstra's exchange buildings and other telecommunications infrastructure. These assets include fibre cables used to connect remote voice switching and ADSL broadband hardware DSLAMs deployed in the CAN to the local exchange. These assets are used for the provision of the fixed line voice and broadband services, as well as for other services. CO04 comprised [redacted] of the initial RAB value.
CO05 Transmission Equipment	The Transmission Equipment (CO05) Asset Class contains predominantly SDH as well as PDH transmission equipment (as well as other transmission equipment used to support both PDH and SDH systems). These assets are used in the provision of fixed line voice and broadband services, as well as other services. CO05 comprised [redacted] of the initial RAB value.
CO06 Core Radio Bearer Equipment	The Core Radio Bearer Equipment (CO06) Asset Class contains core radio bearer equipment used to deliver transmission services (i.e. SDH and PDH-based services) in areas without fibre optic cable (CO04). These assets are generally used in regional and remote areas and support the provision of transmission services (and, in turn, those services that rely on Transmission Equipment). CO06 comprised [redacted] of the initial RAB value.
CO07 Other Communications Plant and Equipment	The Other Communications Plant and Equipment (CO07) Asset Class contains racks, ironworks and tie cables used in Telstra exchange buildings to support the provision of fixed line services, and other services – including use by third parties. CO07 comprised [redacted] of the initial RAB value.
CO08 Network Land	The Network Land (CO08) Asset Class is the value of network land assets (which include freehold network land, structural land improvements, mains power connections, fencing, roads, paths, parking, drainage and landscaping) – excluding that share allocated to CA08. These assets are required for the provision of the fixed line services and other services – including use by third parties. CO08 comprised [redacted] of the initial RAB value.
CO09 Network Buildings/Support	The Network Buildings/Support (CO09) Asset Class is the value of aggregate network buildings and support assets – less the share allocated to CA09. This asset is required for the provision of the fixed line services and other services – including use by third parties. CO09 comprised [redacted] of the initial RAB value.
CO10 Indirect Capital Assets	The Indirect Capital Assets (CO10) Assets Class contains equipment related to motor vehicles and mechanical aids, but is predominantly IT – both software and hardware. CO10 is required for the provision of the fixed line services and other services. CO10 comprised [redacted] of the initial RAB value.
CO11 LSS Equipment	The LSS Equipment (CO11) Asset Class is a service-specific asset class that contains all costs considered relevant to LSS (and no costs relevant to other services). It did not contribute to the initial RAB value (i.e. there are no assets attributed to the class, with all cost being operating expenditure).
CO12 Data Equipment	The Data Equipment (CO12) Asset Class contains equipment necessary to provide fixed line broadband services (specifically DSL broadband services), including the equipment and software required to route and aggregate DSL traffic. This equipment is used for the provision of the fixed line broadband services – specifically retail and wholesale ADSL and Other DSL services. CO12 comprised [redacted] of the initial RAB value.

A.2 Definition of services

The following service descriptions are based primarily on the descriptions in Appendix E of the ACCC's March 2015 draft decision. That document also refers to the declarations that provide the legal basis for these service descriptions.

Unconditioned local loop service (ULLS)

The ULLS is the use of unconditioned communications wire between the boundary of the telecoms network at the subscriber's NTU and a point on a telecoms network that is a potential point of interconnection located at, or associated with, a customer access module and located on the end-user side of the customer access module.

In some sections of the CAF calculations the ULLS is split into the following bands:

- band 1 – CBD
- band 2 – Metropolitan
- band 3 – Regional
- band 4 – Rural.

The FLSM then aggregates bands 1–3 together for further calculations.

Wholesale line rental (WLR)

The WLR service is the wholesale equivalent of PSTN retail access. It is a line rental telephone service which allows a subscriber to connect to a carrier or carriage service provider's public switched telephone network, and provides the end user with:

- the ability to make and receive any 3.1kHz bandwidth calls (subject to any conditions that might apply to particular types of call), including, but not limited to, local calls, national and international long-distance calls; and

- a telephone number; however, the WLR service does not include services where the connectivity between the end user and the carrier or carriage service provider's network is provided in whole or in part by means of a Layer 2 bitstream service (that is supplied by an NBN corporation).

PSTN FOAS/FTAS

FOAS (fixed originating access service) is an access service for the carriage of telephone calls (i.e. voice, data over the voice band) to a PoI from end customers assigned numbers from the geographic number ranges of the Australian Numbering Plan and directly connected to the access provider's network.

FTAS (fixed terminating access service) is the reverse of the FOAS service, delivering telephone calls from the PoI to an end subscriber.

Local carriage service (LCS)

The local carriage service (LCS) is a service for the carriage of telephone calls from customer equipment at an end-user's premises to separately located customer equipment of a subscriber in the same standard zone where both subscribers' connectivity is provided by means of PSTN and not via an NBN corporation.

Line sharing service (LSS)

The line sharing service (LSS) is the use of the non-voiceband frequency spectrum of unconditioned communications wire (over which wire an underlying voiceband PSTN service is operating) between the subscriber's premises and a potential PoI located at, or associated with, the subscriber side of a customer access module.

Wholesale ADSL

The wholesale asymmetric digital subscriber line (ADSL) service is an Internet-grade, best-efforts point-to-point service for the carriage of communications in digital form between a point of interconnection and a subscriber network termination unit.

It is supplied using ADSL technology over a metallic pair that runs from the subscriber to the nearest upstream exchange or remote integrated multiplexer or customer multiplexer. It uses a static Layer 2 tunnelling protocol (L2TP) over a transport layer to aggregate communications to the PoI.

This service is technically the same service as retail ADSL. In contrast, Other DSL is a different set of services, primarily including business broadband services (taken without a corresponding PSTN line according to its treatment in this model).

Telstra equipment building access (TEBA) service

The TEBA service is not defined in the draft decision as it is not a regulated service. However, detailed information is available from Telstra.[108] The service provides colocation to access seekers in multiples of rack units. The service includes access to power equipment, cable guides, interconnection cabling as well as security.

108 See http://www.telstrawholesale.com.au/products/facilities/teba/index.htm.

Annex B Cost allocation factor fixed principles

In its July 2011 FAD Decision final report,[109] the ACCC set out fixed principles that it applied in its 2011 FAD.

Those relevant to cost allocation are reproduced below:

Figure B.1: Cost allocation factor fixed principles [Source: ACCC, 2011]

Cost allocation factors

In relation to the cost allocation factors used to allocate the revenue requirement to particular declared fixed line services, the fixed principles provisions specify that:

- The allocation of the costs of operating the PSTN should reflect the relative usage of the network by various services.
- Direct costs should be attributed to the service.
- The cost allocation factors for shared costs should reflect causal relationships between supplying services and incurring costs.
- No cost should be allocated more than once to any service.
- The determination of cost allocation factors should reflect the principles above except where reliable information is not available to support the application of the principles.

109 See http://www.accc.gov.au/system/files/FADs%20for%20Fixed%20Line%20Services%20-%20Final%20Report%20-%20public%20version.pdf.

Annex C Equipment usage per call geography table

The *routeing factor model* relies on a combination of call dispersion data and engineering logic to build up the routeing factors used in the CAF. The overall process is explained in Appendix B of the *CAF user guide*. As part of our review we have verified the logic of the *equipment usage per call geography table*. This is a key input to the calculation of routeing factors.

We examined the equipment usage per call geography table in conjunction with the definition of call types (summarised in Section 3.1.3). We were able to produce the following schematics demonstrating the routeing logic that the table implied.

Figure C.1: Local LAS call (and OTA in red dash) [Source: Analysys Mason, 2015]

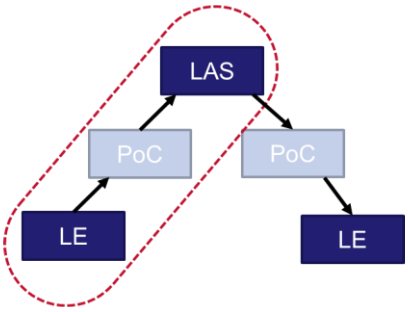


Figure C.2: Local zone call [Source: Analysys Mason, 2015]

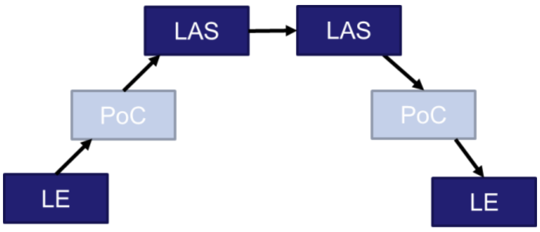


Figure C.3: Other zone call (F2M and International NSW/WA in red dash) [Source: Analysys Mason, 2015]

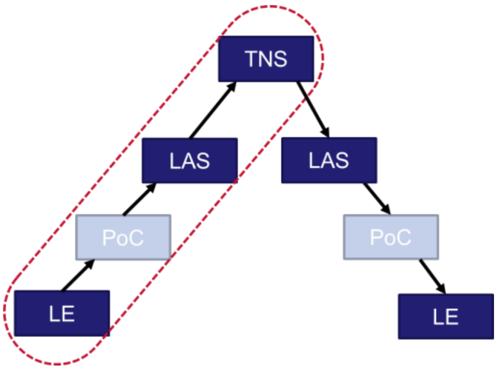
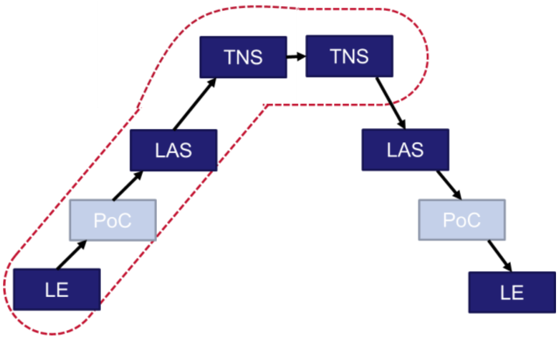


Figure C.4: Interstate call (F2M and International Other in red dash) [Source: Analysys Mason, 2015]



For example a local call passes through the local exchange (LE) once, through the Point of Confluence (PoC, only found in non-metro areas) and through the local access switch (LAS). It uses each of these nodes and the links between them once. The routeing table reflects this usage. More-complex services may use each type of node or link multiple times, as the diagrams below show.

We verified that the logic of the table was correct, with the exception of the factors for fixed-to-mobile (F2M) call types, where we identified an error. In this case the data contained within the columns for 'F2M Non-metro' and 'F2M Metro' should be reversed.

[**Telstra CiC]**

Figure C.5: Error in F2M usage per call geography table [Source: Telstra Routeing factor model, 2015]

We also noted that:

- PoCs are omitted where an originating or terminating leg is in a Metro area – PoCs are only a feature of non-metro areas, according to the logic used in the model. We understand that this is representative of the real network topology and are not aware of a reason for this classification of Metro/non-Metro to have changed since the call dispersion data was gathered (**[Telstra CiC]**).
- The reason for the difference between International NSW/WA and International Other calls is that all international calls must be routed via Perth or Sydney. Therefore international calls from Western Australia or Sydney, respectively, are able to transit to international connections by passing through one TNS only (whereas international calls from other states must pass via the originating state TNS and then via the TNS in Perth or Sydney).

Our assessment is that the usage of transmission links and switches for each of the services is logical. Our only recommendation is that the error identified with respect to the F2M Metro and Non-Metro usage inputs is corrected by reversing the values in the two columns of this table.

Annex D Composition of service costs by asset class

A simple analysis of the FLSM and CAF, as proposed by Telstra, is helpful in indicating the relative importance of each asset class to each service.

Using Telstra's calculated allocation factors for 2013/14 (Figure D.1) and total revenue requirements (including tax) by asset class for the period of the model (Figure D.2) gives an indication of the impact that each asset class has on the service costing.

Figure D.1: Telstra's proposed 2013/14 cost allocation factors [Source: Telstra's CAF,[110] 2015]

[Telstra CiC]

Asset class	2013/14 revenue requirement (AUD million)
Ducts and pipes	**[Telstra CiC]**
Copper cables	**[Telstra CiC]**
Other cables	**[Telstra CiC]**
Pair gain systems	**[Telstra CiC]**
CAN radio bearer equipment	**[Telstra CiC]**
Other CAN assets	**[Telstra CiC]**
Other communications plant & equipment (access)	**[Telstra CiC]**
Network land (access)	**[Telstra CiC]**
Network buildings/support (access)	**[Telstra CiC]**
Indirect capital assets (access)	**[Telstra CiC]**
Switching equipment – local	**[Telstra CiC]**

Figure D.2: 2013/14 revenue requirements by asset class [Source: FLSM,[111] 2015]

110 *Allocations summary* sheet; B11:O47.

111 *6.Revenue Requirement* sheet; T286:T330.

Asset class	2013/14 revenue requirement (AUD million)
Switching equipment – trunk	**[Telstra CiC]**
Switching equipment – other	**[Telstra CiC]**
Interexchange cables	**[Telstra CiC]**
Transmission equipment	**[Telstra CiC]**
Core radio bearer equipment	**[Telstra CiC]**
Other communications plant & equipment (core)	**[Telstra CiC]**
Network land (core)	**[Telstra CiC]**
Network buildings/support (core)	**[Telstra CiC]**
Indirect capital assets (core)	**[Telstra CiC]**
LSS equipment	**[Telstra CiC]**
Data equipment	**[Telstra CiC]**

Figure D.2: 2013/14 revenue requirements by asset class [Source: FLSM, 2015]

Figure D.3 shows the results for 2013/14 and Figure D.4 the results of an equivalent analysis for 2018/19 (the final year of the FLSM). The composition of each asset class varies over time as the revenue requirements for asset classes change due to varying capex and opex forecasts.

Figure D.3: Composition of service costs by asset class 2013/14 [Source: Analysys Mason based on Telstra's proposed CAF, 2015]

	ULLS bands 1–3	ULLS band 4	WLR	PSTN FOAS/ FTAS	LCS	LSS	WADSL
Ducts and pipes	**[Telstra CiC]**						
Copper cables							
Other cables							
Pair gain systems							
CAN Radio Bearer Equipment							
Other CAN assets							
Other Communications Plant & Equipment (access)							
Network Land (access)							
Network Buildings/Support (access)							
Indirect capital assets (access)							

	ULLS bands 1–3	ULLS band 4	WLR	PSTN FOAS/ FTAS	LCS	LSS	WADSL
Switching equipment – local							
Switching equipment – trunk							
Switching equipment – other							
Interexchange Cables							
Transmission equipment							
Core Radio Bearer Equipment							
Other Communications Plant & Equipment (core)							
Network Land (core)							
Network Buildings/Support (core)							
Indirect capital assets (core)							
LSS equipment							
Data equipment							

Figure D.4: Composition of service costs by asset class 2018/19 [Source: Analysys Mason based on Telstra's proposed CAF, 2015]

	ULLS bands 1–3	ULLS band 4	WLR	PSTN FOAS/ FTAS	LCS	LSS	WADSL
Ducts and pipes	**[Telstra CiC]**						
Copper cables							
Other cables							
Pair gain systems							
CAN Radio Bearer Equipment							
Other CAN assets							
Other							

	ULLS bands 1–3	ULLS band 4	WLR	PSTN FOAS/ FTAS	LCS	LSS	WADSL
Communications Plant & Equipment (access)							
Network Land (access)							
Network Buildings/Support (access)							
Indirect capital assets (access)							
Switching equipment – local							
Switching equipment – trunk							
Switching equipment – other							
Interexchange Cables							
Transmission equipment							
Core Radio Bearer Equipment							
Other Communications Plant & Equipment (core)							
Network Land (core)							
Network Buildings/Support (core)							
Indirect capital assets (core)							
LSS equipment							
Data equipment							